ONE BILLION PEOPLE ONE BILLION OPPORTUNITIES

BUILDING HUMAN CAPITAL IN AFRICA

Agnes Soucat and Mthuli Ncube, editors

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Acknowledgments

One Billion People, One Billion Opportunities reflects the efforts of a broad and diverse group of experts both inside and outside the African Development Bank. It reflects inputs from African Development Bank Group staff across a range of departments, including all the Regional Departments, Economics Department (EC ON), Agriculture Department (OSAN), Research Department (EDRE), Regional Integration Department (ONRI), Private Sector Department (OPSM), Policy Department (ORPC), Water Supply and Sanitation Department (OWAS), Strategy Department (STRG), Results and Quality Assurance (ORQR), Fragile States Unit (OSFU), Environment and Climate Change departments (ONEC and CCCC), and Governance Department (OSGE).

Adel Ben Youssef led the core team, under the supervision of Agnes Soucat and Mthuli Ncube. The previous conference copy was arranged and supervised by Adel Ben Youssef and Nawsheen Elaheebocus.

The authors wish to thank Oliver Bakewell (Oxford University), Caglar Ozden (World Bank), Ninna Nyberg-Sørensen (Danish Institute for International Studies), Cristina Hoyos (Fragile States Department, AfDB), Carla Silva (Consultant, AfDB), Yogesh Vyas (ONEC, AfDB), Franck Sperling (ONEC, AfDB), Alexis Rwabizambuga (QRQR, AfDB), Balgi Oman-Elasha (ORQR, AfDB), Uzoamaka Nwamarah (CCCC, AfDB), Shogi Hikaru (OWAS, AfDB), Lucien Manga (WHO/AFRO), Ezzedine Larbi (Consultant, OSHD, AfDB), John Afele (Consultant, AfDB), Rania Dourai (Consultant, AfDB), Rüdiger Krech (Director, Department of Ethics and Social Determinants of Health, WHO, Switzerland), Jacques Mader (Regional Health Adviser, Swiss Agency for Development and Cooperation, Federal Department of Foreign Affairs, Tanzania), Mwihaki Kimura Muraguri (Associate Director, The Rockefeller Foundation, Kenya), Jean-Olivier Schmidt (Project Coordinator, GIZ, Germany), Jack Castle (Health Financing Expert, Clinton Health Access Initiative, Zambia), El Bashier Sallam (Manager, Islamic Development Bank, Saudi Arabia), Robert Hecht (Managing Director, Results for Development Institute, United States), Juliet Nabyonga (Health Economist, WHO, Uganda), Danielle Kuczynski (Global Program Manager, Clinton Health Access Initiative, United States), Meredith Kimball (Results for Development Institute, United States), Kennedy K. Mbekeani (Regional Economist, Southern Africa Resource Center, AfDB, South Africa), Carlos Mollinedo (Chief Strategist, Strategy Department, AfDB), Kalayu Gebre-Selassie (Principal Governance Expert, OSGE, AfDB), Ibrahim Sanogo (Principal Health Analyst, AfDB, Côte d'Ivoire), Emily Carter (Intern, OSHD, AfDB), Hamida Ben Youssef (Professional coach, Consultant), Nessrine Omrani (Post-Doctoral Studies, University Paris Sud), Ludovic Ragni (Professor, University of Nice Sophia-Antipolis), Ammar Guesmi (Professor, University of Nice Sophia-Antipolis), Cecile Ambert (Principal Stategy Officer, AfDB), Aissatou Ba (Principal Cooperation Officer, AfDB), May Babiker (Principal Socioeconomist, AfDB), Frank Boahene (OSHD, AfDB), Mouna Diawara (Country Economist, ORCE), Henrik Franklin (Natural Resources Management Specialist), Dougou Keita (Manager, Agriculture and Agro-industry Division, AfDB), Nana Kgosidintsi (Health Analyst, OSHD, AfDB), Benedict Kunene (OSHD, AfDB), Mateus Magala (Resident Representative of AfDB Zimbabwe), Wilberforce Mariki (Principal Country Economist, AfDB), Corinne Massardier (Consultant Migration Development, AfDB), Alain Mingat (Professor of Economics, IREDU), Joseph Muvawala (OSHD, AfDB), Maimuna Nalubega (Consultant, AfDB), Judicail Etienne Porgo (Lead Education Specialist, OSHD, AfDB), Boukary Savadogo (Manager of Education Division OSHD, AfDB), Abebe Shimeles (Manager of Development Research Division, AfDB), Ravi Soopramanien (Procurement Officer/Strategist, AfDB), Julian Schweitzer (Principal, Results for Development Institute), Philippe Trape (Senior Country Economist, OREB, AfDB), Yemesrach Workie (Senior Policy Officer, AfDB), Mohamed Youssouf (Manager of Poverty Reduction and Social Protection Division, OSHD, AfDB), and Issiaka Zoungrana (Capacity Building Specialist, AfDB).

The book was prepared with the context of the Human Capital Strategy (2014–2018) of the African Development Bank. The Strategy was prepared under the oversight of Senior Management, particularly Vice President Aly Abou-Sabaa and a steering committee comprising Akissa Bahri, Yero Baldeh, Abdirahman Beileh, Ebrima Faal, Sering Jallow, Kapil Kapoor, Steve Kayizzi-Mugerwa, Jacob Kolster, Janvier Litse, Simon Mizrahi, Ginette Muteta-Nzau, Gabriel Negatu, Serge M. N'Guessan, Timothy Turner and Desire Vencatachellum.

Special thanks to Bruce Ross-Larson, Jack Harlow, Chris Trott, Elaine Wilson and the entire team at Communications Development Incorporated in Washington, DC, for their helpful and professional support in editing and laying out the report.

Produced by Communications Development Incorporated, Washington, D.C.
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CHAPTER 1

One billion opportunities: The changing landscape of human capital in Africa

Agnes Soucat and Mthuli Ncube

Africa is experiencing profound shifts with repercussions for building human capital. Demographically, Africa's young and rapidly growing population is the world's most dynamic. Economically, African countries have been growing 5% on average over the past decade, thanks to a windfall of sustained high commodity prices and discovery of new natural resources. Africa continues to weather the global crises. The private sector has a much larger presence than ever before. Technologically, Africa has been benefiting from a shift of the technological curve, leapfrogging its access to new information and communication technologies (ICTs). By 2025 mobile phone coverage will be nearly universal, implying scope for changing the financial services reaching the poor, even in fragile states.[1] This has expanded opportunities and enhanced connectivity to the rest of the world. Politically, Africa's democracies are gaining ground, and governance standards are improving thanks to greater demand for voice and accountability, which has fostered democratic reforms and reduced conflicts and civil wars. Environmentally, Africa needs to ensure that it remains a net biodiversity creditor and addresses the consequences of environmental changes that hurt the poor the most (pollution, waste and environmental degradation arising from increased urbanization, food security and displaced populations).

Africa's metamorphosis

With 1 billion people in Africa today and 2.3 billion people—mostly youths—projected for 2050, the continent's greatest asset, or risk, in the coming decade will be its capacity to harness this rapidly expanding reservoir of human capital (figure 1.1).[2] After Asia, Africa is the world's largest and most populous continent, with about 15% of the world's people. Africa is also the world's youngest region. In mid-2011 the top 10 countries with the youngest populations were African.[3] By 2040 Africa will have the largest workforce, surpassing China and India (figure 1.2). Within the continent, East and West Africa will be the youngest regions. A large "youth bulge" can be an opportunity for change, progress and social dynamism—or a risk.[4] If the talents of this rising youth cohort are harnessed and channeled to the productive sectors of the economy, the opportunities for economic and social development are endless.

Children in Africa born in the next 15 years will be the movers and shakers of 22nd century Africa. The magnitude of the population growth and its impact on human development is staggering. Over the next 15 years roughly 600 million children born in Africa will then be the parents, teachers or nurses leading Africa as it nears the 22nd century. To benefit from the demographic dividend and build a highly skilled labor force, Africa's graduating cohort of high school and technical vocational education and training (TVET) students needs to increase dramatically. Roughly 5.3 million students (only 23% of children enrolled in primary education) graduated from high school in Africa in 2010. According to the United Nations Population Division, 34.4 million children will enter primary school in 2013. Ensuring that 75% of them graduate from high school (25.8 million, half of them girls) requires a fivefold increase from today.

Africa's economic growth amid uncertainty in the global economy has been remarkable. Out of the 10 fastest growing economies globally,[5] 7 are expected to be in Africa between 2011 and 2015 (figure 1.3).

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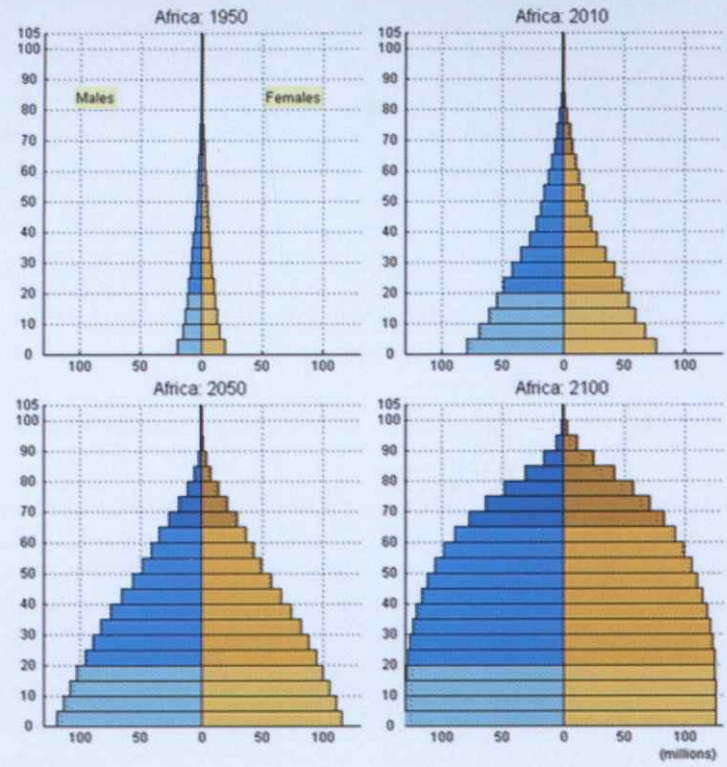
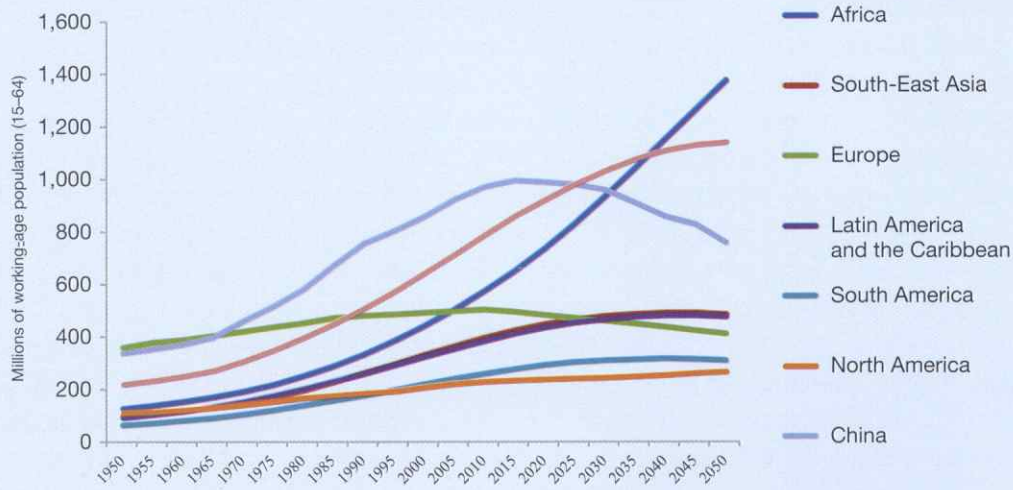
Africa's economic growth amid uncertainty in the global economy has been remarkable. Out of the 10 fastest growing economies globally,[5] 7 are expected to be in Africa between 2011 and 2015 (figure 1.3).

Figure 1.1 **A strikingly large youth bulge in Africa**



Source: UN DESA 2011.

Figure 1.2 **Africa will have the world's largest workforce by 2050**

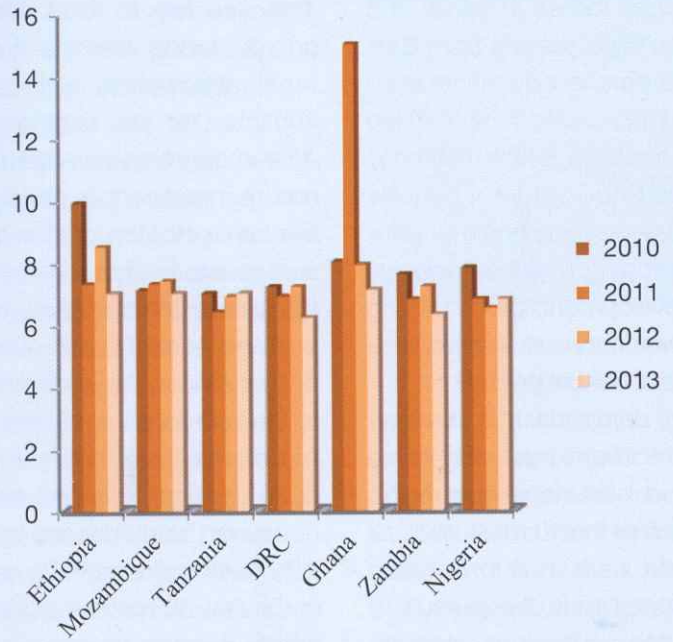


Source: United Nations Department of Economic and Social Welfare.

The region's GDP has grown solidly averaging at almost 5% a year since 2000, spurred by domestic demand and still high commodity prices. Of 53 countries, 24 more than doubled their per capita income from 1990 to 2010, and the past decade of robust growth reduced poverty. Economic growth reached an average of 4.8% in 2013 from 4.2% in 2012—and is expected to accelerate to 5.2 % in 2014, boosted by increased investment in natural resources and infrastructure, and strong household spending (figure 1.4).

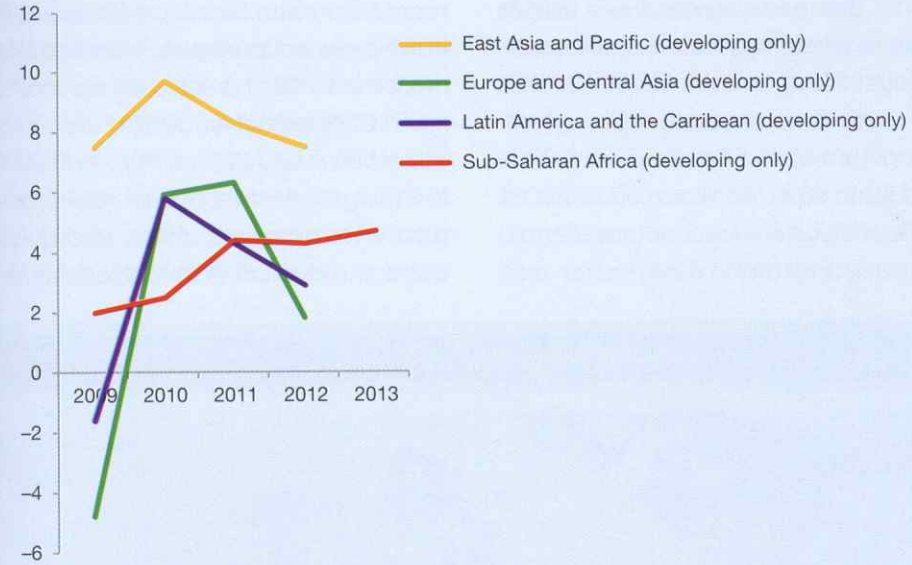
Yet, the elasticity of poverty to growth in Africa has been much lower than in other

Figure 1.3 **Seven fast growing economies of the world are in Africa**



Source: Authors' calculations based on AfDB and World Bank data.

Figure 1.4 **Growth still remains robust in much of Africa**



Source: AfDB, National Statistics; World Bank.

regions, and the poverty gap remains high. Poverty declined 0.5% a year between 1990 and 2008 in Africa (excluding North Africa), compared with 2.3% in East Asia and 1.0% in South Asia. The burden of poverty is borne disproportionately by women and rural dwellers. The average poverty rate in Sub-Saharan countries has been reducing at a sluggish rate of about 1 percentage point a year from 2000 to 2012.[6] While headcount poverty fell by 8% between 1990 and 2010 in Sub-Saharan Africa, it fell by 43.7% and 17.0% in South East Asia and Latin America and the Caribbean respectively. Factors accounting for the notable performance of these regions were attributed to tackling the foundations of

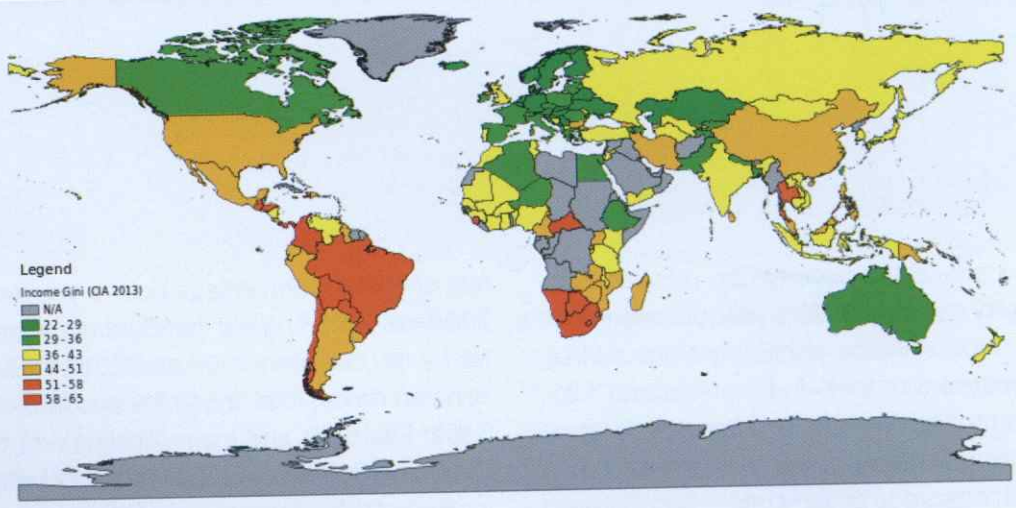
rural poverty such as lack of assets, limited economic opportunities, poor education, as well as disadvantages rooted in social and political inequalities. High payoffs from East Asia's heavy investment in education at all levels to provide human capital to spearhead its industrial transformation bears testimony to the potential short- to long-term benefits from investing in human capital building. Likewise, in other developing regions, inclusive innovation, rural development, green growth and good health systems have also contributed to rapid exits out of rural poverty.

High inequality dampens the poverty-reducing effects of economic growth.[7] Africa is the world's second most inequitable region (figure 1.5). In 2010, 6 of the 10 most unequal countries worldwide were in Sub-Saharan Africa. Ignoring inequality in the pursuit of economic growth can be perilous. Inequality muzzles the efficient use of human and physical resources, lowers the quality of institutions and policies, erodes social cohesion, increases social conflict and derails the growth process, especially in fragile states. The most striking increase in inequality is in South Africa and the Central African Republic—with their respective Gini coefficients rising from 58 to 67 in six years (2000–2006) and 43 to 56 in five years (2003–2008).

Africa's ecological infrastructure—terrestrial, freshwater and marine ecosystems—and biodiversity are essential for inclusive human development and improved quality of life.[8] They are key to food security, water and energy supply and the livelihoods of those most affected by adverse environmental impacts. Yet, the ecological footprint of all African countries has dramatically increased, and the continent is rapidly approaching its bio-capacity. Droughts in the Horn of Africa and severe food crises in the Sahel illustrate the catastrophic impacts of climate change on food security and nutrition. Today one in four Africans is undernourished, and one in three children is stunted.[9] Grain yields in Africa are estimated to shrink substantially by 2050, leaving 10 million more children malnourished and Africans on average eating 21% fewer calories.[10] Those undernourished in the first 36 months of life can suffer irreparable damage to their physical and mental development, debilitating them throughout life with lower cognitive learning, educational performance and status in life.

The progress toward the human development Millennium Development Goals (MDGs) in Africa is encouraging, with better performance yet still to be achieved in some areas.[11] Africa boosted net enrollment rates in primary education (MDG 2) from 58% in 1999 to 76% in 2009, the fastest annual rate of improvement ever observed. Africa also doubled its average reduction in child mortality (MDG 4)

Figure 1.5 **Gini coefficients worldwide and within Africa**



Source: Authors.

from 1.2% a year in 1990–2000 to 2.4% in 2000–2010 (figure 1.6).[12] Though Sub-Saharan Africa still records relatively high rates of under-five mortality (box 1.1), the pace of decline has accelerated over time—with the average annual rate of reduction increasing from 0.8% in 1990–1995 to 4.1% in 2005–2012. Notably, high incidence child mortality rate countries including Malawi, Liberia, Tanzania and Ethiopia reduced their rates by two-thirds between 1990 and 2012.

The incidence of HIV is also decreasing in many Sub-Saharan countries. Economic growth has been a major driver of the decline (as in Ethiopia, Kenya, Mali, Nigeria and Tanzania), yet Senegal, despite rather low growth, is one of the best performers. Making the difference were not only sound public policies but also girls' education, new technologies (such as insecticide-treated bed nets) and investments in health programs that provide value for money and reach the rural poor. In Kenya about half the decline in child mortality is thanks to the increased use of insecticide-treated bed nets in households.[13] In Rwanda child mortality fell by more than a third between 2000 and 2012, while assisted delivery at childbirth rose from 39% in 2005 to 70% in 2010. Even so, children in Sub-Saharan Africa are over 16 times more likely to die before the age of five than children in developed regions.[14] Family planning quadrupled—a world first.

Box 1.1 Under-five deaths in Sub-Saharan Africa

By 2050, 37% of the world's children under age five will live in Sub-Saharan Africa; while close to 40% of all live births will take place in that region. Therefore the number of under-five deaths may stagnate or even increase without more progress in the region.

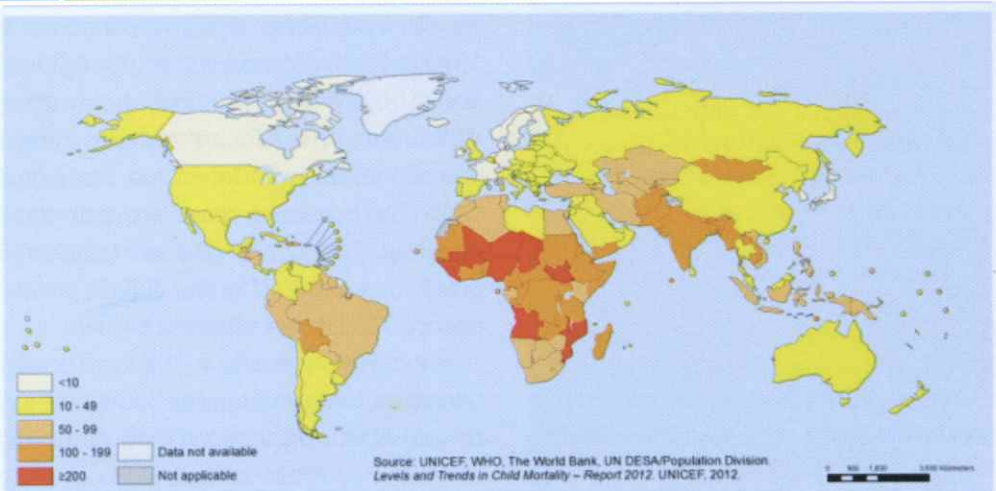
Source: WHO Global Health Observatory.

Yet, there are daunting disparities in progress on all indicators, with improvements skewed toward higher income groups and urban populations.[15] Inequalities in access to such public services as education, health, water and sanitation have led to the further marginalization of excluded groups. In comparison to other regions, slow progress in Sub-Saharan Africa is further widening inequality in the MDGs.

People are the key to unlocking Africa's economic potential

Human capital development is at the heart of the inclusive and green growth agenda—and the fight against poverty and social exclusion in Africa.[16] The human capital agenda focuses on developing skills to boost productivity and competitiveness, tapping on technological innovations and creating jobs; enhancing

Figure 1.6 Nearly half the world's under-five deaths were concentrated in Sub-Saharan Africa in 2012



Source: UNICEF and others 2012.

citizens' voice to improve the quality of public services and the efficiency of public spending; and providing safety nets to protect the poorest against economic and social shocks (box 1.2).[17] It focuses on creating jobs and enhancing human capital to boost productivity and competitiveness, giving voice to all citizens to improve the quality of public services and the efficiency of public spending, and providing safety nets to protect against economic and social shocks.

An integrated human capital development approach is required, because education, science, technology, innovation, nutrition, health and safety nets are inextricably linked with economic growth and poverty reduction. The low growth elasticity in Africa is underpinned by the absence of a diversified economy, poor access to credit and insurance, low human and physical capital and weak systems of social protection. Many obstacles stop girls from completing schooling: family finances, security, nutrition, access to toilet facilities and so on.[18] Educated women have fewer, healthier children at older ages, and their children are more successful in school and life. So educating girls and integrating them into the labor force is a highly cost-effective way to break the intergenerational cycle of poverty (see chapter 25).

Demand is mounting for higher quality and more inclusive growth. The Arab Spring and growing inequalities in Africa have brought forward the relevance of the inclusive growth agenda.[19] This momentum should hinge on knowledge, innovation, constructive creativity, partnerships and shared opportunities, encompassing basic life chances (such as for health, food security, education and sanitation), economic empowerment, participation in society and choices for all. Of equal importance are accountability, satisfaction, resilience and freedom. Africa must ensure that it has the human capital needed to accelerate economic and social development and ensure inclusive and green growth.

Box 1.2 Defining human capital

Human capital is in economic terminology, an input (a necessary condition) to achieving inclusive and green growth. Human development is a development outcome and a measure of both inclusive growth and human rights.

Human capital formation is essential to the contribution to inclusive and green growth. This book uses the World Economic Forum definition of human capital: "the acquisition and deployment of skills, talent, knowledge and experiences of individuals and/populations and their value to organizations, economies and society".

The four key aspects of human capital are education; workforce and employment; wellness including health services; and enabling environment including safety nets; together resulting in returns on human capital and human development outcomes.

Source: World Economic Forum 2013.

Cashing in on the demographic dividend

Many African countries are now positioned to reap the demographic dividend that benefited East Asian economies (see chapter 2). Fertility and dependency ratios fell dramatically in those economies, and the size and proportion of the working-age population grew, triggering high rates of economic growth. Cashing in on the demographic dividend and turning it into growth and jobs will depend not only on Africa's capability to deliver such critical services as education and family planning but also on its ability to improve its policy and institutional environment. In East and South-East Asia the demographic dividend contributed 1.9 percentage points to the 4.3% growth in GDP per effective consumer from 1970 to 2000. Compare that with 0.08 points and 0.06% growth in Sub-Saharan Africa.[20] When and how African countries invest in human capital will determine the extent to which the continent seizes the demographic dividend. The challenges will be especially great for countries in the Sahel, which are exposed to climate change.

Most young people in Africa are underemployed in low-productivity household enterprises. About 90% of the jobs in the region are in the informal economy, where the productivity of young workers is hampered by the lack of technical and employable skills,

information about jobs and markets for entrepreneurial and financial abilities.[21] Increasing entrepreneurial development and opportunities for Africa's youth remains crucial to augment gains in economic growth, productivity, innovation and employment. African youths are not only unemployed and underemployed; they are also the poorest segment of the population. Some 60% of those unemployed in Sub-Saharan Africa are youths ages 15–24, and on average 72% of the youth population lives on less than USD2 a day and 46% less than USD1 a day.[22]

Africa is also urbanizing rapidly (see chapter 3), opening opportunities to transform the continent's economies with a focus on industrialization that can benefit from clusters, growth poles and agglomeration externalities. By 2025 more than half the African population will be urban. During the next quarter century the urban population will be growing almost twice as fast as the general population, rising by more than half a billion from that in 1990. The rapid expansion in urban population is occurring without expansions in basic services and productive employment opportunities. Actions are needed to tackle the challenges in the deteriorating infrastructure, low service delivery capacity, overcrowding, environmental degradation and acute shortages of housing and productive jobs.

Productivity, competitiveness and building a knowledge economy

Africa needs to shift from knowledge consumers to knowledge producers. Even though there has been a notable increase of research networks on the continent, Africa is lagging in scientific research production as measured by the number of published articles in peer-reviewed journals. From 1997 to 2008 Africa's output of 27,000 papers was equivalent to that of the Netherlands. Africa has only 1 web domain for every 10,000 people, compared with a global average of 94. And its share of world science output (measured in the ISI-Thomson Web of Science) has declined (see chapter 13).[23]

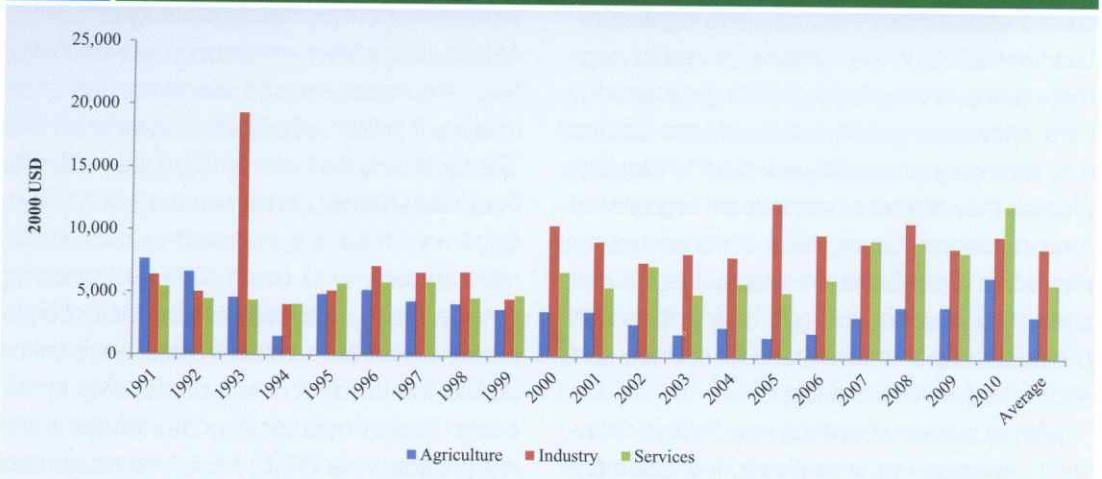
African countries have the lowest ratio of scientists and engineers in research and development. While Africa accounts for 13.4% of world population, it produces only 1.1% of world scientific knowledge.[24] Only 3 African universities are among the world's top 500. Africa has only 35 scientists and engineers per million inhabitants, compared with 168 for Brazil, 2,457 for Europe and 4,103 for the United States. Tertiary students from Sub-Saharan Africa are still among the world's most mobile, with nearly 200,000 studying outside Africa, due mainly to the lack of high-profile institutions in science and engineering and to the low proportion of students in scientific fields. Increasing postgraduate training (master's and PhD) and creating centers of excellence in science and technology can thus boost the innovative capacity of Africans to adapt to the changing needs of the global economy (see chapter 14).

Due to low investment in research and development, Africa ranks low in global competitiveness and productivity. While productivity in agriculture and services has increased in Africa, it remains lower than that in industry (figure 1.7). Africa has much to gain by diversifying exports and deepening regional trade, as its share in world trade remains low and concentrated in natural resources.[25] The poor education of workers is a major impediment to trade, production and competitiveness. Science, engineering technology and business are not the areas of higher education undertaken by most African students. The result is a skills mismatch. University graduates remain unemployed, while African countries continue to face shortages of skilled labor.

Youth unemployment, job creation and retaining skilled workers

Most African countries are struggling with the two-pronged challenge of creating jobs and retaining skilled workers, while having to import skilled workers for specific industries. Even in the face of entrenched unemployment and underemployment, African economies face labor and skills shortages. Employers in many countries note the inadequately educated workforce as problematic for doing business and skills shortages as the

Figure 1.7 **Over 2005–2010 industry had the highest value added per worker but a shrinking share, while agriculture had the lowest productivity but progressed**



Source: Authors' calculations based on World Bank (2012).

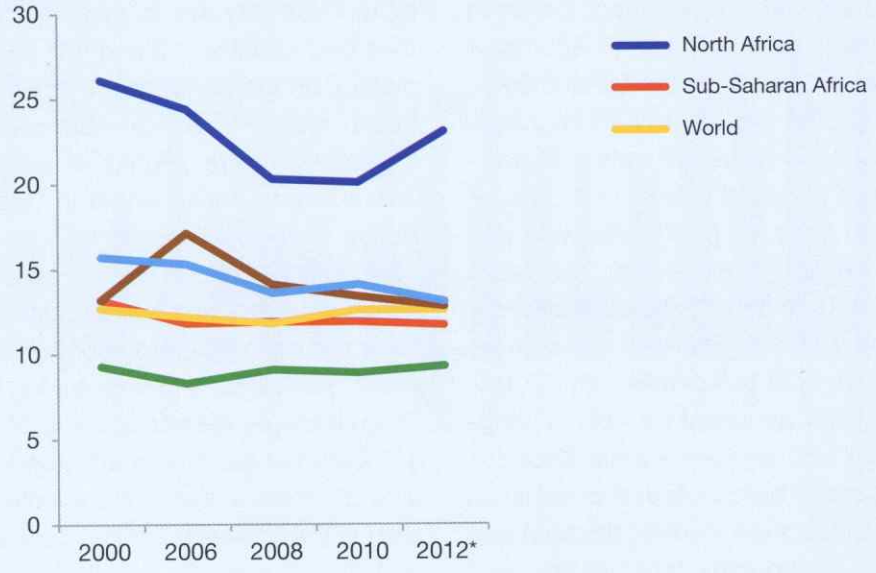
most pressing labor market issue for investors. The private sector is not able to quickly acquire, move and retain skills in Africa. Brain drain of high-skilled workers is particularly grave in certain sectors, especially education and health. Africans are among the world's most mobile people, and migration is part of most African families' household strategies. The absolute majority of Africans migrate within the continent, and much of this migration is irregular and unregulated (see chapter 20). Even so, slow regional integration is still a constraint on labor mobility, affecting competitiveness and productivity (see chapter 5). Migrants in developing countries are mainly young people ages 18–29—mostly searching for jobs. In 2010 people ages 15–34 accounted for 42.6% of international migrants in the least developed countries. Almost all African countries are immigration destinations, especially those with mining, oil and gas, and telecommunication services.

Africa has one of the world's highest unemployment rates after Europe. Unemployment in Africa is 12.0%, against 9.1% worldwide. Youths represent 60% of African unemployment (figure 1.8). The notable effects are in North Africa, where the unemployment rate is among the highest levels of all regions globally—youth unemployment increased from 20.8% in 2007 to 23.7% in 2012. Three-quarters of the increase in global unemployment in 2012 saw noticeable effects in Sub-Saharan Africa, with youth unemployment rate reaching 11.6%. Although below the world average of 12.6%, it masks significant variations across countries. Unemployment rates of those ages 15–24 years old reaches up to 52.9 % in South Africa (2013), 27.4% in Namibia (2012) and 24.9 % in Ethiopia (2006), compared with 9% in Côte d'Ivoire (2012) and 10% in Senegal (2011). Vulnerable employment in Sub-Saharan Africa, most of whom are the youth, still remains extremely high—77 per cent in 2012. In Liberia, Malawi and Mali more than two-thirds of young people cannot find a stable job.[26] In Sub Saharan Africa, when it comes to employment, the primary challenge is not only to address unemployment, but rather to increase productivity in the informal sector.

In Egypt, Mauritius, Morocco, South Africa and Tunisia young people are two to six times more likely to be unemployed than their adult counterparts. The potentially dynamic and buoyant informal sector has been unable to absorb the large number of job seekers. Youths not only face high unemployment and underemployment but are also disproportionately disadvantaged compared with adults. In North Africa, youths are four to five times less likely to get a job than an adult.

Gender inequality in access to jobs in the labor market is reflected by the employment

Figure 1.8 Youth unemployment is stark in North Africa

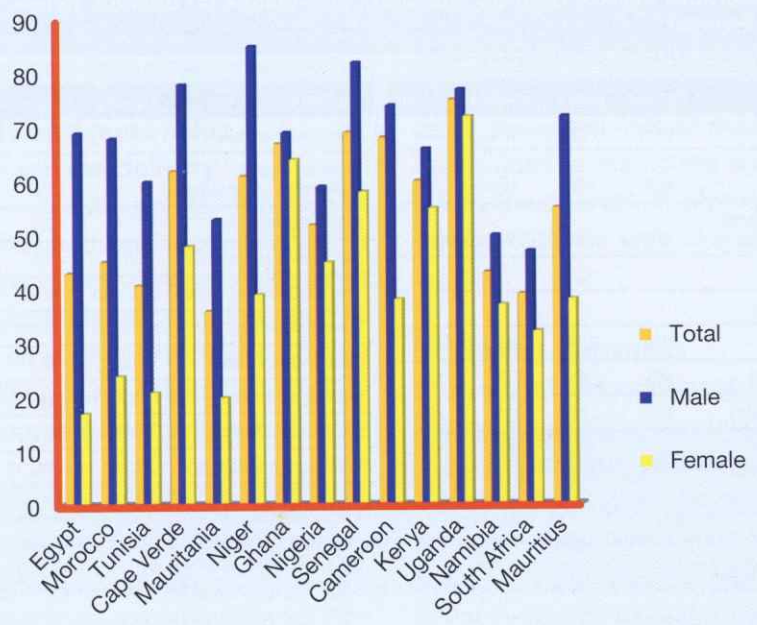


Source: ILO 2011.

to population ration (figure 1.9). More than half of the unemployed youth in Africa are women and gender gaps in employment opportunities are exceptionally high. In North Africa, women's labor force participation has only grown by 0.17 percentage points a year over the last three decades. Male youth unemployment rate in North Africa is more than three times that for male adults and the female youth rate is more than six times that for adult men, a prevailing situation for most countries on the continent. Nonwage work represents more than 80% of women's employment in Sub-Saharan Africa, but less than 20% in countries of Eastern Europe and Central Asia.

It is estimated that over the next decade and a half, 600 million new jobs will be needed globally to absorb the burgeoning

Figure 1.9 Employment to population ratio, 2011



Source: ILO 2011.

working-age populations that are expected mainly in Sub-Saharan Africa and Asia.

There is a large disconnect between graduate skills produced by the education sector and the needs of the labor market. TVET programs are usually more costly than primary and higher education. In addition, there is a lack of good TVET centers, and existing ones are poorly equipped and unable to provide young workers with adequate skills. The number of university graduates tripled in Sub-Saharan Africa from 1.6 million in 1999 to 4.9 million in 2009.[27] To support the continent's rapidly changing political and socioeconomic development, it needs to build skills in the traditional professions (teachers, nurses, doctors) and in science, technology, engineering and mathematics. Globally, the five most frequent job offers are in tech and green sectors.[28] Accordingly, skill profiles nonexistent 10 years ago, as well as future profiles still unknown, will be needed, such as "green consultants," "eco-friendly freelance writers," "Silverlight developers" and "smartphone developers." Most urgent is developing skills to improve the productivity of the informal sector, both in agriculture and nonagriculture, the main reservoir of jobs for the next decades.

Quality of services

While service access has increased, quality remains very low in most African countries (see chapters 12 and 16). Since 2010, metrics on the performance of schools and health clinics in Africa—"Service Delivery Indicators"—were piloted in Senegal and Tanzania and implemented in Uganda and Kenya; they elucidated the reasons that African countries perform badly in education and health (table 1.1). In Uganda absenteeism is 52% among medical personnel in primary health care clinics and 56% among teachers. Drug shortages are also an issue (see chapter 15). Selected essential medicines were consistently more available in the private sector than in public health facilities between 2001 and 2007 (figure 1.10). In Sub-Saharan Africa the availability was 59% in private facilities but 38% in public facilities; in North Africa it was 75% in private facilities but 39% in public facilities. Only 55% of grade 2 students in Mali achieved the average score in mathematics, and only 48% did so in reading.[29] The same problem exists in North Africa. Tunisia consistently ranked among the bottom 10 countries for 15-year-old student reading, mathematics and science skills.[30]

Africa needs about 4 million more teachers and 1–2 million more health workers.

Table 1.1 **Comparative Service Delivery Indicators at-a-glance for Uganda, Kenya, Tanzania and Senegal**

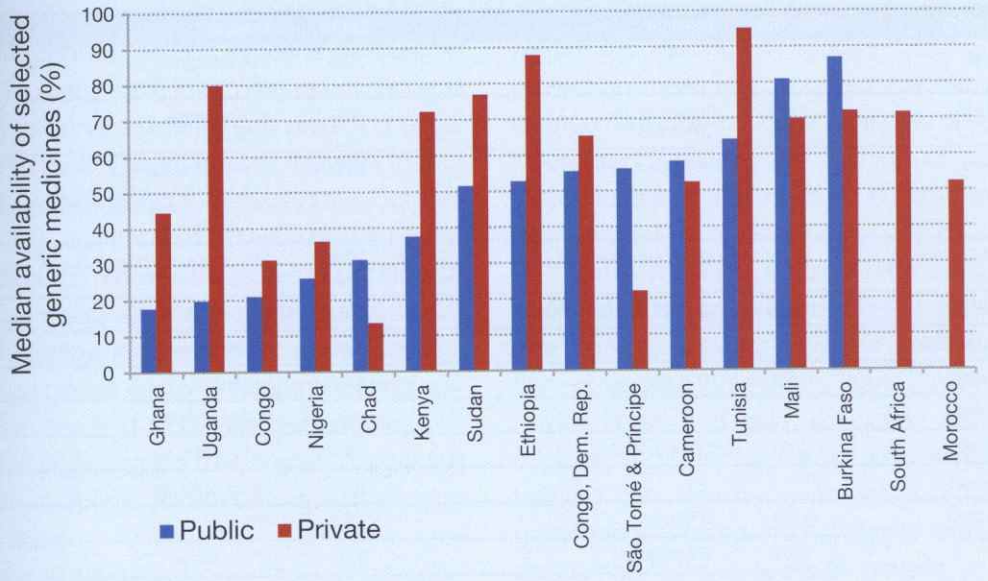
Health	Uganda	Kenya	Tanzania	Senegal
Diagnostic accuracy	56%	72%	57%	34%
Adherence to clinical guidelines	48%	44%	34%	22%
Management of maternal/ neonatal complications	19%	45%	Not available	
Caseload				
Absence from facility				
Drug availability	40%	67%	Not comparable	
Equipment availability	78%	76%	78%	53%
Infrastructure availability	48%	57%	19%	39%

Education	Uganda	Kenya	Tanzania	Senegal
Minimum knowledge	19%	39%	Not comparable	
Test score (English, mathematics and pedagogy)	45%	57%	Not comparable	
School absence rate	27%	15%	23%	18%
Classroom absence rate	56%	42%	53%	29%
Time spent teaching per day	2h 55 min	2h 40 min	2h 04 min	3h 15min
Scheduled teaching time	7h 20 min	5h 40 min	5h 12 min	4h 36 min
Student–teacher ratio	50	32	74	34
Students per textbook	12.4	3.1	Not comparable	
Equipment availability	94%	95%	Not available	
Infrastructure availability	60%	59%	Not comparable	

Note: In the pilot for Senegal and Tanzania, the presence of a weighting scale, a thermometer, and a stethoscope used to compute the equipment availability indicator. Kenya and Uganda added a blood pressure machine on top of the three. Note also that in the pilot the availability was self-reported whereas in the full-fledged Service Delivery Indicators availability and functioning status were physically assessed and verified. The indicator for the pilot is therefore biased upwards.

Source: World Bank, AfDB and AERC 2013.

Figure 1.10 **Private provision of drugs is high in many countries**



Source: World Bank 2011.

Addressing shortages of teachers and health workers at all levels is a key development priority for many African countries. Insufficient secondary education, particularly in science and technology, constrains efforts to increase access to higher education and TVET—as well as to deliver the teachers needed for quality primary education. Health workers—including nurses, midwives, medical technicians, biomedical engineers and experts in e- and m-health—are also in short supply, a result of poor incentives and migration.

More investments, more accountability and more value for money in service delivery

Public money is not always effective, due to poor governance and weak accountability in service delivery. In Sub-Saharan Africa large amounts of funding have been dedicated to infrastructure for schooling (school buildings) and much less to quality inputs (early childhood education, teacher training) and more cost-effective models of service delivery. The main sources of inefficiency include inadequate and inefficient resource allocation and financing options; inadequate domestic production of and access to commodities; inappropriate procurement and management of equipment and commodities; inappropriate staff mix; lack of performance incentives; and weak participatory and accountability mechanisms. Too often public funds do not reach the frontline as suggested by Public Expenditure Tracking Surveys (PETS) undertaken in more than 30% of countries in Africa. PETS can indicate leakages of funds by tracing the path between central government allocation and receipt by service providers (table 1.2 and see chapter 28). In Chad 95% of funds allocated never reached health centers, and in Cameroon 60% of funds allocated never reached schools. And the wealthiest capture the benefits of publicly subsidized health services. In Guinea 48% of public spending on health goes to the richest quintile, less than 8% to the poorest. In Morocco the poorest quintile received only 15% of the education budget.

Widening disparities throughout the continent

Widening income inequality has been a major setback for reducing poverty. Inequality in the distribution of assets (such as land) and public services (such as education and health) hinders poverty reduction. And the gaps in education and health between the rich and the poor remain striking in most

Table 1.2 **Education and health PETS across Africa**

Country	Education	Leakage	Health	Leakage
Chad	—		2004	73% nonwage 99% local allocation
Ghana	2000	50% nonwage 20% salary	2000	80% nonwage 20% salary
Kenya	2004	36% of bursary funds	2004	38% health center level 25% user fees at facility level 37% community development funds at facility level
Madagascar	2003	9% of cash contributions	2006	15% petroleum and registers sent
Mali	2005	60–90% allocated textbooks		
Mozambique			2002	No firm estimates
Namibia	2003	No proof	2003	No proof
Nigeria			2002	No firm estimates
Rwanda	2000	No firm estimates	2000	No firm estimates
Senegal			2002	No firm estimates
Tanzania	1999	57% overall	1999	41%
	2001	18% nonwage	2001	18% nonwage
	2004	5%		
Uganda	1996	87% on average	1996	Not defined
	2002	18%		
Zambia	2002	10% fixed-rule grants 76% nonwage	2007	No firm estimates

Note: — denotes that no PETS was carried out. "No firm estimates" means that a PETS was carried out but there were no percentage estimates of the level of leakages.

Source: PETS/QSDS Data Portal (http://pets.prognoz.com).

African countries. Women from the poorest quintile of African families are three times less likely to receive professional assistance from a skilled attendant at birth than women from the richest. Young Africans constitute the majority of the poor. More than 70% of African youths live on less than USD2 a day. The incidence of poverty among youths in Burundi, Ethiopia, Nigeria, Uganda and Zambia is more than 80%.31 The highest rates of poverty among youths are among women and rural residents.[32] Poor children are more likely to be malnourished, less likely to use health care and less likely to complete five years of primary school. Children under age 5 from the poorest quintile are 2.1 times as likely to be underweight and 1.6 times less likely to be immunized against measles than their counterparts in the richest quintile. The number of underweight children in Africa rose from 24 million in 1990 to 30 million in 2010. Stunting causes poor brain development, so stunted children are more likely to learn poorly and do less well in school. Africa can learn from Latin America on policy measures to narrow the poverty gap. In 2010 Mexico and Brazil spent 2.2% and 4.2% of their GDPs on cash transfer programs. An estimated 110 million people benefited from these programs in Latin America, with a considerable impact (both direct and indirect) on reducing poverty.

Gender disparities also remain severe, particularly for poor women. The poorest—especially girls—are left behind and are less likely to be educated, even less in countries recovering from conflict and fragility. Only 20% of parliamentarians in Africa are women. Almost 75% of school-age girls are expected never to enroll, compared with 66% of boys. In Egypt, for every euro a man earns, a woman earns 78 cents for equal work. Women in Africa represent 52% of the population, but they earn just 10% of the continent's income. More than half of African women give birth without skilled health personnel.

Human capital in Africa: The way forward

The challenge in Africa today is to harness the potential of 1 billion Africans by building skills for better jobs, improving the quality and equity of service delivery and providing equal opportunities. This vision is in line with that of the New Partnership for Africa's Development (NEPAD)[33] and the African Union (AU).[34] Realizing this vision requires measures to significantly improve equity of social expenditures, boost youth employment, promote competitiveness, scale up private sector engagement and capitalize on new and productive technologies.

This book argues that human capital formation in Africa will require investments in three areas:

- *African transformation and human capital formation.* African economies need critical skills and technologies to improve their productivity and stimulate economic growth, raise the employability of graduates by the private sector and foster enterprise creation. Addressing the challenges of urbanization, informal economy, climate change, regional integration and demographics will need to build specific skills for infrastructure and agriculture.
- *Innovative business models for building human capital.* New ways for delivering Education and Health services are needed in Africa. At the same time Africa needs to raise the employability and mobility of youth.
- *Building human capital for an inclusive society.* One of the main levers of inclusivity is strong financial and social systems to build an incremental pathway out of poverty for the continent's poorest. Value for money, accountability and voice in service delivery are essential elements of the governance agenda for delivering better and more equitable services that respond to citizen choices and contribute to stable and inclusive societies.

African transformation and human capital formation

To realize the demographic dividend (see chapter 2), a multisectoral, synergistic approach to inclusive and green growth is needed. For instance, an infrastructure project may embody critical elements of education and training—or require major social protection measures, such as mechanisms for income redistribution or schemes of social insurance. Similarly, the training of senior technicians and engineers for building roads (see chapter 7) or developing energy solutions (see chapter 8) requires refocusing the priorities of education and training systems. The positive impacts of water and sanitation programs on health, early childhood development and girls' education are well documented (see chapter 10). Education and training can also be leveraged to improve governance across institutions to enhance accountability and alleviate poverty, much of which can be attributed to a lack of voice and transparency. A highly skilled labor force is also essential to enhance competitiveness and growth and attract private investment—and to build social and financial protection systems that foster labor mobility and provide safety nets for the poorest.

Demographic and climate changes (see chapter 4) are causing rapid urbanization (see chapter 3) and strengthening the informal economy (see chapter 6). There is thus a need to build the specific skills to challenge this transformation. Sub-Saharan Africa has inadequate planning systems, planning laws and building standards, bureaucratized and inefficient land policy and a shortage of qualified and active planners. Urban policies need to be revised in depth to foster human capital. These need to include training and education for urban decisionmakers, location management and subsidies, development of secondary towns and management of the informal economy.

Africa's transformation will require skills development in infrastructure and agriculture (see chapter 9). They are key to fostering improvements in productivity and support the creation of jobs. By building skills in these key sectors of the economy, private and public, formal and informal, investments can contribute to raise the employability of graduates by private enterprises and stimulate growth.

Developing skills in water, energy and transport sectors has many benefits. It can render water and sanitation, energy and transport service delivery more efficient and accountable through increased participation by users—giving citizens a voice in developing basic services can improve these services. In addition, local and small enterprises—and individual entrepreneurs—can gain businesses and create jobs through building water and sanitation, energy and transport infrastructure and maintaining it. Finally, new regional water, energy and transport infrastructure can tighten regional integration, by developing regional labor markets and by improving regional populations' living conditions (see chapter 5).

These sectors are also engaged in process of change since 1990, reflecting gradual liberalization and deregulation. The implementation of these reforms needs new skills and new profiles (jobs), which are scarce across Africa. For example, as liberalization can only be effective with independent and skilled regulators, each country needs to set up an independent regulator of the energy (electricity) sector with specific skills in market regulations and interventions. Finding qualified people for this regulator is one of the main problems in some countries. At the same time the emergence of new markets needs traders, agents and the like. Those skills are also lacking, and the African education and training system needs to adjust to this. More generally, a complete mapping of needed skills is required.

Innovative business models for building human capital

The rapid speed of change and the magnitude of the Africa challenge calls for new innovative approaches to human capital formation. New models are emerging, building on the opportunity of new technologies and new business models.

Africa needs to revise its models of human capital formation, building on the leapfrogging potential of new technologies and the dynamics of its young population, especially for education (see chapters 17 and 18), health (see chapter 12) and youth employment (see chapters 19 and 20).

The New Education Model for Africa (see chapter 17)—can help create a new framework for education focusing on innovation and entrepreneurship. To improve the quality and efficiency of its education systems, African countries need to rethink the foundation of their education systems, taking into account the new opportunities arising with technology and such challenges as rapid urbanization (box 1.3). Training programs will tap ICTs and new opportunities in the private sector to develop e-education and adaptive learning, thus improving the quality of services.

Countries need also to strengthen their education and training systems, while improving access, quality and relevance (see chapter 16). They need to bridge the infrastructure gap and enhance structural reforms

Box 1.3 The New Education Model for Africa

The New Education Model for Africa proposes to drive skills development through six key components:

- *ICT-based:* Provide high-quality education and tap into new learning technologies.
- *Links with the labor market:* Link the education systems of tomorrow to the labor market and to each country's strategic plan for economic and social development.
- *Public–private partnerships:* Help countries tap into the experience, knowledge and financial leverage of the private sector to develop cutting-edge learning environments.
- *Creativity and critical thinking:* Move away from a purely classroom-based education model to foster interaction and debate among professors, students, young entrepreneurs and businesses in Africa and globally with a view to create a culture of entrepreneurship and job-rich growth.
- *Participatory:* Engage key stakeholders in developing strong education models (parents, faculties, universities, science academies, non-governmental organizations, civil society and communities).
- *Evidence-based:* Ensure that all programs have a built-in impact evaluation component to ensure that they are results-based, focusing on quality and learning outcomes.

to better cope with demographic and social challenges. And they also need to support quality education at the primary and secondary levels, as well as governance. Tackling the shortage of high-quality teachers and professors through training programs is also key to improving education delivery.

Investments in science, technology and innovation support programs are key (see chapter 13). They include investments to improve the quality of mathematics, science and technology education at the secondary and tertiary levels and increase advanced qualifications in science, technology, math and engineering. An area of concentration is biotechnology, because of its potential to positively impact on the agricultural and health sectors and to alleviate poverty (see chapter 15). Other areas include engineering, particularly manufacturing, to help add value to African natural resources and raw materials, contribute to economic growth and ICT, improve productivity, foster better teaching and learning processes and facilitate Africa's communication with the rest of the world. The involvement of women in studying science and engineering is paramount. These along with strategic reforms are necessary to expand young people's access to science-based education in countries and at the regional level, to ensure a critical mass of graduates with cutting-edge knowledge that is relevant to the needs of the private sector.

Regional centers and networks of excellence are essential to promote regional integration (see chapter 14). Regional integration is a high priority to help countries overcome barriers of trade and labor mobility. Dynamic regional centers and networks of excellence are needed. These need also to evolve into innovation networks with global linkages and mentorship programs (using the diaspora) to help prepare the next generation of entrepreneurs. They can be physically located in one country or may be regional networks of science and technology institutions linked by ICTs—attractive as ICT costs come down. Support to student regional mobility can also take place through scholarships and internship programs.

Regional approaches can help address youth employment and labor mobility (see chapter 19). This includes deepening financial outreach to women small entrepreneurs across national borders and economically active rural poor. It can also include supporting social business and innovative financing mechanisms to increase the demand for services and the productivity of poor household enterprises. The mechanisms cover the portability of social security and taxation agreements, equal rights for national and foreign workers, the recognition of foreign qualifications and occupational classifications and pre-departure orientation and student mobility through scholarships and internships.

Knowledge and policy work on labor markets, including the growing informal sector, can be ramped up to ensure that African countries have a full range of skill training and labor market responses. This would facilitate legal labor mobility among participating African countries and in specific professions (see chapter 20). It will also support structures that enable matching the demand and supply of intra-African talent, mainly through market mechanisms. Employers and providers of training and vocational education providers should be encouraged to collaborate to produce workers with skills better adapted to employer and labor market requirements.

Building human capital for an inclusive society

> "Taking advantage of a demographic opportunity depends on a conducive policy environment. Good governance matters, as do solid macroeconomic management, a carefully designed trade policy, efficient infrastructure, well-functioning financial and labor markets and above all, effective investments in health, education and training."[35]

Governance reforms need to aim at increasing value for money and improving the voice of citizens—particularly women and youth—in service delivery. This includes supporting the development of safety nets including pooling

and risk protection; supporting the increase of private involvement in the delivery of financial services, such as microfinance and social business; and strengthening the inclusiveness of infrastructure projects.

Building social and financial systems through community engagement and financial inclusion is key to ensure the social progression and graduation of the poor and vulnerable out of the poverty trap. Using a wide range of instruments (social dialogue, microfinance, insurance, and safety nets), African countries can engage in building and grooming financial systems to provide the right environment for productive investments and services that will contribute to inclusive growth.

Over the next decade African countries will need to further develop comprehensive safety nets, addressing heads on issues of social transfers and subsidies. Building the safety net is associated with making public expenditures more efficient and more equitable. This will include the testing and development of cash transfer programs that reach the poor and vulnerable and buy results in terms of social outcomes (see chapter 21). This will also require progressively implementing social risk mitigation mechanisms in the form of insurance programs, including weather-based insurance and health insurance (see chapter 23). This will help generate incomes and improve food security, while enhancing resilience to such shocks as rising food and medicines prices.

Developing productive safety nets will also require investing in private sector development, including support to microenterprises, microfinance and social businesses (see chapter 27). It will accelerate support for community livelihoods, protect productive assets, develop local economies and promote community social capital including through better nutrition (see chapter 22). It will continue to strengthen access to finance for the poor and marginalized through microfinance, which has helped poor people build assets, reconstruct livelihoods, enhance incomes and contribute to growth in most parts of Africa. Emphasis should be placed on business and entrepreneurship skills services for financed microfinance initiatives (see chapter 26). Countries should also develop systems to capture opportunities (such as corporate social responsibility and public–private partnerships) and finance (such as philanthropic resources). Similarly, support can be provided to developing innovative banking methods to extend finance for health and education to the poor.

So far, many efforts have focused on creating the preconditions to enhance demand-side accountability through institutions that act as a bridge between the government and citizens, by providing accessible and credible information on policy performance (such as parliamentary role in scrutiny of budgets). Going forward, more will have to be done to supporting programs and projects focusing directly on building grassroots capacity to demand improvements in state provision of public goods, especially for women, youths and marginalized groups.

Increasing value for money (see chapter 29) in social service delivery is a central agenda. A focus on better governance will help make service delivery more transparent and efficient (see chapter 28). Priority should be given to:

- Evidence-based planning and budgeting, ensuring that plans are based on evidence and resources are allocated to high-impact interventions with big returns on human capital.
- Transparent financial management in decentralized and autonomous service delivery arrangements, supporting the institutionalization of financing policies (both public and private) for social safety nets, public expenditure tracking and performance audits, and better procurement and distribution of equipment and commodities (school books, medical products).
- Fostering results by providing performance-based financing and incentives to overcome low demand, poor quality and inadequate service delivery. This includes financial systems that are evidence-based and focusing on results and strengthening the link between resources and outcomes

at the point of service delivery. With careful design and appropriate institutional capacity, there is a need for creating performance incentives that can improve access to service delivery for poor people, as with results-based financing, for example.

The voice of citizens—particularly women, youth and marginalized groups—in service delivery is to be strengthened. Support for voice and accountability programs needs to step up, including political and administrative decentralization of education and health services and strengthening of the capacity of local communities and governments to deliver services and results, especially in fragile states (see chapter 30). Supporting mechanisms foster information flows, feedback between service providers and users, and accountability mechanisms on such issues as amount of resources made available, how resources have been used, the quantity and quality of delivered services and the attendance of teachers and health workers. This can be done by testing and scaling up monitoring mechanisms, such as citizen report cards, community scorecards, participatory budgeting, grievance redress systems and client satisfaction surveys.

Governments will probably also need to engage further with the private sector in delivering better and more equitable social services to support an enabling environment for private investment in education, science and technology, health (see chapter 24) and productive safety nets. It also supports capacity building to contract, monitor, evaluate and regulate the private sector, encouraging innovation.

Finally, better regulation and regional integration would foster harmonization of policies to build human capital. Improving the regulation and harmonization of labor and social policies is essential for labor mobility and regional integration. This includes tax policies that foster social benefits (such as the Sintax, a tax levied on products considered socially undesirable and harmful, such as alcohol and tobacco).

Conclusions

Africa is the most demographically dynamic continent of the world today. Thanks to the windfall of a favorable price for natural resources, it is also now one of the most vibrant economically. Most African countries are expected to leave the low-income trap within the next two decades. Yet economic growth has not yet translated into significant poverty reduction and the development of a sustainable model of inclusive growth. This will happen only if significant and judicious investments are made in capturing the opportunity of the demographic dividend. The building of human capital will determine the economic and social fate of the African continent over the next few decades. Countries will thus have to invest in addressing the structural inequities of assets distribution and service inequity. For that, a vast program of investments in skill and technology, new models of service delivery, and efficient and equitable use of the public purse (including the expansion of the social safety nets) will be needed over the next decade.

Notes

1. ODI 2012.
2. Population Reference Bureau 2011.
3. Angola, Burkina Faso, Burundi, Chad, Congo, Mali, Mozambique, Niger, Uganda and Zambia.
4. A "youth bulge" is usually defined as a high proportion of 15- to 29-year-olds relative to the adult population.
5. Including China, India and Vietnam.
6. AfDB and others 2011.
7. Ravallion 2007.
8. AfDB and WWF 2012.
9. UNDP 2012.
10. IFPRI 2009.
11. MDG 1a: Reduce by half the proportion of people living on less than a dollar a day. MDG 1c: Reduce by half the proportion of people who suffer from hunger. MDG 2: Ensure that all boys and girls complete a full course of primary schooling. MDG 4: Reduce by two-thirds the mortality rate among children under 5. MDG 5: Reduce by three-quarters the maternal mortality ratio. Achieve, by 2015, universal access to reproductive health. MDG 6: Halt and begin to reverse the spread of HIV/AIDS. Achieve,

by 2010, universal access to treatment for HIV/AIDS for all those who need it. Halt and begin to reverse the incidence of malaria and other major diseases.

12. The exception being six low- and middle-income countries where conflict and HIV/AIDS were the primary causes of an increase.
13. Rajaratnam and others 2010; Demombynes and Trommlerova 2012.
14. UNICEF and others 2013.
15. AfDB and others 2011.
16. AfDB 2013.
17. This definition aligns with Amartya Sen's philosophy that building human capital is about creating "capabilities": freedoms of opportunity and not just of theoretical rights.
18. Commission on Growth and Development 2008.
19. World Bank 2011.
20. Mason 2005.
21. ILO 2011.
22. ILO 2011.
23. There is also a "decline" in the number of robust and vibrant university-based research centers, though there is an increase in transnational and regional research networks, such as the African Labor Research Network and the Energy, Environment and Development Network for Africa.
24. NEPAD 2010.
25. World Bank 2011.
26. ILO 2013.
27. World Bank 2009.
28. Beyond.com 2011.
29. World Bank n.d.
30. OECD 2009.
31. World Bank 2009.
32. UN n.d.
33. www.nepad.org/system/files/NEPAD%20Framework%2020(English).pdf.
34. www.au.int/en/about/vision.
35. Bloom and Canning 2011, 80.

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PART I

African Transformation and Human Capital Formation

CHAPTER 2

Capturing the demographic dividend: Source, magnitude and realization

David E. Bloom, Salal Humair, Larry Rosenberg, Jaypee Sevilla and James Trussell

The population of Sub-Saharan Africa is growing more rapidly than that in any world region. The United Nations (UN) Population Division medium-fertility scenario projects that Sub-Saharan Africa's population will more than double in less than four decades, from 901 million today to 2.07 billion in 2050. The region will account for roughly half of global population growth till 2050, raising the region's share of world population to 22% by then, compared with 13% today.

Given the low living standard throughout the region—in health, education, housing and other factors—rapid population growth raises questions about the region's economic prospects. With governments that have historically struggled to promote economic growth, worries abound about the feasibility of improving the lives of Africans.

The implications of such population growth are the subject of controversy and are the continuation of a historical debate that has been going on for hundreds of years. Thomas Malthus, in his 1798 treatise, *An Essay on the Principle of Population,* predicted that population would grow faster than food supply and that humanity was thus doomed to misery. Others have argued that large populations are important for countries striving to gain a place on the world stage and for economic advancement. But for a long time researchers found no measurable relationship between the rate of population growth and economic advancement. That understanding changed in the last two decades. We now have evidence of a link between population growth and economic advancement, but that link is more nuanced than in the earlier arguments.

Consider Sub-Saharan Africa. The UN population projections are not the only path this region can follow. If the fertility rate (number of children per woman over her lifetime) in Sub-Saharan Africa were just half a child lower than the rate in the UN medium-fertility scenario, the region would have 1.84 billion people in 2050—about 230 million fewer than in the medium-fertility scenario.

Perhaps even more important, if the fertility rate were lower by just half a child, the age distribution of Sub-Saharan Africa would shift. The ratio of those between ages 15 and 64 (what demographers consider the "working-age population")[1] and the non-working-age population is 1.17—the lowest of any world region. In the medium-fertility scenario, this ratio is projected to rise to 1.59 in 2050; the corresponding figure in the low-fertility scenario is 1.80.[2] Figure 2.1 shows the ratio of the working-age to non-working-age population in Sub-Saharan Africa and the three countries we focus on this paper (Kenya, Nigeria and Senegal), with data from 1950 to the present and projections through 2050.

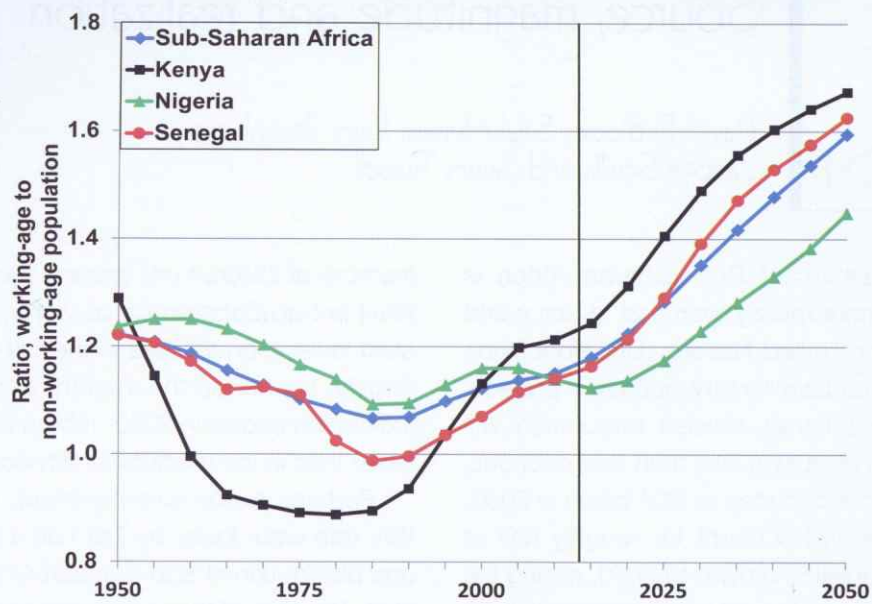
Why do these population figures, and the different fertility scenarios, matter? How might lowering the fertility rate lead to more rapid economic growth? The answer lies in a concept known as the "demographic dividend."

What is the demographic dividend?

The demographic dividend is the economic growth potential that is created by favorable shifts in the age distribution of the population. For most low- and middle-income countries, changes in population age structure stem from the demographic transition, which is as central to the field of demography as supply and demand is to economics.

The demographic transition is a descriptive model that refers to the nearly ubiquitous change developing countries make from a

Figure 2.1 **Longitudinal change in the ratio of working-age to non-working-age population**



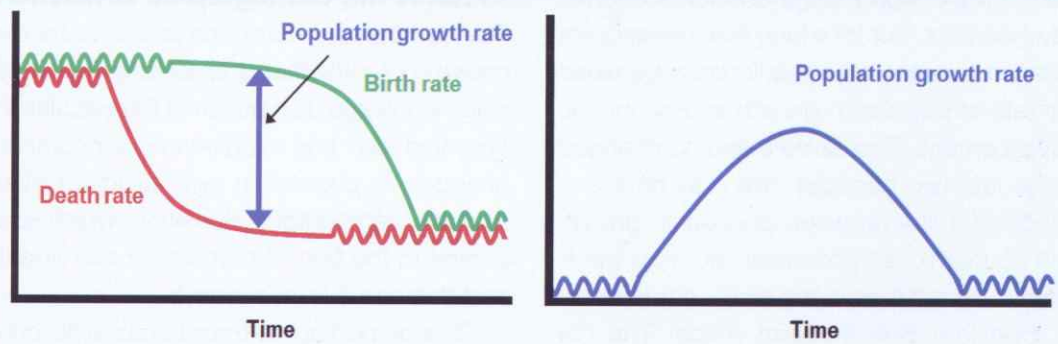
Source: UN DESA 2013.

regime of high fertility and high mortality to one of low fertility and low mortality (figure 2.2). But these changes tend to happen in an asynchronous fashion, with death rates declining first and birth rates following suit later. The result of the lag is a transitional period of population growth, which has traditionally been the main focus of economists interested in demographics.

Mortality declines in high-mortality populations are mainly associated with declines in infant and child mortality (due to the spread of vaccines, antibiotics, safe water, sanitation and so on). That mortality decline causes a baby boom—not the usual one in which there are more births, but one in which more babies that are born actually survive. The baby boom ends as fertility then declines—which it invariably does as couples realize that fewer births are needed to reach their targets for surviving children, and as those targets themselves are moderated as the development process proceeds.

Baby booms are very consequential economically, because a society with many children requires considerable resources for food, clothing, housing, medical care and schooling. Those resources must be diverted

Figure 2.2 **The demographic transition: High fertility and mortality transitioning to low fertility and mortality, with consequent temporary high rate of population growth**



Source: Authors.

from other uses such as building factories, creating infrastructure and investing in research and development. And that diversion of resources tends to slow economic growth.

But the baby boom will invariably reach the working ages within a period of 15–25 years. And when that happens the economic situation changes as the productive capacity of the economy expands on a per capita basis—most centrally because the share of the population that is of working age rises, if temporarily. The economy expands on a per capita basis as the boomers reach working ages—that is, output per capita rises, holding output per worker fixed, because there are more workers per capita—and as women's labor force participation rises with declining fertility. Potential output also grows because the working ages are also the prime years for savings, which are key to capital accumulation and technological innovation. Savings get a further boost as old-age mortality declines in the latter phases of the demographic transition.

In sum, mortality declines at the beginning of the demographic transition catalyze fertility declines. And fertility declines are potent drivers of economically consequential changes in the age structure of the population.

Empirical evidence on the demographic dividend

The description of the demographic dividend above shows the potential economic importance of the relative size of a country's working-age population. During the demographic transition, the working-age share of the population rises when fertility falls (declines that can happen, in part, because of the effect of family planning programs). When the working-age share is high, economic growth may be potentiated—the demographic dividend.

Evidence for the demographic dividend comes from, among other examples, the rise of East Asian economies in the 1960s, 1970s, and 1980s,[3] and more recent analysis of the economic performance of Asia in the 1990s.[4] The dividend may be quite large; it is estimated to account for up to a third of the rise in incomes seen in East Asia between 1965 and 1990.[5] An early examination of a possible demographic dividend for Africa is Bloom and Sachs (1998), who find that the Sub-Saharan countries have the potential to reap a sizable demographic dividend. Bloom and others (2007) find that African economies follow the same principles as those of other countries and that with enabling policies in place, Sub-Saharan Africa should be able to realize a demographic dividend. Canning (forthcoming) provides a more current treatment of the demographic dividend in Africa.

Perhaps the easiest way to see the dividend in action is to compare the economically and demographically most extreme regions of the developing world: East Asia and the Pacific and Sub-Saharan Africa (figure 2.3).

The Sub-Saharan economies grew slowly in the first several decades; even so, East Asia did not catch up to Sub-Saharan Africa until around 1990. But then, as is widely known, the East Asian economies took off, while the Sub-Saharan ones continued to stagnate. Now, East Asia's per capita income is more than triple that of Sub-Saharan Africa.

The fertility rate decline was also distinctly different in the two regions, with East Asia's rate falling rapidly and Sub-Saharan Africa's slowly. Fertility in Sub-Saharan Africa in 2010 stood at about the same level as in East Asia in the early 1970s (five children per woman).

Falling fertility raises the share of the population of working age, and figure 2.3 shows the consequences for the age structure in the two regions. The ratio of working-age to non-working-age population soared in East Asia, starting in the 1980s, while it started to rise in Sub-Saharan Africa only in the 1990s, and then only slowly. In fact, the ratio has been lower in Sub-Saharan Africa than in East Asia throughout the period shown, reflecting a fairly high burden of youth dependency, due to a long history of consistently high fertility. By contrast, East Asia has had the fastest and most pronounced demographic transition in history. In 1950 the difference in the working-age to non-working-age ratio between East Asia

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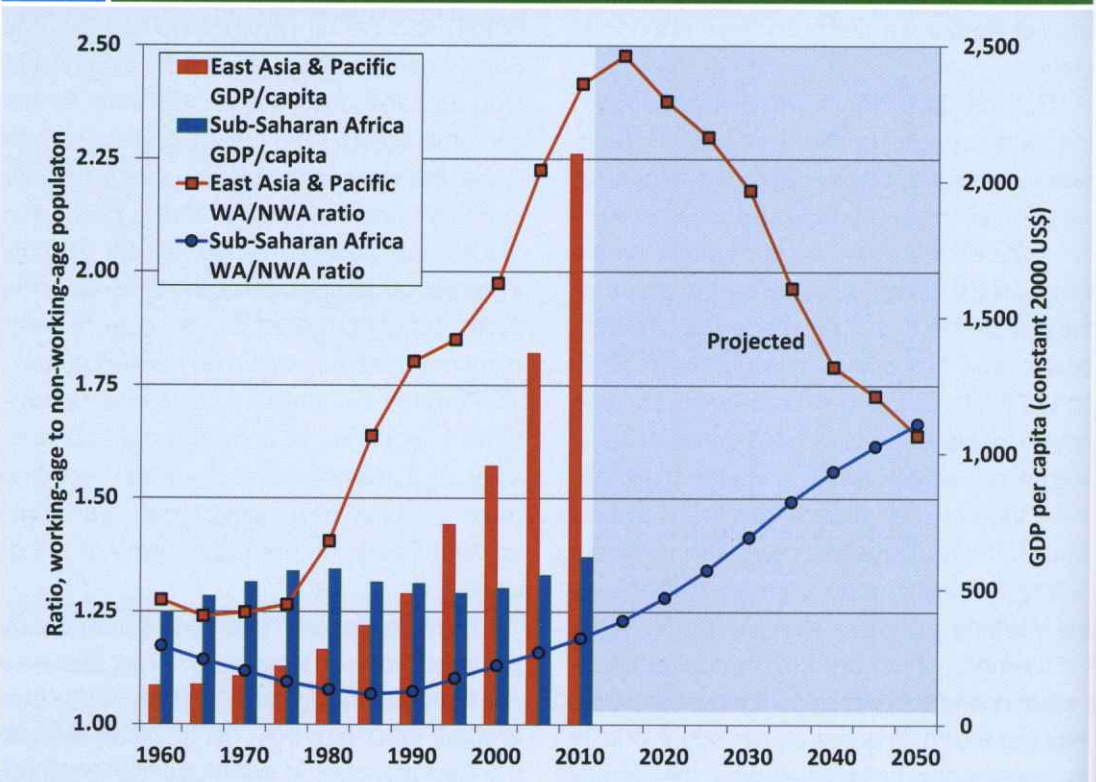
Figure 2.3 **GDP per capita and the ratio of working-age to non-working-age population skyrocketed from 1960 to 2010 in East Asia and the Pacific—but remained flat in Sub-Saharan Africa**



Source: UN DESA 2011; World Bank 2013.

and Sub-Saharan Africa was fairly small, but it grew dramatically from 1975 on. And today East Asia has roughly 2.4 workers for every non-worker, much more than Sub-Saharan Africa's 1.2. For a household, country or region, such a differential will tend to translate into a commensurately large increase in income.

Demographic changes have closely tracked income growth in both regions, offering a compelling explanation for East Asia overtaking Sub-Saharan Africa economically. There are, of course, many other determinants of income growth, and economists have investigated them in considerable depth. But even with those determinants taken into account, the basic narrative about the economic impact of demographics remains qualitatively unchanged. Note also that about 2 percentage points of annual per capita income growth in East Asia over the past few decades can be attributed to its favorable demographics.

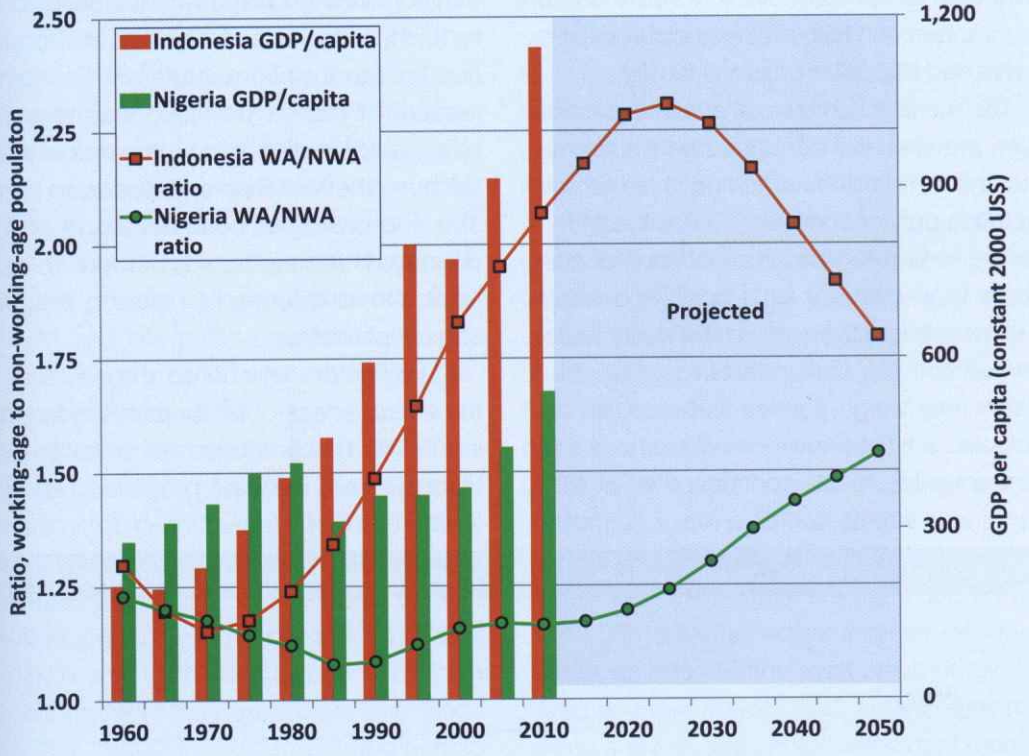
Going forward, starting in 2015, East Asia's working-age to non-working-age ratio is slated to plummet, while Sub-Saharan Africa's to rise. These changes may influence economic outcomes in the two regions.

Now compare the demographic and economic history of Indonesia and Nigeria (figure 2.4). Both countries are populous, major oil exporters with large Muslim populations, so they make an apt pair for comparison.

The two countries had similar ratios of working-age to non-working-age population in 1960, and their ratios fell in the ensuing years. But as Indonesia's fertility rate started to decline (while Nigeria's did not), its ratio rose rapidly. Meanwhile, in Nigeria the ratio has only recently begun to rise, thanks to a slow fertility rate decline.

Nigeria had a slightly higher GDP per capita than Indonesia in 1960, but Indonesia's is now roughly double Nigeria's. As with the comparison of East Asia and Sub-Saharan Africa, demographic change

Figure 2.4 **GDP per capita and the ratio of working-age to non-working-age population were similar in 1960 in Indonesia and Nigeria—then Indonesia took off in 1975 while Nigeria has only recently begun to rise**



Source: UN DESA 2011; World Bank 2013.

closely tracks income growth in Indonesia and Nigeria.

The economic successes of East Asia and Indonesia are not coincidentally related to demographics. Rather, they seem to be causally related to East Asia's and Indonesia's fertility transitions, which led their age structures to develop in a way highly favorable for economic growth, allowing these countries to harness a demographic dividend. In much of Sub-Saharan Africa this fertility transition has only begun to take place.

The demographic dividend is not the sole explanation for the differing economic trajectories of East Asia (and Indonesia) and Sub-Saharan Africa (and Nigeria). But it is intuitively plausible, theoretically sound and consistent with the data.

The effect of investments in family planning programs on fertility

The economic consequences of demographic transitions raise two questions: Can Sub-Saharan Africa lower its fertility? And if so, what economic benefits can it see?

One avenue for reducing fertility is family planning programs. Although some have argued otherwise, on balance, the evidence suggests that family planning programs can help lower fertility appreciably, but only if they are well designed for the cultural and social context, and well implemented.

Sorting out the conflicting views and evidence

Many demographers think that binding constraints in supplying contraceptives explain the elevated rates of fertility. They attribute a high share of fertility decline to the expansion of family planning programs.[6] By contrast, some economists argue that family planning has no independent effect on fertility,[7] and that desired fertility is key, along with its determinants—economic advances, expansions in girls' education,[8] greater economic opportunities for women and so on. According to

this view, all family planning does is enable the alignment of desired and actual fertility.[9] But providing family planning services does more than just prevent births: a well-thought-out program can help change norms on family size and thus affect desired fertility.

The mere observation of a negative correlation between the contraceptive prevalence rate and fertility does not imply that increasing the supply of contraceptives will lead to a decline in births. Various other factors contribute to a woman's (or a family's) decision to use contraceptives and in the ability to use them effectively: Cultural norms or religious beliefs may weigh against some or all contraceptives. Husbands (or their mothers) may not want wives to use contraceptives at all. A fear of side effects can be a major stumbling block. And misinformation about proper use can render them ineffective. These impediments are relevant to the more than 200 million women who have unmet need for family planning—that is, they do not want to have children in the near future, they are in a union with a man, and they are at risk of becoming pregnant because they are not using contraceptives. Many demographers believe that if these women were offered family planning services, many or most would all use contraceptives and their fertility rate would decline.

Key here is that for a family planning program to work, it has to be well designed and implemented—it must consider the exact setting in which it will be used. For example, experience and studies in West Africa suggest that provision of family planning services alone is not always what appeals to families in high-fertility settings. For the Navrongo experiment in Ghana, family planning services were well integrated with community health services, and that integration seems to have been a key to success.[10] This experiment is notable because it was a randomized trial and found that the intervention led to a decline in fertility of one child per woman.

Also supporting the view that family planning programs can reduce fertility is the Matlab program, carried out in Bangladesh between 1977 and 1996. Participating villages were randomized, with some receiving family planning services and others not. Examining the Matlab data, Yale economist T. Paul Schultz recently concluded that: "The family planning program is associated with a 10–15% decrease in fertility and population growth for two decades."[11] Economists like Lant Pritchett dismiss these results as being inapplicable to countries as a whole, because the Matlab program was so expensive and could not be extended to a whole country. That may be so, but Matlab at the least shows that family planning programs can affect fertility.

The bottom line: while the evidence for the effectiveness of family planning in reducing fertility has produced equivocal interpretations, family planning programs can affect fertility (such as a reduction of 1.0 in the total fertility rate) if well designed and well implemented (such as including proper counseling and matching the type of contraceptive to participant needs) and if they fit well with the social and cultural context in which they are carried out.

Potential size of the economic benefits of meeting unmet need

If family planning programs cause fertility decline, what economic benefits might result from well-designed and well-implemented programs?

One simple way to estimate economic benefits is to estimate the health benefits of family planning programs (such as reductions in maternal and infant mortality or morbidity), and then use various measures (such as the value of a life saved or disability-adjusted life years) to compute the resulting economic benefits. This is the approach reported in the recent *State of the World Population 2012* report of the United Nations Population Fund, which also discusses the range of potential economic benefits from investment in family planning programs.[12]

Here we present a different approach that directly estimates the impact of family planning on per capita income. More specifically, we estimate the impact of "meeting unmet need" (MUN) for modern methods of family planning—that is, of raising the uptake of

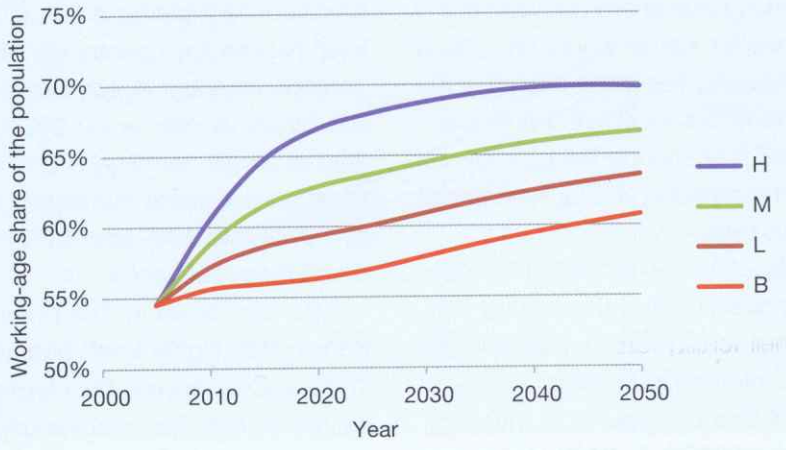
modern contraception among the women of reproductive age who are in marriage or in union, who currently do not wish to be pregnant and who are not using modern contraception. Note also that the per capita income increases we estimate are only a part of the total package of benefits resulting from family planning programs. Other benefits include reduced maternal and infant mortality, unsafe abortions and unintended pregnancies.[13]

The methodology for the research carried out for this chapter is described in detail in annex 2.1 and integrates new research with well-established methods for estimating the demographic dividend.[14]

We present the results for three Sub-Saharan countries (Kenya, Nigeria and Senegal) for multiple scenarios, where unmet need for contraceptives is met with different degrees of success.[15] For each country we explore when none of the unmet need for contraception is met, which serves as our baseline (B); when a low level (33%) of unmet need is met (L); when a moderate level (67%) of unmet need is met (M) and when a high level (100%) of unmet need is met (H).[16]

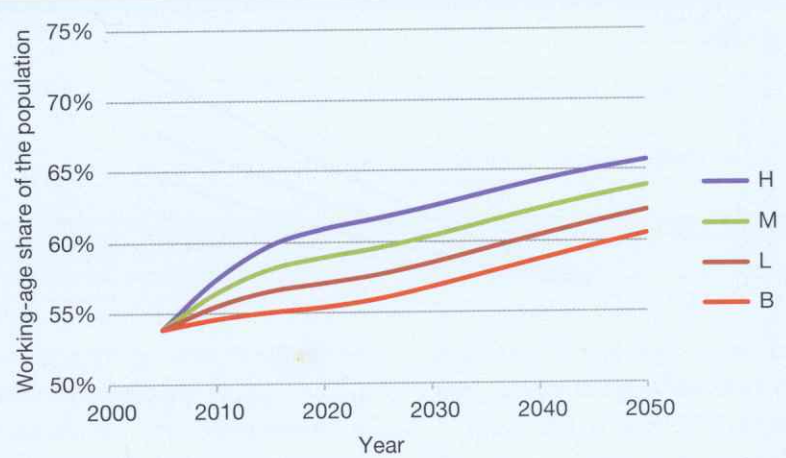
Figures 2.5–2.7 show how the primary driver of economic growth for the demographic dividend, the working-age share of the population, is substantially shifted under different MUN scenarios. For Kenya, for instance, the working-age share of the population could increase over the baseline (in 2025) by as much as 3 percentage points

Figure 2.5 Working-age share of the population under the MUN scenarios, Kenya



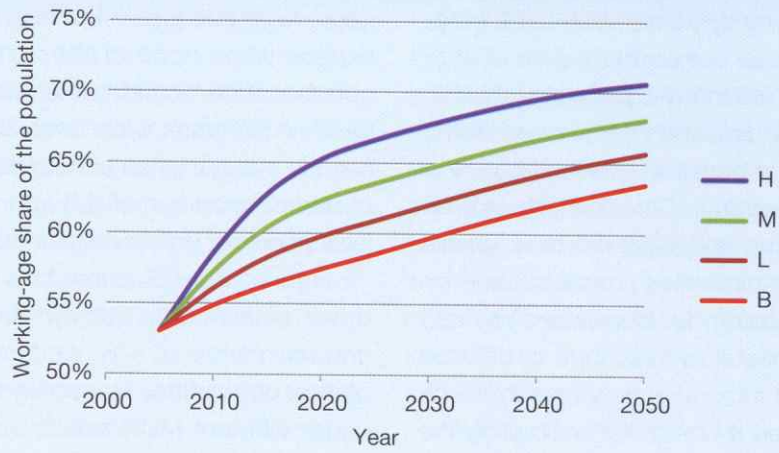
Source: Authors.

Figure 2.6 Working-age share of the population under the MUN scenarios, Nigeria



Source: Authors.

Figure 2.7 **Working-age share of the population under the MUN scenarios, Senegal**



Source: Authors.

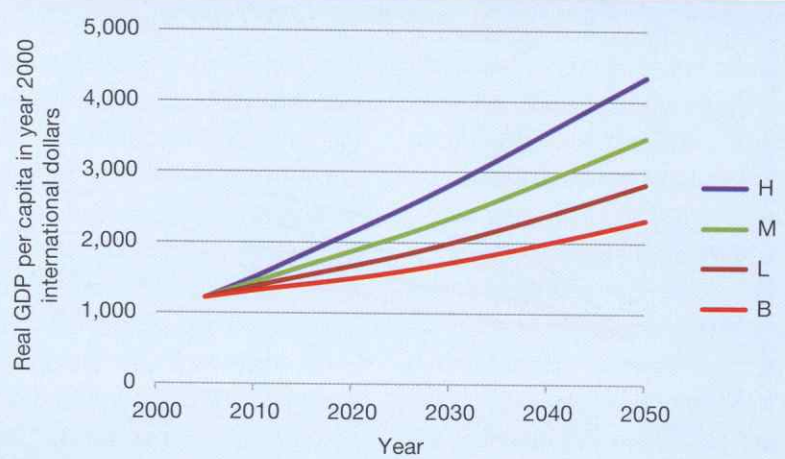
over 2005–2050 for the L scenario and by as much as 11 percentage points for the H scenario. Over 2005–2050 the maximum difference in working-age share between the H and L scenarios for Kenya would be around 8 percentage points. For other countries the maximum differences in working-age share between H and L scenarios are less than in Kenya, but still substantial (4% for Nigeria and 6% for Senegal respectively).

Figures 2.8–2.10 show projected GDP per capita for the baseline and three MUN scenarios. The amounts shown are real GDP per capita in 2000 international dollars.

Table 2.1 shows a snapshot of these figures in 2030 and 2050. In 2030 Kenya can enjoy a 16% increase in per capita income over the baseline by meeting a third of its unmet need, and a 64% increase over the baseline by meeting all of its unmet need. Even Nigeria (the country with the lowest percentage increase in per capita income over the baseline) can enjoy 9% (by meeting a third of unmet need) and 32% (by meeting all of its unmet need) more per capita income by 2030, and 12% and 43% more by 2050 under these scenarios.

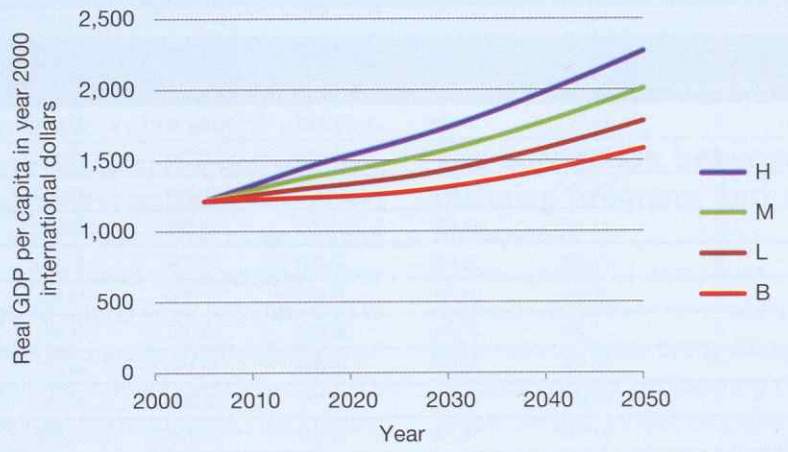
We also observe that both Senegal and Kenya enjoy higher levels and rates of growth in per capita income than Nigeria. This finding results from Senegal's superior life expectancy relative to Nigeria, and from Kenya's

Figure 2.8 **Projected per capita income under the MUN scenarios, Kenya**



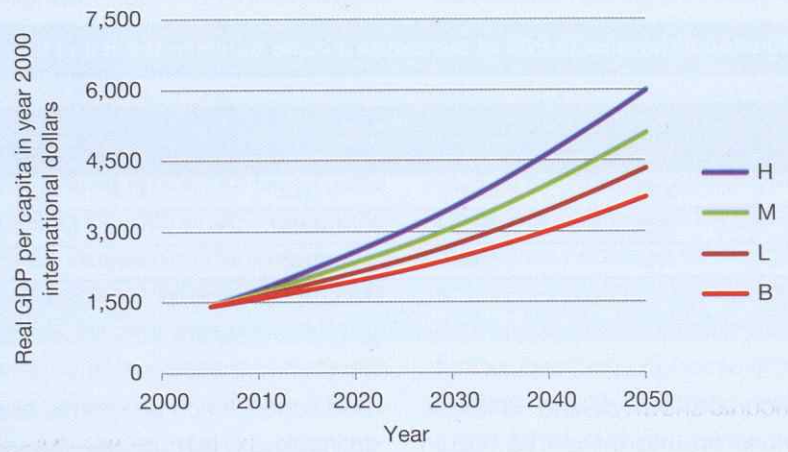
Source: Authors.

Figure 2.9 **Projected per capita income under the MUN scenarios, Nigeria**



Source: Authors.

Figure 2.10 **Projected per capita income under the MUN scenarios, Senegal**



Source: Authors.

Table 2.1 **Estimated per capita income in 2030 and 2050 under the MUN scenarios**

Country	Year	B	L	M	H
Kenya	2030	1,710	1,990	2,340	2,810
	2050	2,310	2,820	3,480	4,340
Nigeria	2030	1,310	1,430	1,560	1,720
	2050	1,580	1,770	2,000	2,260
Senegal	2030	2,410	2,700	3,060	3,490
	2050	3,720	4,320	5,060	5,970

Source: Authors.

superior life expectancy and institutional quality relative to Nigeria.

Table 2.2 facilitates the comparison of the different per capita income trends under the MUN scenarios by showing the present discounted value (PDV), discounted back to 2005, using different discount rates.

Table 2.3 shows the differences in the PDV of per capita income in 2030 and 2050 between the H and L scenarios. At 3%

Table 2.2 **Estimated PDV of per capita income (discounted to 2005) for 2030 and 2050 under the MUN scenarios**

Country	MUN scenario	3%		6%		0%	
		2030	2050	2030	2050	2030	2050
Kenya	B	25,300	39,600	18,700	24,200	36,000	75,700
	L	27,500	44,500	20,200	26,700	39,400	86,900
	M	30,100	50,700	21,900	29,700	43,700	101,100
	H	33,300	58,600	24,000	33,500	48,900	119,500
Nigeria	B	22,200	32,600	16,700	20,700	31,100	59,700
	L	23,300	34,700	17,400	21,800	32,800	64,400
	M	24,400	37,200	18,200	23,000	34,600	69,800
	H	25,700	40,000	19,000	24,500	36,600	76,100
Senegal	B	32,000	53,500	23,400	31,600	46,100	106,100
	L	34,200	58,700	24,800	34,100	49,600	118,200
	M	36,700	64,900	26,500	37,100	53,600	132,700
	H	39,600	72,400	28,300	40,700	58,300	150,400

Source: Authors.

Table 2.3 **Estimated difference in PDV of per capita income between the H and L scenarios**

Country	Year	3%		6%	
		2030	2050	2030	2050
Kenya	2005	5,800	14,000	3,700	6,800
Nigeria	2005	2,400	5,200	1,600	2,600
Senegal	2005	5,300	13,600	3,400	6,500

Source: Authors.

discounting, for both Kenya and Senegal, these differences are more than $5,000 in 2030 and about USD14,000 in 2050.

Bringing about a demographic dividend: Policy implications

Without enabling policy interventions, the demographic dividend will not necessarily come about. Countries need to assess their progression through the demographic transition to determine what steps are most important in realizing the dividend.

Countries still in the very early stages of the demographic transition (such as some of those in Central and Western Africa, including Nigeria) need to focus on policies that will catalyze the transition. To do that, countries need to think about making wider and deeper investments in health. Such investments traditionally involve primary health care, safe water and sanitation, vaccines and drugs, and school lunch programs, all of which tend to improve child survival—the usual trigger for fertility decline.

Countries in the middle stages of the demographic transition (such as some in Southern Africa, but also including Kenya) need to focus on policies to accelerate the transition, which essentially means a policy to accelerate fertility decline. This typically involves providing family planning supplies and services and expanding education and job opportunities for girls and women.

It is also important to note other preconditions for countries to capture the demographic dividend, since the gains from a change in age structure are not automatic.[17] Realizing the demographic dividend requires first and foremost the creation of opportunity, particularly the right mix of jobs that allow workers to contribute productively to the economy.

Job creation in turn requires sustained investment in human capital, such as in education and health. Uneducated workers can typically engage in activities with a relatively low value added. Similarly, unhealthy workers are often limited in the energy and perseverance they can bring to a workplace. By contrast, workers who are well educated and healthy are much more able to contribute productively to a country's economy. They are more likely to attend work regularly and to learn new skills and apply them reliably. The human capital that is embodied in educated, healthy individuals is invaluable for promoting rapid economic growth.

In Sub-Saharan Africa another factor comes into play: outmigration and brain drain. When a large number of educated individuals migrate to other countries where their skills may be more highly rewarded, the economic benefits of having an educated population are somewhat diminished. We cannot at present quantify the extent of this effect in Sub-Saharan Africa, but we do note one countervailing phenomenon—emigrants very often send home remittances in sufficiently large amounts to add nontrivially to gross national income and make a large positive difference in the welfare of recipient households.

Beyond health and education, other factors can facilitate realization of the demographic dividend, including good governance, strong institutions of various types, a carefully constructed trade policy, solid macroeconomic management, well-developed financial markets, good relations with neighboring countries and an absence of civil conflict and foreign wars. Also of note, the East Asian countries were able to capitalize on their demographic changes in part because they focused on producing low-cost exports, which a portion of the working-age population was employed in producing.

The many challenges countries face in bringing about a demographic dividend are not insurmountable, but they do require well-chosen and well-implemented policies. Further, the attainment of good institutions, better education and better health, for example, are not just prerequisites for realizing the demographic dividend, but for a range of other things on the path to development—human rights, social security, adaptability and sustainability of a society.

The connection between family planning programs and raising incomes

Family planning programs, when implemented sensitive to local practices and local needs, can bring about lower fertility rates, in part by lowering desired fertility. When desired fertility falls and contraception is available, fewer children will be born. The previous, larger cohort of children, when they reach working age, will constitute a relatively large working-age cohort. If working-age individuals are healthy and well educated, and if policies are in place so that potential workers are in fact productively employed, the working-age cohort can produce more per worker and per person (compared with the past), thus raising per capita income. In addition, since working-age individuals typically save more than people at other ages, the national savings rate can increase. The extra savings can be channeled into new investment, thus further boosting economic growth.

This whole chain of events begins with lower fertility, which can be powerfully abetted by carefully designed family planning programs that are attuned to local circumstances and that provide contraception to those who want it. This is a powerful chain, since the potential consequence of greater use of contraception is higher incomes.

Conclusions

The demographic dividend—the one-time economic bonus that can arise, if conditions are right, from a decline in fertility rates—could matter a lot for Sub-Saharan Africa. Rapid population growth will doubtless bring great challenges, but lower fertility rates could usher in a higher share of working-age people in the population and thus, potentially, enormous economic benefits for the region.

For instance, our results show that meeting unmet need for modern contraceptives

could substantially increase GDP per capita in Kenya, Nigeria and Senegal:

- *The impact of meeting unmet need on per capita income.* In 2030 these three countries can enjoy an increase in per capita income of 8–13% over the baseline if they meet a third of their unmet need, and can enjoy a 31–65% higher per capita income if they meet all of their unmet need. By 2050 these ranges become 13–22% and 47–87%, respectively.
- *The difference in the discounted cumulative value of per capita income between meeting a smaller portion of unmet need and meeting a larger portion of unmet need.* At 3% discounting, the increase in PDV of income between meeting a high level of unmet need and meeting a low level of unmet need by 2030 is between USD2,400 and USD5,800, with the difference for two of the countries above USD5,000. By 2050 the difference in PDV is between USD5,300 and USD14,100, with the difference for two of the countries above USD13,500.

Together, these results provide a strong argument for sustained investment in family planning programs in Africa. In fact, the economic justification is even stronger since the above results focus on only a small part of the total economic benefits. A broader focus would include other long-term effects of fertility reduction—such as improved mother and child health, which could lead to better cognition and better schooling, and thus lead to higher productivity, a higher lifetime income and protection for families against catastrophic health incidents.[18]

International efforts in this sphere could help. As the world nears the 2015 deadline for meeting the Millennium Development Goals (MDGs), a searching question will be how to push MDG 5 (reduction in maternal mortality and universal access to reproductive health) higher on the agenda of policymakers. With progress on MDG 5 lagging well behind that of others, advocates for reproductive health may find a need not only to redouble but also refocus their efforts. In doing so, they may find economic arguments an increasingly valuable complement to their ethics- and human rights–based arguments for investing in reproductive health. The rights-based approach has been central to global family planning efforts, especially since 1994, and has led to important gains.[19] But as policymakers seek to balance competing priorities amid mounting economic pressures, the value of economic arguments will increase.

With respect to a focus on reproductive health, the earliest signals regarding the post-2015 development agenda are not unambiguously positive. The June 2013 Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, *A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development,* does not emphasize the importance of reproductive health or of lowering fertility rates.[20] It does include a paragraph on these topics (in its discussion of the proposed new Goal 4, "Ensure healthy lives," Section (d), "Ensure universal sexual and reproductive health and rights"), but does not suggest that they could be of overriding importance in reducing poverty and does not mention them in relationship to economic growth.

Of course, speeding social and economic development is a broad undertaking, and lowering fertility is one of numerous means that countries can adopt in pursuit of these goals. As noted above, a large and diverse set of factors can affect the pace of economic growth. Improving education can be particularly important, as educated individuals are more likely to be able to contribute productively to a growing economy. And in addition to the factors listed earlier, we should add environmental sustainability as an important consideration in countries' efforts to improve their standard of living.

Finally, we should note that our emphasis on the potential of fertility decline to spur economic growth is offered in the spirit of preventing future problems. Fertility decline certainly does not guarantee future economic growth. But it does pave the way for lessening the many problems that are exacerbated by having a large and rapidly growing population.

Annex 2.1 Methodology

Linking "meeting unmet need" (MUN) for contraception to the demographic dividend involves estimating the impact of MUN on fertility trends and hence the population age structure, and estimating the impact of the population age structure on economic growth. We develop a model to estimate the impact of MUN on reduced fertility and to project a population age structure. We then use the approach described in the *Nigeria: the Next Generation* (NNG) report to estimate the demographic dividend and generate trends in per capita income from the projected population age structure.[21]

MUN, fertility and population age-structure (MUN-AFR model)

We model the relationship between MUN and age-specific fertility rates (AFR) within five-year age groups of women, where women in each age group can use an age-specific method mix of contraceptives. The model takes as input the following data and outputs a population age structure for the future, under different scenarios for levels of unmet need:

- Age-specific male and female populations in 2005.
- Age-specific default fertility for years 2005–2050.
- Age-specific mortality rates for 2010.
- Fraction of women married or living with a male partner.
- Fraction of women demanding contraceptives.[22]
- Fraction of women using contraceptives of a given type (such as pills or intrauterine devices).
- Typical-use efficacy of different contraceptive types.

We implement this model for three countries: Kenya, Nigeria and Senegal. The data sources for these countries are United Nations *World Population Prospects* (WPP2010)[23] and Demographic and Health Surveys (DHS), supplemented with data from other sources.[24] For DHS data we choose the latest available data for Kenya (2008–2009),[25] Nigeria (2008)[26] and Senegal (2005),[27] since the latest DHS data (2008) do not report contraceptive usage. For default fertility for each country over 2005–2050, we choose the high-fertility variant from WPP2010 since even this variant would assume meeting some unmet need. We use this default fertility to infer age-specific fertility for women over 2005–2050, as if there were no contraceptive use, such that our projected population age structure approximately matches the WPP2010 population projection.

For each country we explore four MUN scenarios: when none of the unmet need for contraception is met, which serves as our baseline (B); when a low level (33%) of unmet need is met (L); when a moderate level (66%) of unmet need is met (M) and when a high level (100%) of unmet need is met (H). In exploring these scenarios we assume that unmet need is met instantaneously, and at the same level across time. While this may seem unrealistic, the purpose of our investigation is not precision of population projections; rather, it is to establish the differences in these projections obtained under the MUN scenarios, which can reveal the differences in the demographic dividend. Making a consistent assumption across all scenarios is therefore adequate. We also assume that all unmet need is filled through the current mix of modern methods.

Population age structure and the demographic dividend

We estimate the demographic dividend for each of the MUN scenarios in two steps: first, we estimate the historical determinants of per capita income growth using the empirical demographic dividend model that formed the basis for the NNG report;[28] second, we use these determinants to project future per capita income growth using the demographic projections from the MUN-AFR model. The model in NNG expresses the per capita income growth rate over a five-year interval as a function of the following variables: per capita income and the working-age share of the population

at the beginning of the interval, the difference in the growth rate between the working-age and total population over the interval, and a set of other control variables at the end of the interval. These other control variables include country-level indicators for tropical location, being landlocked, trade openness, average years of secondary schooling, life expectancy and a measure of the quality of institutions in a country. Bloom and others (2011) estimate the parameters of this model through a cross-country growth regression using five-year country-level panel data from 1965 to 2005 for a global sample of countries.

Projecting the growth rate of per capita output in some future five-year interval requires projecting the above-mentioned determinants of that growth rate. Of these determinants, the MUN-AFR model provides all the demographic determinants of growth in all future periods for any MUN scenario—the working-age share of the population and the growth rates of the working-age and total populations. The last year for which we have complete data on the control variables is 2005, so we make the simplifying assumption that these control variables stay at their 2005 values throughout all future periods in the projection. Although obviously not realistic, our primary interest is to estimate the variations in economic growth, rather than the absolute levels of such growth, under variations in age structure that are induced by different degrees to which unmet need is met. Holding the other determinants of growth fixed helps isolate that impact.

With the above pieces in place, the projection of per capita income takes place step-by-step in five-year intervals, from 2005 onward. We start with actual per capita income in 2005 and use the Bloom and others (2011) demographic dividend model to project its growth rate from 2005 to 2010. We combine this level and growth rate to determine per capita income in 2010. The process is repeated for 2010–2015 and then onward.

Further notes on methodology

In sensitivity analyses we have confirmed that our results are robust to changes in several assumptions—for example, the exact mix of methods used for contraception. We discuss three sets of assumptions in our model below. While discussing our assumptions, we also note that the purpose of our estimation was to determine the differences in benefits under various scenarios for meeting unmet need, rather than projecting the absolute level of benefits that would accrue under any given scenario.

MUN-AFR model

There are two assumptions of note in the MUN-AFR model. First, we assume mortality remains constant over time. This assumption was made only for simplifying the underlying model, and does not seem important as our population projections track the WPP projections well (which use time-varying mortalities) through 2050.

Second, we assume that the shares of women who are married or in union, of those demanding contraceptives and of those using contraceptives remain constant over time. For the WPP2010 fertility variants this assumption would imply that fertility reductions over time are happening because of reasons other than increasing contraceptive prevalence (such as women marrying later because of rising education levels or lessening social pressures). This is unlikely to be true.

But we have made the assumption of constant contraceptive prevalence for a pragmatic reason. First, to estimate the effect of meeting unmet need under a time trend for contraceptive prevalence would have required several other assumptions, for some of which little data would have been available. For example, for any given WPP2010 variant, we would have needed to infer an implied time trend in contraceptive prevalence compatible with this variant, and then guess the unmet need associated with this trend. This strategy would have involved assumptions, such as the method mix used over time, the number of women married or in union in the future, the number of married or in-union women demanding contraceptives but not receiving them and so forth. Since our interest was in the incremental benefit in per capita income

(above the baseline) achieved by meeting unmet need, rather than absolute values of per capita income, we opted for the simplest set of assumptions that could give us broad estimates of the demographic dividend.

Demographic dividend model

A description of the data sources and the assumptions behind the data used for estimating historical economic growth can be found from the NNG report and from Bloom and others (2011). Here we only note the differences in the estimation carried out here from what is in the report.

The principal difference in our estimation from that report is that we do not use time fixed effects or a time trend. We do this because the primary purpose of our estimation exercise here is projection into the future rather than parameter estimation. Using time fixed effects in the estimation would have required projecting the coefficients of future time dummies. Similarly, how to properly extrapolate a time trend into the future is unclear.

Projecting future per capita income growth

The first assumption of note in our model for projecting future growth in per capita income is that, for each country, we are assuming "all things equal." That is, we assume that all variables for a country remain fixed at their 2005 values (life expectancy, level of education, institutional quality), except for fertility and level of contraceptive use.

The projection of future economic growth due to demographic changes can become arbitrarily complicated if all conceivable factors that can influence this growth are included in the model. For instance, we can imagine that output per capita depends on labor force participation rates, labor participation by women, skill mix of the labor force and so forth. Similarly, we know that that the demographic transition is accompanied by improvements in life expectancy, and we believe that realization of the demographic dividend in countries with weak institutions will require improvements in institutional capacity. But as before, we reasoned that any changes in such variables are likely to be similar across the baseline and MUN scenarios we are examining. In calculating the differential benefits across different MUN scenarios and the baseline, we thus kept these variables constant rather than introduce more assumptions into the mix. We think that parsimonious assumptions give us better understanding into how much the main drivers of economic growth influence the differences in income across different MUN scenarios.

The second assumption worth noting is that we assume future growth is solely determined by the variables that were historically associated with growth in a global sample of countries. The impact of this assumption on the difference in income across different MUN scenarios for a given country is not substantial, when the increase in per capita income for a MUN scenario in any year is viewed as a percentage of the baseline per capita income for that country.

Notes

David E. Bloom, Salal Humair, and Larry Rosenberg (Harvard School of Public Health); Jaypee Sevilla (George Mason School of Law); and James Trussell (Office of Population Research, Princeton University and The Hull York Medical School). This research was supported by a grant from the Bill and Melinda Gates Institute for Population and Reproductive Health. It was also supported in part by the Eunice Kennedy Shriver National Institute of Child Health and Human Development grant for Infrastructure for Population Research at Princeton University.

1. The conclusions presented in the chapter would not be substantially different if we used a somewhat different age range for "working age."
2. Although this increase would matter, as explained below, it must be acknowledged that this change is dwarfed by the pace at which this indicator increased in East Asia and the Pacific—from 1.27 in 1975 to 2.45 today—a spurt that took place primarily because of that region's rapid fertility decline.
3. Bloom and Williamson 1998.
4. Bloom and Finlay 2009.
5. Bloom and Williamson 1998; Bloom, Canning and Malaney 2000; Bloom and Canning 2008.
6. Cleland and others 1994; Bongaarts and Sinding 2011.

7. Pritchett 1994.
8. Lutz and KC 2011.
9. See Gertler and Molyneaux (1994) for a study of Indonesia and Miller (2010) for a study of Colombia—both finding that family planning explains a very small share of fertility decline.
10. Nyonator and others 2005.
11. Schultz 2009.
12. UNFPA 2012.
13. Ahmed and others 2012; Singh and Darroch 2012.
14. Bloom and Williamson 1998; Bloom, Canning and Malaney 2000; Bloom, Canning and Sevilla 2003; Bloom and Canning 2008; Bloom 2011.
15. These three countries represent three different rates of fertility decline to date. Nigeria has undergone the slowest change, with its total fertility rate having declined minimally, from a peak of 6.8 children per woman in the late 1970s to 6.0 today. Senegal's total fertility rate has declined more rapidly, from a peak of 7.5 in the late 1970s to 5.0 today. Kenya has seen the fastest reduction, from a peak of 8.1 in the early 1960s (and a level of 7.6 in the late 1970s) to 4.4 today.
16. Although these criteria are somewhat arbitrary, they make sense: A minimally successful program might still reasonably be expected to achieve a one-third reduction in unmet need, whereas a reasonable goal for a moderately successful program would be a two-thirds reduction. We include the no-reduction and complete-reduction scenarios to show the full range of possibilities.
17. Bloom 2011.
18. UNFPA 2012.
19. UNFPA 2012.
20. UN 2013.
21. British Council Nigeria 2010.
22. The total demand for contraceptives, both for spacing and limiting births.
23. UN DESA 2011.
24. Stover, Heaton and Ross 2006; Trussell 2011.
25. KNBS and ICF Macro 2010.
26. NPC and ICF Macro 2009.
27. Ndiaye and Ayad 2006.
28. British Council Nigeria 2010.

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CHAPTER 3

Resolving the puzzle of urbanization without growth

Cuong Nguyen Viet, Mohamed Arouri, Adel Ben Youssef and Agnes Soucat

Urbanization is defined as "the demographic process whereby an increasing share of the national population lives within urban settlements."[1] Settlements are also defined as urban only if most of their residents derive the majority of their livelihoods from nonfarm occupations. Throughout history, urbanization has been a key force in human and economic development.[2]

According to the UN population bureau (2010), Africa's population reached more than 1 billion in 2009, of whom around 40% lived in urban areas. It is expected to grow to 2.3 billion by 2050, of whom 60% will be urban. This urbanization is an important challenge for the next few decades. According to several research papers and reports, Africa's urbanization was, in contrast with most other regions in the world, not associated with economic growth in past decades. For instance, Ravallion, Chen and Sangraula (2007) find that urbanization helps poverty reduction in other regions, but not in Africa.

However, the picture appears to be different now and Africa has been growing at the same rate as the rest of the world, if not better in the recent few years. In 2012 six of the fastest economic growth countries in the world were in Africa (see chapter 1). Rapid urbanization and investment in human capital seems to be modifying the pattern of economic growth in Africa in the recent period, even if there are no academic studies confirming that observation.[3] Governments have often tried to influence the pace or location of urbanization. Generally, efforts consisted in shifting resources from agriculture to finance the expansion of modern and more productive economic sectors—usually manufacturing and services—which were concentrated in cities.

Researchers, governments, international organizations and donors now seem to agree that it is urgent to develop consistent policy actions in urban planning and governance in Africa in the next decades, as African cities are expected to become home of more than half of Africa's population by 2030. Understanding the links between urbanization, human capital and economic growth can help build more efficient urbanization policies in Africa.

The objective of this chapter is to investigate the impacts of urbanization on human capital and economic growth in Africa. It seeks to contribute to the urbanization–growth debate by investigating how urbanization is linked to human capital accumulation and economic growth. More precisely, compared with previous studies on the urbanization-growth nexus, we focus exclusively on African countries, consider both direct and indirect channels through which urbanization may influence economic activity and examine a long period including the evolutions observed in the recent years.

The urbanization-growth nexus in the literature

There are varieties of channels through which urbanization can affect economic growth, and most studies suggest that urbanization should have a positive impact on economic growth.[4]

First, cities play a vital role in the economic and social fabric of both developed and developing countries by offering opportunities for education, employment and health services. Education capital determines the ability of a nation to develop new technologies and adopt existing technologies.[5] Health capital can influence economic

activity directly through its impact on labor productivity.

Expanding education systems in urban areas is easier and costs less than expanding it in rural areas. Returns to education are thus generally found to be higher in urban than rural areas. The effect of urbanization on education is generally positive, and empirical literature shows this correlation especially in Asia. Urban populations have more chance to reach hospitals, care centers and sanitation. Health care systems are also more developed, which may lead to better health performance than those in rural areas. Moreover, urban workers have better access to transport and to other facilities such as water, the Internet and electricity. Firms and workers may have higher productivity in urban than rural areas.

Second, urbanization implies agglomeration of people and firms, which reduces production costs. Urbanization permits external scale and scope economies, reduces transactions costs and allows specialization among firms leading to low costs of production.[6] Rosenthal and Strange (2004) report that doubling the size of cities can lead to an increase in productivity of some 3–8%. Actually, urban areas generate 85% of GDP in high-income countries.

Third, urbanization seems to be a key factor in entrepreneurship.[7] Urban populations access finance and promote easily their ideas and have to some extent a local market (an urban market with higher consumer density) to do business. Loughran and Schultz (2005) show that geography affects firms' performance: all things equal, urban firms are more profitable than rural ones. Poverty reduction can be associated with the ability to become entrepreneurs and to make one's own business. This shift in behavior makes urban areas more attractive for entrepreneurs and entrepreneurship.

Moreover, a city's prosperity and growth depend crucially on its ability to attract productive workers, match them appropriately to jobs, and further develop their skills.[8] The importance of skills has been stressed in urban economics since its beginning. Urbanization causes migration of talent and skilled people to major cities. This concentration causes interactions and engenders spillovers of knowledge and skills. Skilled people upgrade their skills and knowledge more efficiently when they are exposed to similar profiles and skilled people (urban areas) than in places where they do not interact with peers (rural areas). This raises productivity in urban areas.

Fourth, there are spillover effects or positive externalities of urban development on rural areas.[9] Through migration, remittances and interactive activities between urban and rural areas, urbanization can have positive effects on both finance and human capital. Through migration, transfer of information, production skills and technology can all be improved in migrant-sending areas.[10]

However, this positive effect of urbanization on economic growth is not always observed.[11] Both economic theory and empirical studies suggest that there is an inverted U-shape relationship between urbanization and economic growth:[12] in the first stage of development, urbanization improves economic growth; in the second stage, there is a negative correlation between urbanization and economic growth. Rapid urbanization can negatively impact the economy via its effect on straining infrastructures.[13] Thus it seems that the effect of urbanization on economic activity is complex and depends on several factors such as level of development, stage of urbanization, and nature of main economic activities.[14]

In what follows, we investigate the urbanization-growth relationship in Africa by focusing in particular on the impact of urbanization on human capital accumulation.

Methodology

To understand the relationship between urbanization and economic growth in Africa, we proceed in three steps. First, we propose a landscape of African urbanization in order to apprehend what makes urbanization in Africa different from other regions in the world. Second, we test for Granger causality relationships among urbanization, human

capital and economic variables. And third, we run some panel regressions to assess the intensity of links between the variables. More specifically, we run regressions of education and health variables, and GDP per capita on urbanization and other explanatory variables, using panel data from African countries. An outcome variable—GDP, education and health variables—is assumed to be a function of urbanization and other explanatory variables as follows:

$$y_{it}=\beta_0+y_{i,t-1}\beta_1+U_{it}\beta_2+U_{it}^2\beta_3+X_{it}\beta_4+G_t\beta_5+v_i+u_{it}, \quad (1)$$

where y_{it} is an outcome of interest (GDP per capita, economic structure, education and health variables) of country i in year t, and $y_{i,t-1}$ is the lagged dependent variable. U_{it} is the share of urban population in the total population of country i in year t, and U_{it}^2 is the squared share of urban population. X_{it} is a vector of explanatory variables including the population density, the share of population ages 0–14 (% of total) and the share of population age 65 and above (% of total). G_t is a vector of year dummies. The error term is decomposed into time-invariant component v_i and time-variant component u_{it}. The effect of urbanization is measured by β_2 and β_3.

We tend to use a small set of control variables that are more exogenous. The control variables should not be affected by the variable of interest—that is, the share of urban population in this study.[15] As urbanization can affect development and GDP, it can also affect a large number of economic outcomes in the countries. In addition, the difference data were used and time-invariant control variables removed from the estimation. Thus the number of control variables is small in the regressions.

As the estimation of urbanization can be biased due to the correlation between urbanization variables and errors, finding a convincing instrument for urbanization is challenging. In this chapter we first use panel data to eliminate the time-invariant component v_i by the first-differencing of equation (1):

$$\Delta y_{it}=\Delta y_{i,t-1}\beta_1+\Delta U_{it}\beta_2+\Delta U_{it}^2\beta_3+\Delta X_{it}\beta_4+\Delta G_t\beta_5+u_{it} \quad (2)$$

However, it is possible that $\Delta y_{i,t-1}$, ΔU_{it} and ΔU_{it}^2 can still be correlated with Δu_{it}. A widely-used Generalized Method of Moments (GMM) developed by Holtz-Eakin, Newey and Rosen (1988) and Arellano and Bond (1991) are used. The GMM-type instruments for the above differenced endogenous variables are higher-order lags of these variables.

All the data used to obtain the results in the next section are sourced from the World Development Indicators database.[16] A description of summary statistics of variables used in this chapter is given in annex 3.1.

Results: The landscape of African urbanization

Trends and regional differences

Although the rhythm of urbanization in Africa is the highest in the world, the continent is still the least urbanized region. By 2008 the whole of Africa had only 39.1% of its population living in urban areas. This proportion is far behind that of the Arab States (55%), Latin America and the Caribbean (77%), Eastern Asia (43%) and the Organisation for Economic Co-operation and Development (75%). Further, urban population is growing by nearly 3.4% a year making Africa's urban population the fastest growing in the world. Predictions are for about 700% increase over 2000–2030. By 2030 it is projected that half of the African population will reside in urban areas (table 3.1). According to UN-HABITAT (2010), urban population in Africa is expected to increase from 395 million people in 2010 to 1 billion in 2040. For instance, the city of Lagos, home to 8 million in 2000 is expected to exceed 16 million by 2015.[17]

Africa's urbanization varies by subregion. While Northern and Southern Africa exhibit rapid urbanization, Eastern and Western Africa are still mainly rural. Urbanization is unequal in the different African regions because of the differences in geography, culture and economic activities. Understanding the impact of urbanization on economic growth in Africa needs to take into account these differences.

Table 3.1 **Proportion of African population residing in urban areas by subregion, 1980–2030**

Region/subregion	1980	1990	2000	2010	2020	2030
Africa	27.9	32.0	35.9	39.9	44.6	50.0
Eastern Africa	14.4	17.7	21.1	24.6	29.0	34.8
Northern Africa	44.4	48.5	51.1	53.5	56.8	61.3
Southern Africa	31.5	36.7	42.1	47.1	52.3	57.9
Western Africa	29.2	33.0	38.4	44.1	50.1	56.1

Source: UN-HABITAT 2008.

Causes of rapid urbanization in Africa

Urban economic theories usually identify two explanations of rural–urban migration. The first relates to Lewis (1977) focusing on the "pull" side. The second view relates to factors affecting the rural sector that drives the "push" of population shifts into cities. Migration to cities may result from displacement due to civil conflicts, drought or other shocks to agricultural productivity and can be seen as a survival strategy.

In Africa, people migrate to urban areas primarily in response to the better job and economic opportunities available there but also because of climate variability and civil wars. Given the persistence of rural–urban wage gaps in both developed and developing countries, migration to urban areas is unavoidable and even desirable as a way to improve allocation of human resources, especially in land-scarce countries.[18] Africans also migrate to escape for example drought, famine, flooding, internal conflict such as civil war, and inequalities in the spatial distribution of social, cultural and political opportunities. Because Sub-Saharan economies are more dependent on rainfall and agriculture accounts for more than twice the share of GDP there than in other developing regions, climate also causes migration to urban areas. Sub-Saharan Africa suffers from a variety of chronic diseases that affect labor productivity and can be exacerbated by lack of rainfall.

Rapid urbanization is also partly due to improving health condition in cities. Urban areas and cities exhibit rapid growth owing to better health conditions. Cities offer transport, infrastructure and access to knowledge and technology, all of which are highly beneficial to children. Africa is expecting to double its population by 2050, pointing to extensive pressure on urban spaces and urbanization. At the same time, urban populations are more aware of contraception and more likely to have fewer children. Rapid urbanization in Africa cannot be explained, only, by cities: Africa is also the world's youngest region, and in mid-2011 the top 10 countries with the youngest population were in Africa. By 2040 Africa will have the largest workforce, surpassing those in China and India.

Some scholars claim that climate change is affecting agriculture productivity and accelerating rural–urban migration. But many rural dwellers choose to become urban inhabitants and end up in slums, which do not necessarily offer better living conditions than rural areas for a given income. Barrios, Bertinelli and Strobl (2006) use rainfall data to show that low rainfall (low agricultural productivity) is associated with higher contemporary urbanization in Africa. Brückner (2012) finds also that a decrease in the share of agricultural value added leads to a significant increase in urbanization for a panel of 41 African countries during 1960–2007. Poelhekke (2011) explains African urbanization mainly by rural–urban migration as an insurance mechanism for agricultural risk—due to higher aggregate agriculture risk, which induces rural–urban migration. Uninsurable expected risk will lead such migration, and climate change may accelerate it if solutions like micro-insurance and change in productive methods (such as irrigation) are not brought in.

Poverty

Urbanization in Africa is characterized by high poverty. Sub-Saharan African countries

have the highest levels of urban poverty in the world. Despite African cities generating about 55–60% of the continent's GDP, 43% of its urban populations live below the poverty line. Urban poverty in Africa frequently manifests itself in unequal access to decent housing. The majority of the urban and peri-urban poor also tend to live in ecologically fragile zones where they overexploit the surrounding lands.

Urbanization in Africa is also characterized by a high proportion of urban poor living in slums: Sub-Saharan Africa's slum population was recently more than 60% among urban residents. They tend to lack basic urban services such as access to sanitation, clean water, energy and solid waste disposal. This population is likely to be adversely affected by climate change and its effects.

Education

Urbanization improves access to basic education for all. Expanding education systems in urban areas is easier and costs less than in rural areas. Thus Africa's rapid urbanization is expected to increase enrollment, especially at primary level. Indeed, the nature of cities appears to provide incentives for investment in education by residents. Returns to education are generally higher in urban than rural areas—and so literacy rates and enrollment should be higher in urban than rural areas.

It seems that there is a positive relationship between urbanization and education (table 3.2): school enrollment at both primary and secondary level increases with urbanization. While enrollment in primary schools is less than 50% in regions with an urban population share less than 20%, it is more than 88% for regions with an urban population share between 50% and 90%. Enrollment in secondary school shows more profound effects. The average enrollment rate in areas with urbanization less than 20% is 12.2%. This rate is 55.2% for areas with an urbanization rate between 50% and 90%. Moreover, urbanization is closing the gender gap. The primary enrollment gap in areas where urbanization is between 30% and 40% is 11.9% higher for male than female students, while this rate is only 4.1% in favor of male students in areas where urbanization is between 50% and 90%. In secondary schools, the dividend is more pronounced. The secondary enrollment rate gap in areas where urbanization is between 30% and 40% is 5.2% higher for male than female students, while this rate moves in favor of females with a gap of 2.2% in favor of female students in areas where urbanization is between 50% and 90%. Urbanization seems to imply a double dividend: fostering global enrollment rate in primary and secondary schools, and closing the gender gap.

Tertiary education is very weak in Africa with only 3.9% of the population enrolled. Urban enrollment in tertiary education in areas with an urban share between 50% and 90% is 10 times as high as in areas with urbanization below 20% (table 3.3). As at primary and secondary level, urbanization seems to help close the gender gap at tertiary level, too.

Table 3.2 **Primary and secondary school enrollment by urban population share**

Urban population share (%)	School enrollment, primary (% of net)	School enrollment, primary, female (% of net)	School enrollment, primary, male (% of net)	School enrollment, secondary (% of net)	School enrollment, secondary, female (% of net)	School enrollment, secondary, male (% of net)
0–20	49.6	47.3	49.7	12.2	12.1	12.8
20–30	60.0	54.8	63.5	18.6	17.4	19.2
30–40	67.1	60.6	72.5	23.8	21.2	26.3
40–50	75.6	69.3	77.3	39.4	37.9	41.5
50–90	88.3	84.6	88.7	55.2	54.0	51.8
Total	66.5	61.5	68.4	25.1	23.9	25.5

Source: Authors' estimation using World Development Indicators database.

Table 3.3 **Tertiary school enrollment by urban population share**

Urban population share (%)	School enrollment, tertiary (% of net)	School enrollment, tertiary, female (% of net)	School enrollment, tertiary, male (% of net)
0–20	1.1	0.6	1.4
20–30	2.0	1.4	2.7
30–40	2.9	1.7	4.4
40–50	8.7	7.4	11.3
50–90	11.1	10.9	11.8
Total	3.9	3.3	5.0

Source: Authors' estimation using World Development Indicators database.

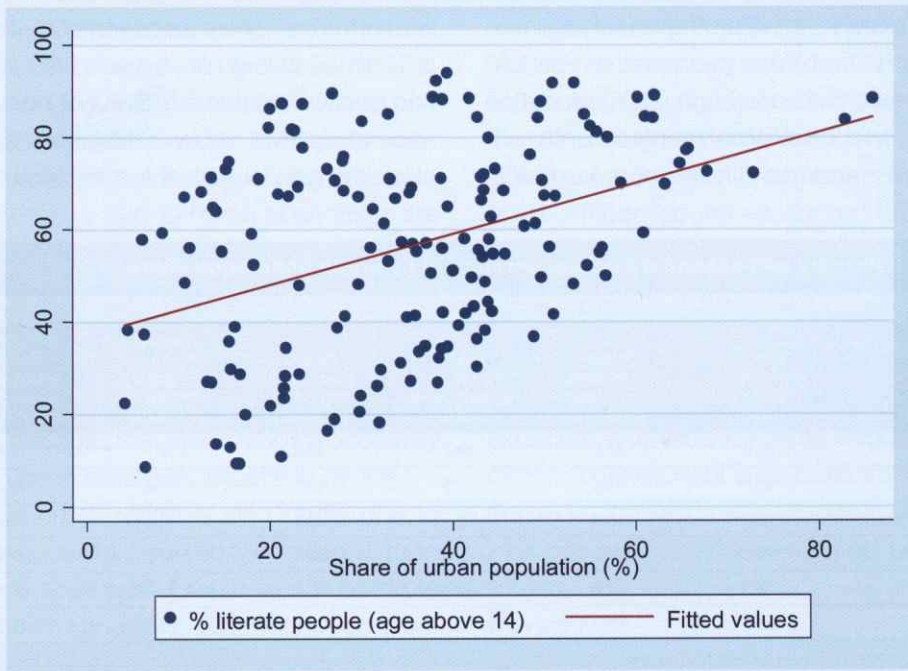
There a strong positive correlation between the literacy rate and urban population share in Africa (figure 3.1). Africa seems to benefit from this urbanization dividend.

Health

Urban populations have more chance to reach hospitals and care centers, and to have access to sanitation. Health care systems are also more developed, which may lead to better health performances than those in rural areas. Fink and Hill (2013) demonstrate that urbanization heavily cuts under-five mortality in developing countries (rural areas still account for the overwhelming majority of child deaths). However, urbanization is also associated with substantial pollution (air and water) and pervasive traffic congestion. In particular, rapid and generally unplanned urbanization in Africa is associated with environmental deterioration, settlement on marginal lands and degradation of basic services such as such as drinking water, sanitation and waste disposal and treatment. This may lead to health problems, and as a result the total effect of urbanization on health is unclear and depends strongly on public policies pursued by governments.

Life expectancy is 16.2 years more in areas where urbanization is between 50% and 90% than in areas where it is below 20% (table 3.4). Life expectancy at birth is higher

Figure 3.1 **Literacy and urban population share**



Source: Authors' estimation using World Development Indicators database.

for females than males in all areas and the difference is stable, and does not seem linked to urbanization. On average females have three years of life expectancy more than males.

The infant mortality rate changes with the urban population share. It is 118.4 per 1,000 live births for areas under 20% but only 47.8 per 1,000 live births in areas with an urban population share from 50% to 90%. Under-five mortality shows a more pronounced effect: it is 204.3 per 1,000 live births where the urban population share is less than 20% and only 69.5 per 1,000 live births where that share is between 50% and 90%. Access to hospitals and to care centers, better health information and public health in rural areas may explain these figures and the significant differences.

Childhood malnutrition is still high in Africa: 38.7% of children under five have malnutrition, which seems linked to urbanization. While the prevalence of malnutrition (height for age) in areas with an urban population share below 20% is 48.9%, this figure is only 25.3% in areas with an urban population share between 50% and 90%. The same trend is found with weight for age: while the rate is about 26.2% in areas with an urban population share below 20%, the figure is only 9.5% in areas where that share is between 50% and 90%.

Differences between urban and rural areas in health care centers and access to health facilities explain the differences in life expectancy and childhood malnutrition (table 3.5). On average, only 46.2% of African children are taken to a health provider: only 41.7% in areas with an urban share less than 20% and 51.2% in areas with an urban share between 50% and 90%. Moreover, births attended by skilled staff are only 38.3% in areas with an urban population share below 20% and 78.0% in areas with that share between 50% and 90%. Urban parents are twice as likely as rural parents to have a child attended by skilled staff. The number of community health workers per 1,000 inhabitants

Table 3.4 Life expectancy and child mortality by urban population share

Urban population share (%)	Life expectancy at birth, total (years)	Life expectancy at birth, female (years)	Life expectancy at birth, male (years)	Mortality rate, infant (per 1,000 live births)	Mortality rate, under-5 (per 1,000 live births)
0–20	45.8	47.1	44.5	118.4	204.3
20–30	48.7	50.0	47.4	106.0	174.9
30–40	50.7	52.1	49.4	97.9	158.4
40–50	57.9	59.9	56.1	72.3	108.3
50–90	62.0	63.8	60.2	47.8	69.5
Total	50.5	52.0	49.1	97.2	159.9

Source: Authors' estimation using World Development Indicators database.

Table 3.5 Health care utilization by urban population share

Urban population share (%)	% of children under 5 taken to a health provider	Births attended by skilled health staff (% of total)	Community health workers (per 1,000 people)	Health expenditure, public (% of government expenditure)	Health expenditure, total (% of GDP)
0–20	41.7	38.3	0.51	9.8	5.8
20–30	48.6	49.2	0.58	10.4	5.3
30–40	45.5	50.1	0.24	9.6	5.9
40–50	46.3	59.4	0.23	8.2	5.3
50–90	51.2	78.0	0.35	8.2	5.0
Total	46.2	54.1	0.36	9.2	5.5

Source: Authors' estimation using World Development Indicators database.

is higher in areas with a less than 20% urban population share than in areas with that share between 50% and 90%.

Careful examination of those living in slums is needed. Antai and Moradi (2010) show that under-five childhood mortality increased in those areas in Nigeria during 1983–2003. So, while global trends show a generally positive impact of urbanization on health, more studies on these disadvantaged areas are needed.

Economic transformation

Employment in agriculture is still high in Africa (table 3.6). On average, 37.1% of the total is in that sector. However, the picture is highly contrasted between less (76.1%) and more urbanized areas (21.3%). Agricultural value added shows the same pattern: in developed countries it is around 2% of GDP, but in Africa is still very high at 30.5%. Urbanization is affecting this pattern, though. For less urbanized areas, agriculture value added is 41.8% but only 10.0% in more urbanized areas.

Urbanization is causing economic transformation of Africa, confirmed when we observe industry and services. Industry grows in more urbanized areas. Employment in industry varies from 6.1% in less urbanized areas to 26.1% in the most urbanized areas. Industrial value added is also linked to urbanization. While it accounts for 18.3% in the less urbanized areas, it accounts for 39.0% in the most urbanized areas. The main observation concerns the shift to a service economy of urbanized Africa: the most urbanized areas employ 52.6% of workers in services, the less urbanized areas 17.8%. Services value added in the most urbanized areas is 51.0% of GDP.

These findings confirm the hypothesis according to which urbanization is shifting Africa's economy from agriculture to services. This shift is due to the availability of workers and skills in urban areas. But despite this shift, unemployment and poverty are high, especially in urban areas.

Economic growth

The relationship between GDP per capita and urban population share seems to be positive (figure 3.2). While countries below 20% of urban population share have the weakest GDP per capita, countries over 60% have the strongest. Intermediate countries vary widely. The relationship is clearer when we observe North African countries. GDP per capita is strictly increasing with urban population share. The explanation of this relationship, as our conceptual framework advocates, is that urbanization permits human capital accumulation, which implies growth as endogenous growth theories suggest. The economic transformation allows the hiring of people in more efficient sectors offering better wages.

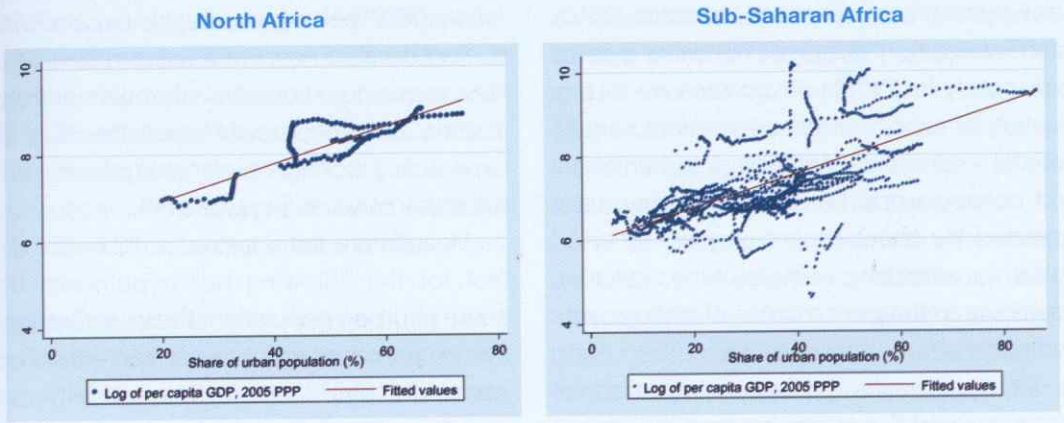
However, when looking at Sub-Saharan Africa the positive relationship between urbanization and economic growth appears to be less clear. In the next subsections, we will use robust statistical techniques to test for the significance of this relationship and the intensity of the potential impact of urbanization on economic growth in Sub-Saharan Africa. Indeed, there was a mystery over the lack of a positive relationship between growth

Table 3.6 **Economic structure by urban population share**

Urban population share (%)	Employment in agriculture (% of total employment)	Employment in industry (% of total employment)	Employment in services (% of total employment)	Agriculture value added (% of GDP)	Industry value added (% of GDP)	Services value added (% of GDP)
0–20	76.1	6.1	17.8	41.8	18.3	40.0
20–30	74.6	5.6	19.8	32.0	23.9	44.1
30–40	52.0	11.2	36.8	31.5	26.4	42.1
40–50	27.6	25.1	47.3	20.5	30.4	49.1
50–90	21.3	26.1	52.6	10.0	39.0	51.0
Total	37.1	20.2	42.8	30.5	25.5	44.0

Source: Authors' estimation using World Development Indicators database.

Figure 3.2 GDP per capita and urbanization in Africa

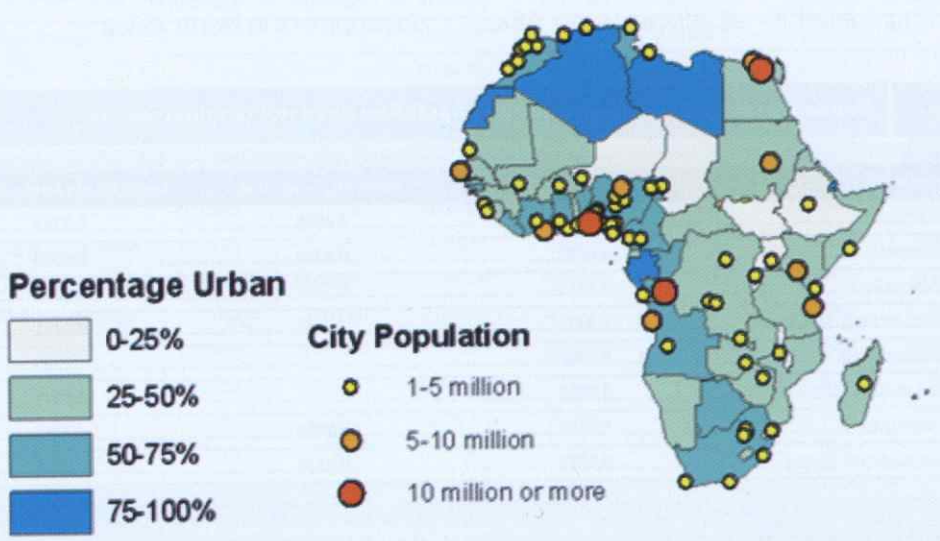


Source: Authors' estimation using World Development Indicators database.

and urbanization in Sub-Saharan Africa over the past decades. While in other parts of the world, migration from rural areas to urban areas is explained by the externalities of urbanization and changes in the economy, Barrios, Bertinelli and Strobl (2006) indicate that "unlike the rest of the world, African urbanization has been driven by geographical 'first nature' conditions, climate change, in particular, that have made the countryside unviable. Urbanization is 'flight,' reflecting choices made under duress, rather than migration to unduly attractive cities." Annez, Buckley and Kalarickal (2010) extend this analysis and find similar results.

Moreover we should notice that in contrast to Asian and Latin American developing countries, Africa does not have enough mega-cities (figure 3.3).[19] This leads to lack of agglomeration effects and areas of innovation. Cities are not serving as engines of growth and structural transformation. Instead, they form part of a major symptom of economic and social crisis that have enveloped the continent.[20] However, the picture seems to be changing: several cities in Africa are exhibiting huge transformations, including urbanization rates, which are among the highest in the world. Weak economic performance in Africa was associated with its

Figure 3.3 Urbanization in Africa



Source: UN-HABITAT 2012.

economic geography given its small market size, undersupply of public goods and weak business environment. Venables (2010) associates also the lack of big cities as one explanatory factor. He advocates developing clusters of export-oriented manufacturing in coastal economies: "Africa's fragmentation and consequent urban structure may have impeded the development of major international manufacturing centers of the type that contribute to the performance of high growth economies."[21]

Finally, it seems that urbanization in Africa is rapid but is not backed by urban-based investment or much formal-enterprise growth. This too is something of a puzzle.[22] Most urban business in Africa is in the informal sector. Elgin and Oyvat (2013) show an inverted U-shape relationship between informality and urbanization. In the early stage of urbanization the informal sector grows, but tends to fall in the later stages. African urbanization can be considered as an earlier stage, leading to expansion of the informal sector (see chapter 6). The high proportion of informality may help explain the weak economic growth associated to urbanization in Africa in the last decades.

Granger causality tests

Before estimating the intensity of the impact of urbanization on human capital and economic activity in Africa using regressions, we proceed to Granger causality tests on data aggregated for all Africa, North Africa and Sub-Saharan Africa. We consider the following variables: child mortality, employment, GDP per capita, health expenditure, human development (combining indicators of life expectancy, educational attainment and income into a composite index, the HDI), life expectancy, school enrollment (primary) and the share of urban population.[23]

Results are summarized in table 3.7. We test for the following null hypothesis: the share of urban population does not Granger-cause the other variables of interest. Thus, we report the *p*-value for the causality running from the share of urban population to the other studied variables. Recall that the *p*-value provides the smallest level of significance at which the null hypothesis would be rejected, the smaller the *p*-value, the stronger the evidence is in favor of the alternative hypothesis of causality.

When data aggregated over all Africa are considered, the share of urban population Granger-causes employment, government and global health expenditure, and human capital development. Thus our findings suggest that urbanization by offering more job opportunities increases the rate of employment and public and private investments in health, increasing human capital.

In North Africa the share of urban population Granger-causes employment and life expectancy. However, urbanization does not seem to be linked to private and public expenditure, or to the global index of human development in North Africa.

Table 3.7 **Causality tests: The share of urban population does not Granger-cause**

Variable	All Africa: *p*-value	North Africa: *p*-value	Sub-Saharan Africa: *p*-value
Child mortality	0.5202	**0.0568**	**0.3347**
Employment	**0.0592**	**0.0389**	**0.0806**
GDP per capita	0.6845	0.5798	**0.0082**
Government health expenditure	**0.0474**	0.1149	**0.0271**
Health expenditure	**0.0608**	—	0.1268
Human capital development	**0.0008**	—	**0.0041**
Life expectancy	0.9580	**0.0056**	0.7422
School enrollment-primary	**0.0052**	**0.0332**	**0.0021**

Note: — denotes that the considered variable is not cointegrated with the share of urban population. Figures in bold indicate significance at 10% significance.

Source: Authors' estimation using World Development Indicators database.

In Sub-Saharan Africa the findings in the last column show that the share of urban population Granger-causes GDP per capita and human capital development. If we look at details: urbanization affects employment and health expenditure. However, the global effect on life expectancy is not significant. The next subsection examines further these relationship based of panel regression results.

Regression results

The GMM-instrumental regressions are presented in tables 3.8–3.10.[24] Table 3.8 shows that the effect of urbanization on education enrollment is positive and statistically significant. The positive effect holds for all the education level and for both boys and girls. A 1 percentage point increase in the share of urban population is associated with a 0.25 percentage point increase in primary school enrollment. The effect of the urban population on secondary and tertiary school enrollment is 0.96 and 0.07 percentage points, respectively.

In table 3.9, we examine the effect of the urban population share on health variables. We find a positive effect of the urban population share on the life expectancy, and this effect is diminishing across the level of the urban population share. It means an inverted U-shape relationship between the urban population share and life expectancy. The effect of urbanization on mortality rate also follows a U-shape curve. It means that in the early stages the mortality rate decreases as urbanization increases, but in the later stages it increases as urbanization continues. Possibly, the constraints on health care facilities in urban areas cannot provide good health care services for urban populations as it grows quickly. Other issues may be pollution and environments in urban areas that can cause health problems for urban dwellers.

The effects of urbanization on GDP and economic structure of the economy is presented in table 3.10. It shows an inverted U-shape relationship between the urban population share and per capita GDP. The peak of urbanization is around 73%—equal to 0.00391/(2*0.0000269). After this point, higher urbanization is associated with decreasing per capita GDP if other factors are kept constant. When we exclude North African countries and run the regression

Table 3.8 GMM regressions of education variables on the share of urban population

Explanatory variables	School enrollment, primary (% of net)	School enrollment, primary, female (% of net)	School enrollment, primary, male (% of net)	School enrollment, secondary (% of net)	School enrollment, secondary, female (% of net)	School enrollment, secondary, male (% of net)	School enrollment, tertiary (% of gross)	School enrollment, tertiary, female (% of gross)	School enrollment, tertiary, male (% of gross)
Share of urban population (%)	0.25307***	0.14358**	0.62771***	0.86897***	−0.52769**	0.95221***	0.06972***	0.06266***	0.09481***
	(0.06060)	(0.06902)	(0.18547)	(0.20785)	(0.24609)	(0.33238)	(0.01076)	(0.02082)	(0.02236)
Squared share of urban population (%)			−0.00502**		0.01354***				
			(0.00220)		(0.00303)				
Lagged dependent variable	0.88529***	0.90227***	0.84468***	−0.04292	0.55927***	−0.16145***	0.90005***	0.85870***	0.82878***
	(0.01931)	(0.02085)	(0.02412)	(0.05840)	(0.05610)	(0.05564)	(0.01280)	(0.02220)	(0.02185)
Population ages 0–14 (% of total)	0.33299***	0.25728**	0.33383**	0.43497	0.23703	0.54265	−0.07520***	−0.10002***	−0.07301*
	(0.10994)	(0.11735)	(0.13685)	(0.32785)	(0.19725)	(0.56201)	(0.02355)	(0.03805)	(0.04052)
Population ages 65 and above (% of total)	0.24793	−0.10451	0.77619	1.04978	−5.81053***	6.38029**	0.36197***	0.43991**	0.36645*
	(0.64061)	(0.69606)	(0.78704)	(1.66933)	(1.32447)	(2.87593)	(0.11616)	(0.20477)	(0.21036)
Population density (people per sq. km of land area)	0.11071***	0.09718***	0.09830***	0.00199	0.08694**	−0.03959	−0.00151	−0.00846*	−0.00133
	(0.01911)	(0.02111)	(0.02416)	(0.06115)	(0.03504)	(0.09935)	(0.00222)	(0.00490)	(0.00518)
Constant	−21.7058***	−16.3724**	−24.1638***	−21.6134	15.34794	−35.38091	0.96120	2.28318	0.01559
	(7.31914)	(7.8247)	(8.5270)	(15.8510)	(10.24626)	(26.77516)	(1.50525)	(2.52726)	(2.70147)
Observations	730	649	649	257	249	249	957	699	699
Number of countries	48	47	47	38	38	38	49	48	48

Note: Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation using World Development Indicators database.

Table 3.9 GMM regressions of health variables on the share of urban population

Explanatory variables	Life expectancy at birth, female (years)	Life expectancy at birth, male (years)	Life expectancy at birth, total (years)	Mortality rate, infant (per 1,000 live births)	Mortality rate, under-5 (per 1,000 live births)	Health expenditure, public (% of government expenditure)	Health expenditure, total (% of GDP)
Share of urban population (%)	0.01252***	0.01376***	0.01313***	−0.09772***	−0.19343***	0.13483***	0.08748***
	(0.00111)	(0.00147)	(0.00107)	(0.00369)	(0.01866)	(0.05232)	(0.02455)
Squared share of urban population (%)	−0.00029***	−0.00029***	−0.00029***	0.00123***	0.00238***	−0.00166***	−0.00102***
	(0.00001)	(0.00002)	(0.00001)	(0.00005)	(0.00024)	(0.00059)	(0.00028)
Lagged dependent variable	1.00042***	0.99658***	0.99888***	0.99007***	0.98474***	0.64543***	0.82175***
	(0.00066)	(0.00096)	(0.00067)	(0.00068)	(0.00179)	(0.02803)	(0.02264)
Population ages 0–14 (% of total)	0.02475***	0.01559***	0.01991***	−0.08436***	−0.22150***	0.01125	−0.02446
	(0.00118)	(0.00157)	(0.00113)	(0.00488)	(0.02448)	(0.03745)	(0.01719)
Population ages 65 and above (% of total)	0.05012***	0.03142***	0.03944***	−0.12249***	−0.41749***	−0.17175	−0.24224**
	(0.00684)	(0.00903)	(0.00657)	(0.02832)	(0.14290)	(0.21351)	(0.10049)
Population density (people per sq. km of land area)	0.00060***	0.00058***	0.00059***	−0.00298***	−0.00635***	0.00435***	0.00154***
	(0.00011)	(0.00014)	(0.00010)	(0.00018)	(0.00091)	(0.00106)	(0.00049)
Constant	−0.82120***	−0.26074***	−0.54346***	4.63609***	12.46084***	0.76159	1.16725
	(0.06865)	(0.08970)	(0.06552)	(0.29581)	(1.51512)	(2.67605)	(1.22898)
Observations	2,559	2,559	2,559	2,400	2,400	794	796
Number of countries	51	51	51	51	51	51	51

Note: Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation using World Development Indicators database.

Table 3.10 GMM regressions of GDP and economic structure

Explanatory variables	Log of per capita GDP, 2005 PPP	Employment in agriculture (% of total employment)	Employment in industry (% of total employment)	Employment in services (% of total employment)	Agriculture value added (% of GDP)	Industry value added (% of GDP)	Services value added (% of GDP)
Share of urban population (%)	0.00391***	−5.5947	10.1816***	−1.8874	−0.03250	−0.01413	0.10471**
	(0.00112)	(8.5863)	(3.1489)	(6.3539)	(0.04421)	(0.03883)	(0.04539)
Squared share of urban population (%)	−0.00003**	0.04451	−0.08415***	0.01085	0.00035	0.00008	−0.00099**
	(0.00001)	(0.07852)	(0.02871)	(0.05850)	(0.00046)	(0.00041)	(0.00047)
Lagged dependent variable	0.95818***	0.63939***	0.68499***	0.59394***	0.89489***	0.91974***	0.81397***
	(0.00619)	(0.10867)	(0.09945)	(0.11332)	(0.00997)	(0.00915)	(0.01321)
Population ages 0–14 (% of total)	0.00316***	−1.84640*	0.68634*	0.80764	−0.02747	0.06186	−0.03301
	(0.00103)	(1.07792)	(0.37394)	(0.76018)	(0.04396)	(0.03858)	(0.04467)
Population ages 65 and above (% of total)	0.01623***	2.10820	−1.55911	−1.01752	−0.07249	−0.17843	0.61022**
	(0.00570)	(4.31332)	(1.49726)	(3.30918)	(0.25294)	(0.22150)	(0.26038)
Population density (people per sq. km of land area)	−0.00002	−0.29000	0.13543**	0.17889	−0.00845*	−0.00401	0.01993***
	(0.00009)	(0.18189)	(0.06406)	(0.13478)	(0.00433)	(0.00373)	(0.00445)
Constant	0.03680	266.440	−316.297***	36.19302	4.61237*	1.44926	4.01029
	(0.08122)	(250.91400)	(91.68356)	(186.35581)	(2.69625)	(2.31628)	(2.69010)
Observations	1459	88	88	88	2017	1991	1995
Number of countries	49	11	11	11	51	51	51

Note: Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' estimation using World Development Indicators database.

using the sample of Sub-Saharan countries, we find very similar results of an inverted U-shape with a peak around 70%. The share of employment in industry and the share of services in GDP also follow an inverted U-shape relationship with urbanization.

Using more robust econometric techniques, Arouri and others (2014a,b) confirm that the relationship between urbanization and economic growth in Africa is nonlinear and that human capital accumulation shapes this relationship: a good level of human development benefits the growth effect of urbanization, while a weak human capital development amplifies negative effects of urbanization.

Conclusions and policy implications

The dynamic panel data regressions we used to estimate the effect of urbanization on human capital and per capita GDP of African countries show an inverted U-shape relationship between the urban population share and per capita GDP. Urbanization also shows impacts on human capital variables, such as enrollment rates and health variables. Africa's human capital is fostered by these impacts, which are permitting greater and faster growth. Urbanization is reshaping the sectoral composition of the economy: services account for 51% of GDP in the most urbanized economies, and agriculture 76.1% of total employment in the less urbanized countries.

Our empirical findings suggest several policy implications.

Africa needs to build urbanization skills that can manage the rapid urbanization process. Sub-Saharan Africa now has inadequate planning systems, planning laws and building standards, bureaucratized and inefficient land policy and a shortage of qualified and active planners. Urban policies need to be revised in depth to foster human capital. At least five topics should be considered: training and education for urban decision-makers; location management and subsidies, development of secondary towns, data for urbanization management, and management of the informal economy.

The provision of urban infrastructure is key for boosting the urbanization dividend. Rural–urban migration is still an open debate. According to the World Bank (2009) and Annez, Buckley and Kalarickal (2010), subsidies to assist the poor should be location neutral. Individuals rather than policymakers are in the best position to determine where they should live. But saying this implies that "laissez-faire" may lead to an anarchic growth of cities and towns in Africa with huge implications for providing clean water, electricity and waste management. There is a strong need to build and provide urban infrastructure, especially for marginalized peoples. The growth of anarchic slums in Africa without urban infrastructure needs to be reversed.

At the same time, for long-term rural–urban migration to reemerge as a major economic and demographic force, African urban economies must deliver greater economic security to the majority of urban residents.[25] Security in urban Africa needs to be put on the political agenda.

Moreover, as it is well known, big cities need complex skills for their management and to be governed by participatory mechanisms. There is an urgency to address the challenge of skills for urban planners and more generally curricula in urbanization schools. While most academic papers, donor interventions and development agencies focus on big cities, new academic findings stress the possible role of secondary towns for inclusive growth.[26] These new approaches need to be confirmed by further research, but they also imply change in policymakers' decisions on secondary towns.

Finally, one should notice that urban policy in many African countries is simply absent or even sometimes "anti-urban."[27] Consequently, the precarious living conditions that define slums and informal work continue in a policy vacuum. Further, the data and analysis necessary to inform policy at country and city scales are inadequate or just do not exist.[28] Urbanization management needs to produce open data helping researchers and policymakers to do the right analysis and take the right decisions. Unfortunately, urban statistics for Africa may be "highly suspect," and many can be shown to be "downright wrong."[29]

Annex 3.1 Summary statistics of variables

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Dependent variables					
Log of per capita GDP, 2005 PPP	1,557	7.40	0.97	4.62	10.22
School enrollment, primary (% net)	930	66.54	22.25	9.70	100.00
School enrollment, primary, female (% net)	834	61.46	23.65	7.16	99.38
School enrollment, primary, male (% net)	834	68.41	20.14	12.18	99.96
School enrollment, secondary (% net)	371	25.09	21.04	0.09	97.57
School enrollment, secondary, female (% net)	357	23.88	21.54	0.05	99.71
School enrollment, secondary, male (% net)	357	25.54	19.94	0.14	98.13
School enrollment, tertiary (% gross)	1,181	3.92	5.75	0.00	37.08
School enrollment, tertiary, female (% gross)	934	3.32	6.43	0.00	44.88
School enrollment, tertiary, male (% gross)	934	5.03	6.24	0.00	35.03
Wage and salaried workers, total (% of total employed)	135	42.06	26.50	1.40	84.80
Health expenditure per capita, PPP (constant 2005 international $)	847	150.29	204.57	0.00	1,806.48
Health expenditure, public (% of government expenditure)	849	9.19	3.80	0.00	26.90
Health expenditure, total (% of GDP)	851	5.48	2.54	0.00	22.19
Life expectancy at birth, female (years)	2,666	51.99	9.02	28.37	78.90
Life expectancy at birth, male (years)	2,666	49.10	8.38	25.24	72.90
Life expectancy at birth, total (years)	2,666	50.51	8.67	26.76	74.75
Mortality rate, infant (per 1,000 live births)	2,536	97.15	41.74	11.20	237.40
Mortality rate, under-5 (per 1,000 live births)	2,536	159.91	78.82	13.10	486.00
Employment in agriculture (% of total employment)	171	37.09	24.83	3.20	92.20
Employment in industry (% of total employment)	171	20.16	10.88	2.10	43.10
Employment in services (% of total employment)	171	41.54	16.13	5.60	68.60
Agriculture, value added (% of GDP)	2,079	30.54	17.08	1.82	94.85
Industry, value added (% of GDP)	2,055	25.47	13.86	1.88	94.42
Services, etc., value added (% of GDP)	2,058	44.17	12.33	2.96	84.17
Explanatory variables					
Share of urban population (%)	2,756	28.79	15.68	2.04	86.46
Population ages 0–14 (% of total)	2,756	43.48	4.43	20.17	50.33
Population ages 65 and above (% of total)	2,756	3.34	1.03	1.15	8.38
Population density (people per sq. km of land area)	2,601	56.94	87.71	0.75	633.52

Source: Authors' estimation using World Development Indicators database.

Notes

1. Potts 2012.
2. Bairoch 1988.
3. Mijiyawa 2013.
4. See, for example, Fay and Opal (2000) and Bertinelli and Black (2004).
5. Aghion and Howitt 2009.
6. Kumar and Kober 2012; Krugman 1991; Fujita, Krugman and Mori 1999.
7. Glaeser, Rosenthal and Strange 2010.
8. Bacolod, Blum and Strange 2010.
9. Bairoch 1988; Williamson 1990; Allen 2009; Cali and Menon 2009.
10. McKenzie and Sasin 2007.
11. Fay and Opal 2000.
12. Henderson 2003.
13. Alam, Fatima and Butt 2007.
14. Castells 2011.
15. Heckman, Lalonde and Smith 1999; Angrist and Pischke 2008.
16. World Bank 2013. There are yearly data on 1,301 indicators of countries throughout the world since 1960. It has annual data on 1,301 indicators of countries throughout the world since 1960. It contains data on the share of countries' urban populations since 1960. However, many indicators such as those for health, education and employment are available only for recent years. See http://data.worldbank.org/.
17. Anderson and others 2013.
18. World Bank 2009.
19. World Bank 2009.
20. World Bank 2000.
21. Venables 2010.
22. Bryceson 2006.
23. We proceed in three steps. First, to determine the order of integration of our series we apply three standard unit root tests: Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski and others (KPSS) tests. The ADF and PP tests are based on the null hypothesis of a unit root, while the KPSS test considers the null of no unit root. Results suggest that the series appear to be integrated of order one, which is a standard result in the literature for such series. Second, we apply three tests of the null hypothesis of no cointegration between the share of urban population and the considered series: ADF, PP and Johansen tests. In most cases, the considered variables appear to be cointegrated with the share of urban population, which suggests that urbanization moves together over the long-run with human capital and economic activity in Africa. Third, we implement Granger causality tests.
24. We first include the squared share of urban population in all the regressions. However, in several regressions, the squared share of urban population is not statistically significant. For these regressions, we drop this squared share of urban population and use the linear function. It should be noted that we also run regression for the sample of Sub-Saharan countries and the results are very similar to those based on the full sample of all the Sub-Saharan countries. Possibly, the number of North African countries is very small compared with the number of Sub-Saharan countries. In this chapter, we report the regression results using the sample of all the African countries.
25. Potts 2012.
26. Dorosh and Thurlow 2013; Christiaensen, de Weerdt and Todo 2013.
27. Pieterse 2010.
28. Pieterse 2010.
29. Potts 2012.

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CHAPTER 4

Building resilience to a changing climate

Nikhil Desai and Caroline Jehu-Appiah

This chapter outlines strategies to reduce human vulnerabilities to adverse impacts of climate change in Africa. It proposes that human development should hold a central place in Africa's efforts to mitigate and adapt to climate change. To make these efforts inclusive and pro-poor, there is a need to protect the most vulnerable groups against climate-related risks and develop the technical skill base for sustainable development and job creation.

Key human development interventions include reducing the climate-sensitive burden of disease, strengthening the skill base for climate risk reduction, expanding and promoting universal access to high-quality social services, advancing modern energy transition and installing monitoring and information systems to provide timely warning for disaster risk management and reduction. These proposed interventions are consistent with the Rio+20 UN Conference on Sustainable Development and emerging themes at international climate negotiations.

Climate variability and impacts on African poverty

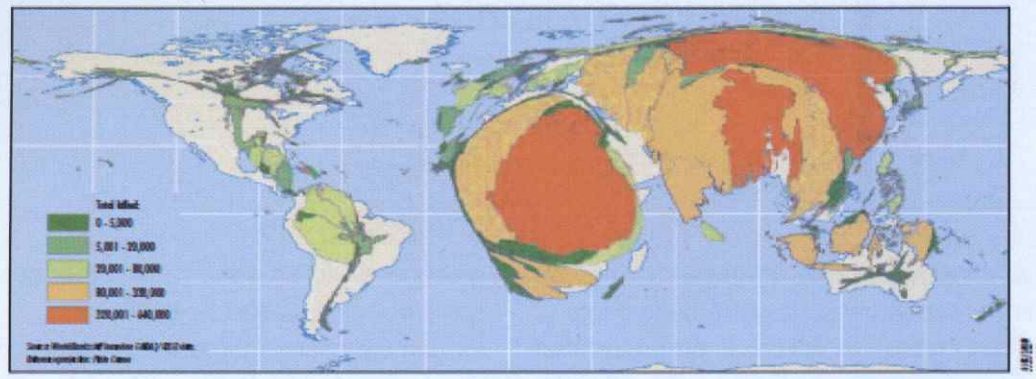
Two definitions of climate change are in common use: total and anthropogenic. By the first definition, climate change refers to identified long-term changes in climate properties, regardless of cause. By the second, climate change refers to the component of change attributable to human activities since the beginning of the industrial age. Most agree that long-term anthropogenic climate change is driven by two main elements: rising atmospheric stocks of greenhouse gases and changes in land-use patterns. These greenhouse gases include carbon dioxide—believed to produce about half the additional greenhouse effect—and many other gases, some of which present health hazards.

Climate change threatens human capital development, especially in developing countries. Climate change, population growth and increased consumption of food, water and energy are stalling and even reversing progress built over generations.[1] The consequences are much more severe for poor people, whose livelihoods depend heavily on the weather. Declining agricultural productivity, worsening water and food security issues and rising incidence and severity of storms, floods and droughts bring health and development risks. Short-term shocks can have long-term consequences and contribute to the intergenerational persistence of poverty and low human development.

Disasters affect African countries more severely than richer countries (figures 4.1 and 4.2). In richer countries disasters may result in the loss of fixed, often insured property. But in poorer countries they more frequently cause deaths, disease and loss of animals or crops that are often uninsured. Such differences are also found within countries between richer and poorer groups.

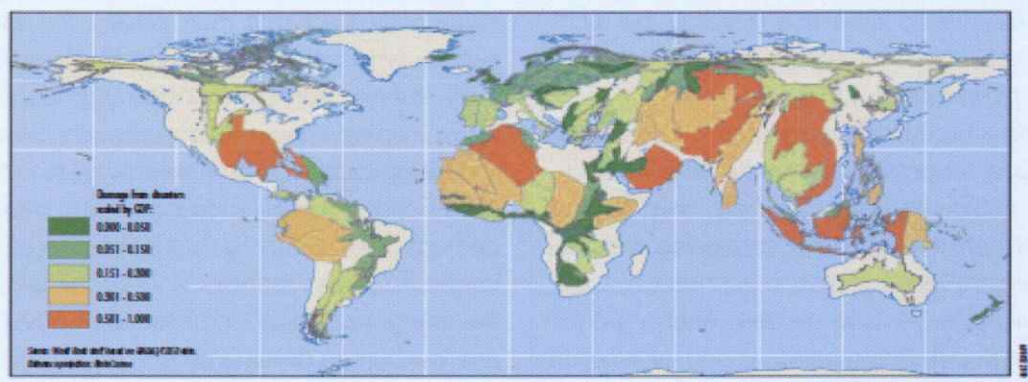
Inequalities in Africa accentuate human capital vulnerabilities. Africa is the world's second most inequitable region—in 2010 Sub-Saharan Africa had 6 of the world's 10 most unequal countries. Inequality derails growth, erodes social cohesion, lowers the quality of institutions and policies and blocks the efficient use of human and physical resources, especially in fragile states. Not only is Sub-Saharan Africa poor in absolute terms, but its poor people are relatively much poorer than those in other regions. Africa is home to about half the world's population below the USD2 per capita a day expenditure

Figure 4.1 **Cumulative deaths due to natural disasters, 1970–2010**



Source: UN and World Bank 2010.

Figure 4.2 **Cumulative damages from disasters, 1970–2008 (scaled by GDP)**



Source: UN and World Bank 2010.

threshold and a disproportionate share of the world's population in least developed countries and fragile states. With high infrastructure deficits[2] and a thin institutional base,[3] it is much more sensitive to climate-induced risks.

Africa's demographic transition poses risks. Africa has the highest urban population density in the world.[4] Some projections indicate that between 2010 and 2025 some African cities will account for up to 85% of the population (figure 4.3).[5] Yet urbanization is failing to bring about inclusive growth, resulting in urban poverty, proliferating slums and rising inequality. Public health services in low-income urban habitats are already overextended and underperforming, but they will face greater demands, especially in dealing with climatic shocks.[5] Growing vehicular transport and persistence of traditional energy use will exacerbate air pollution. Water pollution is on the rise due to poor drainage and water and sanitation infrastructure deficits.

Most of Sub-Saharan Africa has inadequate access to energy and related infrastructure (see chapter 8). Electricity is still largely an urban phenomenon. Estimates show that 600 million Africans do not have household access to electricity, and of the nearly 500 million that do, two-thirds suffer from power shortages. Some 800 million people cook and heat with traditional solid fuels, and a comparable number use kerosene for lighting. This traditional fuel use is unhealthy and saps productivity (through ill health and unnecessary time spent on fuel collection and its inefficient use), and lack of electricity limits time spent on education and reading, with consequent lifelong limits on productivity.

on climate protection and adaptation through ocean conservation; food and water security; low-carbon energy supply systems; and sustainable cities, transport and forest management.[13] They also committed to the three objectives of the Sustainable Energy for All Initiative: universal access to modern energy, doubling the improvement rate of energy efficiency and doubling the share of renewable energy by 2030. In a departure from the near-exclusive emphasis on carbon dioxide emissions, they committed to supporting the Climate and Clean Air Coalition to Reduce Short-lived Climate Pollutants. These pollutants make up more than 30% of near-term global warming, as well as 2 million premature deaths a year, the second due mainly to reliance on traditional solid fuel use (biomass and coal) by poor people in developing countries.

The pace and scale of low-carbon investments and development finance remain uncertain. The multilateral development bank statement for Rio+20 also recognized that "the lack of an international agreement on the future of carbon markets, low carbon prices and limited availability of new concessional sources of climate finance are inhibiting low-carbon investment."[14] Resolution of issues on emission cuts and finance may take several years. At the end of the recent United Nations Framework Convention on Climate Change (UNFCCC) Conference in Doha (December 2012), parties to the Kyoto Protocol agreed to extend the protocol to 2020, and parties to the UNFCCC agreed to work toward a universal climate change agreement to be adopted by 2015 and implemented by 2020.

Attention to climate-related loss and damage is growing. While the prospects for firm emission reduction commitments or additional finance for mitigation and adaptation remain uncertain, the Doha Conference set in motion a new process for possible compensation to developing countries for "loss and damage caused by climate change."[15] Such discussions may bring attention to the current and near-term damage from climate variability and change, whether natural or anthropogenic.

Loss and damage can be minimized by improving climate resilience and enhancing adaptive capacity. Disaster management research indicates that some of the most severe human impacts of climatic variability and extremes can be sharply reduced through direct preventive measures.[16] Not only are healthier people less vulnerable to short-term shocks, but some of the heaviest burden of climate-related illness comes from preventable infectious diseases. At the Rio+20 Conference the multinational development banks stated, "We recognize the importance of improving climate resilience toward long-term adaptation."[17] With international negotiations on emission reduction commitments and adaptation, Africa could move faster to minimize its climate sensitivity.

Managing the unavoidable and avoiding the unmanageable requires human capacity. A Green Climate Fund will soon be operational—with initial funding of USD30 billion and a target to increase funding to USD100 billion a year by 2020[18]—as the permanent financial mechanism for the UNFCCC. To use this aid to effectively manage the unavoidable and avoid the unmanageable, the information base and human skill base must be substantially improved. International negotiations have so far focused on incremental requirements of knowledge and skills to deal with anthropogenic climate change (as mandated in the UNFCCC) while seemingly ignoring the knowledge, skill and institutional limitations for coping with short- and long-term climatic impacts.

Green growth can help build resilience to climate change. Climate change and green growth are inexorably linked. Green growth can create sustainable prosperity in Africa and help mitigate and adapt to climate risks by taking a holistic approach to development that values human, social and natural capital; uses ecosystem goods and services efficiently and sustainably; and builds resilience in a changing and increasingly interconnected world. To make growth better and more inclusive, human capital must be

developed, requiring greater accountability in public services and high-impact investments in education, social protection, nutrition and health, and science and technology.

The new approach and guiding principles

The new approach recognizes the central role of human capacity—the institutional base and the scientific skill base, equipped with relevant technologies—in adapting to climate change and shifting to "lower greenhouse gas" development paths. It focuses on human development services to build resilience, develop the job skill base and reduce climate-sensitive health risks. It puts protecting people—especially poor people—and enhancing their productivity at the center of climate action (box 4.1).

This new approach seeks to expand options to help African countries confront climate change and variability in three ways:

- *Reducing vulnerabilities.* This entails targeting climate-sensitive diseases, first focusing on child and youth malnutrition and undernutrition, then on environmental health—the Sustainable Energy for All Initiative, preventing and reducing exposure to pollution and promoting modern energy transition among poor people.
- *Enhancing capacity.* This involves building a workforce throughout supply chains for green growth, but especially in infrastructure services (including energy) and human development services.
- *Strengthening the role of public health and social protection systems in disaster risk management.* This will focus on monitoring and information systems to provide timely warning of climatic adversities. Climate-linked social protection schemes are also contemplated, building on local meteorological and other environmental data.

Box 4.1 Putting people at the center

People are at the center of a successful transition to a world of far-reaching and balanced global emissions reductions and enhanced resilience. Specific attention must be directed to the most vulnerable groups and their role in crafting solutions and building resilience.

In its fourth assessment report in 2007, the Intergovernmental Panel on Climate Change noted shortcomings in its definition of vulnerability, particularly in its lack of consideration of "social vulnerability," the need to address the determinants of adaptive capacity and the need to consider human development as an essential mediator of climate vulnerability.

Source: SDCC 2011.

Guiding objectives and principles for development

To reduce vulnerabilities to climate risks in Africa, mitigation and adaptation interventions must focus on human capital. They must also be inclusive and pro-poor. Three guiding objectives for human development in relation to climate change are:

- Building a scientific skill base for economywide sustainable development and employment.
- Expanding services to protect the most vulnerable populations against climate-related risks—with a focus on modern energy transition.
- Strengthening safety nets (social protection systems) to account for effects of climate change.

Building a scientific skill base for economywide sustainable development and employment

Knowledge and employment in Africa need to be modernized for global competitiveness. That will mean expanding the skill base in Sub-Saharan Africa for agriculture, manufacturing, transport and utilities, and management and support services in finance, commerce and administration. Central to such modernization will be information and communications technology (ICT), which depends on accelerating modern energy provision (discussed at length below). Africa's ICT revolution needs to be sustainable and directed toward human capital development and other productive employment. Human development will become a growth sector for highly

skilled labor, including the abilities to use and engage in:

- Health diagnostic and surgical equipment.
- Educational equipment—computers, Internet, copying machines.
- Construction, storage, timber and furniture production.
- Lighting and gas or electrical tools—fans, refrigerators, water heating, space conditioning, food and beverage preparation.
- Data processing and records management—administration, financial services, human development services.
- Irrigation and other water pumping, postharvest activities—seed and grain milling, food and beverage processing.

Meeting the needs for these and other skills will entail expanding secondary education and vocational training. Modernizing health and education will require achievement targets in scientific research, disease prevention and treatment and secondary and tertiary education (see chapter 17). Scientific capabilities should be developed within Sub-Saharan Africa for Africa-focused climate adaptation and mitigation. Much of the primary knowledge about climate sensitivity and climate options needs to be developed at local levels and incorporated in science and technology syllabi (for example, knowledge about adaptation, emissions reductions and loss limitations). Identifying local climate-related vulnerabilities—and designing and implementing regional and national policies that account for these vulnerabilities—will require substantial human capital investments in research and postprimary education.[19] In shifting education paradigms along these lines, Africa will increase the number of graduates from postprimary education and technical training institutions; these institutions will need to expand their numbers, geographic reach and equipment asset base. Education and awareness programs will also need to integrate environmental health by introducing sustainability concepts and practices, such as:

- Land and water management.
- Pollution prevention and reduction.
- Transition from unhealthy and unsafe traditional energy use.
- Timely attention to food and water insecurities.

To reduce risks, local governments should create public health cadres and information exchange systems. The geographic and demographic spread of digital wireless devices can facilitate such interventions for nutrition, health, water and sanitation and for education, employment and social protection.

Expanding services to protect the most vulnerable populations against climate-related risks

Climate change can accentuate and compound threats to lives, health and livelihoods in Sub-Saharan Africa. Increased flooding will disrupt emergency relief, spread waterborne diseases and exacerbate food insecurity and malnutrition. And rapid urbanization could heighten risks from climate change by worsening the environmental disease burden—for example, through air pollution—while the inefficient combustion of organic fuels (fossil or biomass) in industry and transport will directly contribute to continuing climate change.[20] How can Sub-Saharan countries become more resilient and adaptive to these interrelated risks?

Just as climate-related and other risks can have composite effects, direct actions can bring synergistic benefits. Given Sub-Saharan Africa's high infant and maternal mortality rates, direct action is needed to reduce and eliminate childhood and maternal malnutrition and hunger, improve water and sanitation and reduce exposure to household air pollution. Better nutrition can reduce vulnerability to diseases. Proper drainage and water storage can reduce disease vectors and increase access to safe water and sanitation. And a transition to modern energy sources can not only eliminate household air pollution, but also reduce fire risks while preventing greenhouse gas emissions.

Because of synergistic benefits, the best possible investment for greenhouse gas mitigation—if one considers all emissions and impacts—is modern energy transition for poor people (box 4.2).[21] Electricity for cooking can be more efficient than traditional

Box 4.2 Climate and human development cobenefits of modern energy transition

From a health perspective, it is important to accelerate the transition from traditional inefficient use of solid fuels (biomass, coal) and similar reliance on candle/kerosene-based lighting to modern fuels, including electricity (even if based on some fossil fuels). Traditional solid fuel use results in high levels of products of incomplete combustion, many of which are highly damaging pollutants and much more potent warming agents than carbon dioxide. Substitution by modern fuels lowers the health risks as well as greenhouse gas loadings (counting all greenhouse gases, not just carbon dioxide).

From a productivity perspective, household access to modern fuels and electricity will not be enough. Human development institutions have a wider footprint in the periurban and rural areas and benefit from electricity-enabled applications, especially ICT. Various e-service and m-service initiatives have been under way in the health, education, administration and commercial sectors. Thus the transition to inclusive electrification promises to reduce costs and improve quality and reliability of service while expanding the market. This can set off a virtuous circle of improved skills, higher productivity and greater employment.

Similar cobenefits may exist in transitioning from animate (human and animal) power to motorized transport (of group carriage or cargo, and even individual transport under certain conditions) and in controlling urban outdoor air pollution and improved water, sanitation and waste management services.

Crucially, processes determine substances. It is not the fuel types that are polluting or unsafe but how they are used. All emissions are coemissions and their composition varies according to process and operating conditions.

Finally, emissions have multiple impacts. Even if it is impossible to aggregate impacts, the tradeoffs between desirable and undesirable impacts (and sometimes among them) should be recognized.

wood fuel, depending on transformation and line losses. And cooking with liquid petroleum gas will produce only a tiny fraction of the greenhouse gas emissions that result from cooking with wood fuel.[22]

A large share of Sub-Saharan Africa's population is deprived of physical infrastructure and other services, including services for hunger prevention and protection against severe shocks to livelihoods. Extreme climate-related events, such as floods or droughts, can undo efforts to provide these services. Such events can also undermine progress toward the Millennium Development Goals. Priorities include:

- Expanding high-quality services farther geographically, and deeper demographically, into present and prospective pockets of poverty.
- Accelerating modern energy transition (see box 4.2).
- Extending information and warning systems—building on the geographic and demographic expansion of electricity and ICT at the bottom of the pyramid.[23]

Providing universal access to basic services can be a relatively inexpensive form of collective insurance. Poor people are increasingly vulnerable to climate-related risks, and these vulnerabilities will keep mounting if they are not addressed quickly. The under-20 population in Sub-Saharan Africa is expected to grow by about 10 million this decade and by another 10 million over 2020–2030. Each child who misses secondary education and lacks good adolescent health suffers a lifelong loss of well-being and productive potential.

A chief concern in human development planning should be the welfare of Africans born around 2010. This generation will include the parents, teachers and mentors of Sub-Saharan leaders at the beginning of the next century, when average global temperatures will have risen dramatically—along with the potential burden of African vulnerabilities.

Programs for health, education and social protection in Sub-Saharan Africa should take the lead in mapping climate-vulnerable areas—through cooperation with national agriculture, meteorology and water resource authorities—and in building local capacity to meet climate-related risks. To increase climate resilience, programs should focus on local environmental health issues by:

- Identifying health and livelihood cobenefits in avoiding or reducing pollution from greenhouse gases other than carbon dioxide.

- Addressing drainage, food, water quality and waste management problems.
- Strengthening local capacity for ICT, including emergency response and disaster risk management.

The constraints on service quality upgrades and expansion are infrastructural, related mostly to electricity provision. Over the last century electric lighting became indispensable to nighttime safety and health care. And today's standard of high-quality service delivery—which includes information collection and analysis for administration, planning and results monitoring—depends on modern ICT, which depends in turn on electricity (at least small amounts of battery power). Accordingly, modernization will require:

- Expanding electricity and ICT in facilities, using solar photovoltaic sources or low-greenhouse-gas technologies as appropriate.
- Training workers to install and use modern energy and ICT equipment—for example, to develop energy resources (for domestic use or export) and to expand distribution systems for electric power and cleaner cooking technologies.
- Promoting modern energy transition—by raising awareness of the risks of indoor and outdoor air pollution,[24] and by increasing the use of newer energy technologies in households and productive enterprises (not only in isolated and traditionally neglected "ecosystems of poverty," but also in new agglomerations created by migration and involuntary displacement).

By modernizing energy and land use, Sub-Saharan Africa can reduce its greenhouse gas emissions per unit of energy service delivered (see box 4.2). As indicated above, beyond the need to expand direct electricity access and make it more reliable, it is also necessary to expand indirect access—enabling ICT-based education and preparing people for jobs that involve digital, electrical equipment. Only a highly skilled labor force can begin to realize the population's human potential. To spark an information revolution at the bottom of the pyramid, Sub-Saharan Africa's transition to modern energy must be accelerated, though in a way that avoids exacerbating climate risks.

Global green growth paradigms tend to posit goals of sustainable consumption and carbon dioxide reduction. Africa demands a different approach. The continent accounts for only about 3–4% of carbon dioxide emissions from fossil fuel worldwide.[25] But Sub-Saharan Africa emits substantial quantities of greenhouse gases other than carbon dioxide—through inefficient fossil fuel combustion and other processes, such as shifts in land use, the open-field combustion of biomass and the continuing use of traditional energy sources. The results include significant health damage and losses to land productivity.

Sub-Saharan Africa thus needs an "all emissions, all impacts" approach. Such a pro-poor, localized approach to green growth in Sub-Saharan Africa requires more research and education, with an expanded knowledge and planning base. Preparing the workforce of 21st-century Africa will require 21st-century technologies and institutional frameworks for accountability.

Strengthening safety nets to account for effects of climate change

Development interventions that aim to build human assets while mitigating climate-related vulnerabilities should be pro-poor and inclusive, with attention to the social determinants of health. Safety nets and financial inclusion programs need to be strengthened if the inclusive growth and green growth agenda—including programs that enhance adaptability and resilience to climate-related risks—are to reach the local level. Targeted local development approaches can improve the capabilities of poor and excluded people and of those who have been involuntarily displaced, whether by extreme climate-related events or by other exigencies. Some approaches include:

- Food stamps, food-for-work programs and conditional cash transfers provided through electronic channels.
- Banking and insurance services provided through expanded product menus and client coverage.

- Basic goods for modern energy provision, such as solar lanterns and battery charging devices along with modern cooking technologies.
- Assistance in forming and operating small and home-based enterprises, both for professional services (health, education) and for energy and infrastructure provision and maintenance (solar systems; cleaner cooking and heating technologies; devices for water storage, heating and purification; engine and vehicle repair and maintenance).
- Assistance to local governments in developing environmental health programs and disease and disaster prevention programs (for food safety, air quality, water quality, drainage improvement and fire prevention) and in installing early warning systems (for droughts, epidemics, extreme weather and any other emergencies).
- Support for central planners and local governments—in cooperation with national disaster relief agencies—to coordinate information and manage logistics for hazard risk management and emergency assistance (food storage and distribution, emergency relocation and aid coordination).
- Geographic expansion of social protection programs in the next two decades to respond to the challenge of migration and unplanned or poorly planned infrastructure (slums and similar urban or suburban areas with poor drainage, water and sanitation and without reliable electricity or public transport).
- Investments in analytical work to better understand the potential costs and benefits of demand-side interventions for livelihoods in Sub-Saharan Africa.

Some social protection programs—financial services, cash transfers, food-for-work programs—are information-intensive and can be shifted to a mobile platform as electricity access improves. Local needs are more readily and quickly identified when human development networks have a wide and deep geographic reach. Although rural communities will gradually decline as a proportion of Sub-Saharan Africa's population, those that remain in urbanizing countries are likely to be remote and more dependent on agriculture. Such rural communities are also likely to remain relatively deprived unless they gain ground through ICT services and a concomitant expansion in financial services and commercial information (alongside the needed expansion of health and education services).

Social protection programs should be designed to address multiple vulnerabilities and capabilities simultaneously (see chapter 21). For example, multiservice programs targeting the poorest people or the involuntarily displaced can combine informal education, primary and reproductive health, HIV/AIDS management, food security and small business development with financing and insurance services. Such approaches will not only help to preserve well-being, but also enable the underserved to catch up with other population segments.

Notes

This document was produced under the strategic guidance of Dr. Agnes Soucat and Dr. Feng Zhao of the OSHD department. The lead authors of this background paper are Nikhil Desai and Caroline Jehu-Appiah. Comments and inputs were received from the OSHD team: Nejmudin Bilal Durairaj, Bineta Ba-Diagne, Laurence Lannes, Atef El Moughraby, Adel Ben Youssef and Nawsheen Elaheebocus. Substantive comments and suggestions were received from external reviewers who reviewed the document at various stages, Yogesh Vyas (ONEC), Frank Sperling (ONEC), Alexis Rwabizambuga (ORQR), Balgis Oman-Elasha (ORQR), Uzoamaka Nwamarah (CCCC.0), Shogi Hikaru (OWAS) and Lucien Manga (WHO/AFRO).

1. UNDP 2007.
2. UN Habitat 2012.
3. UNECA 2005, 2009.
4. Martime 2011; McGranahan and Marcotullio 2005.
5. *The Economist* 2010.
6. Foresight 2006.
7. Hales and others 2002.
8. WHO Global Health Atlas, http://apps.who.int/globalatlas/.
9. WHO 2009.
10. Parry and others 2007.
11. World Bank 2010.

12. OCHA 2011.
13. AfDB 2012; UNEP 2012.
14. World Bank 2012.
15. UNFCCC 2012a,b.
16. UN and World Bank 2010.
17. World Bank 2012.
18. See gcfund.net.
19. As the multi-agency SDCC report recognizes, and as the MDB Rio+20 Statement reflects, a convergence is emerging between the "environmental agenda" of forestry and agriculture, fuel emissions reduction and freshwater and ocean resource management and the "development agenda" of employment, urban development, good governance, health and nutrition, IT-enabled services and disaster risk management.
20. "Changes in emissions of [climate-active pollutants] affect radiative forcing and climate change (ozone, PM, methane), which in turn influences atmospheric chemistry, surface air quality (ozone and PM), and public health. Climate change affects meteorology and hence transport and mixing of air pollutants and natural emissions" (Smith 2012).
21. IIASA 2012.
22. S3IDF 2012.
23. The bottom of the pyramid is taken to mean the category of people living on less than US 2 per capita a day (using 2010 dollars).
24. These terms are somewhat in flux. Household versus other emitters indicate sectors that in some ways have different energy use technologies, but indoor versus outdoor indicates the location of the pollutants. Since emissions from households get outdoors as well, the term "indoor air pollution"—conventionally referring to household emissions from dirty fuels and combustion technologies—is being replaced with "household air pollution."
25. BP 2012.

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CHAPTER 5

Expanding regional markets: The role of skills and health

Anne Sofie Westh Olsen, Atef El Maghraby and Flavien Tchapga

A deepening of economic integration combined with facilitating the structural transformation of African economies is the new strategic vision at the multilateral level for economic development in Africa. This vision is based on recent jobless growth, exacerbating the contrast between the sustained growth of African economies and simultaneous low employment. This contrast is mainly due to rapid population growth of African countries that has resulted in an increase of the working-age population,[1] and the specificity of the observed economic growth, particularly its dependence on natural resources.[2]

This chapter stimulates the debate on the need to deepen integration of policy aspects that have a direct or indirect influence on the quantity and quality of resources to foster human capital development, looking at skills, education and health. Relative to other emerging regions, Africa's competitiveness trails—especially the quality of institutions, infrastructure, macroeconomic policies, education and technological adoption. This chapter deals with the problem of the shortages of skills and access to essential services like health care as key success factors of these new strategic visions. It argues that increased cross-border collaboration and regional management of human capital development can lead to effective skill pooling and health care responses—and thus to a more productive workforce.

First, this chapter outlines the importance of investments in human capital development in achieving economic integration and structural transformation. Regional integration will permit the scaling-up of economic policies, and the simultaneous qualitative changes in the productive system—or the structural transformation of economies—will contribute to improving labor content for economic dynamism, to reducing poverty and to facilitating inclusive economic development in Africa.

Second, it looks at skills and competitiveness, and the comparative advantages of regional integration. The current structure of the GDP of most African countries suggests a wide gap between the required skills for the effectiveness of the structural transformation and the realities of human capital. The *African Economic Outlook 2008* noted that more technical and professional skills will be essential to improve the competitiveness of Africa while contributing to decent employment, poverty reduction and social inclusion.[3]

Third, it deals with health and sustainable development from the perspective of the value added of expanding regional markets and facilitating economies of scale in the health sector. Diseases do not recognize borders or nationalities. Regional integration in health care is thus not only legitimate and rational, but economically and socially compelling. Effective and timely public health responses depend on health systems providing reliable and timely information for action. Regional integration agreements would allow member states to tackle health issues in ways they could not do on their own because of technical and financial limitations.[4]

Although regional integration provides an opportunity to attract foreign direct investment (FDI) due to the increase in the size of the regional market and the movement of goods, services and people, this is not enough. Human development is also needed to increase African countries' competitiveness, making mutual trade and investment more attractive. Africa has an abundant labor force, but this comparative advantage is

underexploited by low human development. Africa also enjoys a big market, but this market is below potential due to low incomes and poor sophistication. And while many African countries still rely on currency depreciation to remain competitive, innovation is essential to stay competitive. It is through human capital that underdeveloped countries will benefit from technology transfer.

This chapter concludes by underlining that human capital development and regional integration are interlinked and can benefit each other (figure 5.1). Regional integration can affect human development by reducing poverty faster, generating employment and improving the sector composition of output and use of resources.[5] Regional integration is likely to lower the costs of local production, raise countries' comparative advantages, promote economies of scale and ease mobility of goods, services and labor—all factors boosting regional development. Human development too can boost regional integration—and thus development—by tackling the "soft" issues of development. It determines the nature and quality of inward investment in a country, and allows the reproducibility of capital injected.

Human capital development in economic integration and structural transformation

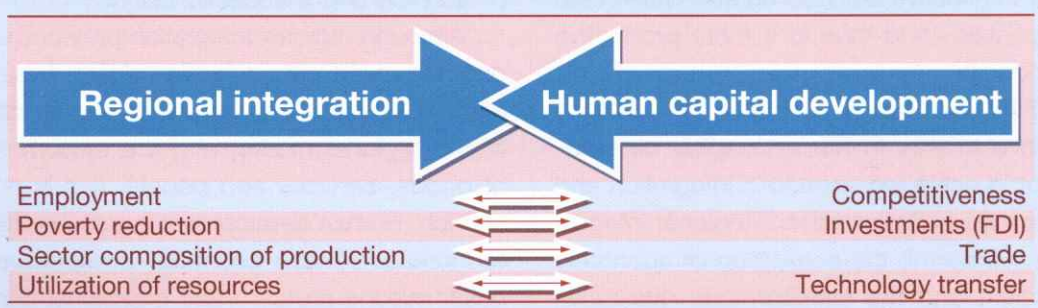
Africa is believed to be the most fragmented continent: of 54 countries, 16 are landlocked (with South Sudan added in July 2011) and half have a population under 10 million. In Africa borders remain "thick" relative to other parts of the world.[6] African countries are also losing out on billions of dollars every year due to fragmented regional markets. Africa thus finds it challenging to enhance economies of scale and advance its added value with existing market structures and ever-mounting regional and global competitiveness.[7]

The aim of the planned economic integration is to create a continental market by 2017 supported by a free trade area (FTA), and later a common market and economic and monetary union by 2028. These ambitious yet achievable plans will create incentives to develop economic activities that will not otherwise exist due to fragmentation and small markets, or if they do exist they will not rest on appropriate economic foundations.

This vision of integration cannot be realized without effective structural transformation, which presupposes a change from the former specialization of African economies—based mainly on exploitation of natural resources—to knowledge economies. The former specialization has not greatly changed the employment content of GDP, nor contributed to poverty reduction even in times of strong growth.[8] Structural transformation should thus lead to a stronger position for African economies into the global production system. Economic integration would offer a better basis for competitiveness and profitability for all economic activities amid global competition.

Regional integration may permit structural transformation toward a regional production system in which industrial development,

Figure 5.1 **The mutually beneficial relationship between regional integration and human capital development**



Source: Authors.

based on the paradigm of "flying geese,"[9] could emerge and develop, providing a gradual transfer of production processes from developed countries to less developed ones. The same goes for relocation strategies justified by labor-cost differentials, and for the international segmentation of production processes, which opens new positions in global value chains for African economies.

An analysis of sources of gains from integration by the United Nations Economic Commission for Africa illustrates this proposition.[10] These gains will stem from the growth of African exports to the rest of the world and from the dynamism of intra-African trade. In other words, those gains will reverse trade flows, to the detriment of traditional African partners. The eight regional economic communities (RECs) could play an early decisive role by promoting the emergence of leadership among countries.[11] Internal restructuring of the leader economies would be the starting point of the flying geese process.

The particularity of the envisaged FTA for Africa is that it adds more than the traditional content of an FTA moving toward a common market formula—the free movement of capital and labor.[12] The proposed African FTA is conceptually comparable to the North American Free Trade Agreement, which provides for labor mobility.

African Union (AU) Heads of State and Government have adopted and are pursuing regional integration as an overarching continental development strategy.[13] The establishment of an African Economic Community (AEC) at the continental level would be the last of six successive stages at the subregional level:

- *Construction on the experiences and structures of the existing RECs:* this should form the basis for establishing the principles, objectives and provisions of the protocol, sequencing and institutions.
- *Regional FTAs:* where members of the agreement charge each other lower tariffs (taxes when goods are sold from one country to another) than those applicable to nonmembers. FTAs have been established in COMESA, EAC, ECCAS, ECOWAS and SADC. Currently, the tripartite FTA between COMESA, EAC and SADC is under negotiation.
- *Customs union:* requires member countries to implement a common external tariff (or taxes) on imports from outside the union. The aim is to facilitate goods to move freely throughout the union. This is fully operational in the EAC and in progress in COMESA.
- *Common market:* has a goal of free movement of labor, capital, services and persons. Products, people, money and services can move freely between the member countries.
- *Monetary union:* entails a common currency and the unification of monetary, fiscal and social policies. This is in place in West African Economic and Monetary Union.
- *Economic union:* where economic barriers between two or more countries are eliminated to facilitate greater exchange of goods, services, capital and people.

But Africa's regional integration has not progressed as fast as other developing regions', both on "hard" issues such as infrastructure like roads, ports, dams, power plants and shared resources (determined by contextual factors such as geography and climatic conditions) and on "soft" issues such as harmonizing policies and regulatory schemes and capacities of institutions (which shape the responses to cross-border challenges of human capital development, especially in health, education and employment) (table 5.1).

The hard issues also depend on soft provisions, since institutional capacity and human capital are required to implement, monitor and sustain such integration. This includes the mandates of the RECs as well as the harmonization of policies, whether for trade, qualifications, health, social security or labor mobility—the soft issues.

Harmonization is needed because, for example, several water-based resources are shared between neighboring African countries such as Lake Victoria, the Nile Basin, Lake Tanganyika and the Manu River.

Table 5.1 **Soft, cross-cutting and hard issues of regional integration**

Soft issues	Cross-cutting issues	Hard issues
Overlapping memberships/mandates of RECs	Institutional capacity	Lack of transport infrastructure
Lack of harmonized policies	Governance	Poor energy infrastructure
Underdeveloped financial markets/regulations and procedures governing investments and trade	Coordination	Incomplete ICT infrastructure

Source: AfDB 2009.

Pollution, erosion and overfishing reduce their quantity and quality, and can spread diseases and contamination. But increased policy harmonization and collaboration can make these resources a source of development, through generating low-cost electricity, expanding irrigated agriculture, supporting transport routes and increasing incomes and food security through sustainable fisheries—thus addressing hard and soft issues.

Regional integration could expand markets for farmers and increase the variety of food available to Africans. Underdeveloped infrastructure, lack of regional trade policies and poor access to finance are among the key challenges. Regional institutions need to address and harmonize agricultural productivity, nutrition policies and regional trade agreements. Especially vital for landlocked countries with small populations and unattractive markets, harmonization and integration will bring economies of scale and increase the variety of foods available.

Finally, beyond the eight RECs are 14 major regional economic groupings in Africa with wide membership overlaps. Each country averages membership in at least two RECs, and some are even members of four, a position that particularly inhibits progress in broader structural alignments such as education and health.

One cannot expect the strategic directions of economic integration and structural transformation to materialize without strong growth of industrial products as a component of GDP, but most important is human capital development to support this shift toward competitive regional markets based on knowledge economies. African competitiveness presupposes the existence of favorable conditions for investment in the "African link," including economies' ability to meet skilled labor needs. Regional integration is thus a necessity for structural transformation, based on skills—as discussed in the next section.

Skills gaps in national labor markets

Africa has experienced average growth of more than 5% over the past decade. But this economic growth has to be turned into improved living standards and human development. Evidence suggests that investments in human capital and social and environmental sustainability are key to growth and development, and that regionally coordinated efforts would facilitate matters. The *Africa Competitiveness Report 2013* underlines the importance of regional integration in diversifying African economies to absorb the 10 million new entrants to the labor force every year.[14] The *African Economic Outlook 2012* highlights jobless growth as a result of high demographic growth.[15] The Global Competitiveness Index identifies the majority of African countries as the least competitive in the world, particularly on education, infrastructure and governance. South Africa ranks the highest, Burundi the lowest. There is a large heterogeneity between middle- versus low-income, fragile states and oil and gas exporters. The latter perform as poorly as fragile states in 9 of 12 competitiveness "pillars."

Challenges

A key challenge is the mismatch of demand and supply of skills in national labor markets across Africa, which leads to low productivity in key sectors. A skill shortage occurs when any one or more of the following arises:

shortage of workers in a particular occupation; labor demand exceeds availability of skills; workers lack appropriate skills and qualifications.[16]

Regional integration could contribute to resolving some of this mismatch, through collaboration on education and skills development, and integration of labor markets. On the former this could be through regional centers of excellence. There is a tendency to perceive the problem of skills shortages only from the perspective of a weak education and training system. Some thus argue that the only way to address skills shortages is through an increase in public investment in education and training. But we would argue that one should also consider the gains of the latter, including facilitating transfer of services across borders. The inability to meet demand through national market results in employers having to import foreign labor, exacerbated by the high brain drain in key sectors across Africa.

Many workers who lack the necessary skills (box 5.1) and competencies are often undereducated or are not adequately practicing so that they lose, partly or totally, what they have learned. In Togo for example, 95.8% of technicians and associate professionals are undereducated.[17] Many African countries have failed to increase their investment in education (see chapter 16). Further, despite the encouraging progress in access to primary education, primary school completion is still lagging. Enrollment in secondary and tertiary (including vocational) education is also particularly low. As a result, fewer than 3 in 10 adults can read and write.[18] Further, millions of children and adolescents continue to drop out of school, without acquiring basic education, knowledge and skills. The

Box 5.1 Skills shortages in South Africa

South Africa's economy accelerated its growth after 2002, leading to a shortage of skilled workers in almost all sectors. South Africa is experiencing skills shortages with youth unemployment much higher than the regional average. More than half of young people in the labor force were unemployed in the first three-quarters of 2012.

The structural changes in the economy contributes to skills shortages. Employment in some sectors has expanded while in others it has contracted, causing large numbers of job losses.[1] There seems to be a growing need for skilled workers. There are increasing numbers of people employed in administrative and managerial occupations as well as technical and professional skills. In other words, as the economy moves toward greater capital and skills intensity, the demand for unskilled workers is diminishing,[2] suggesting that sectors that use skilled people contribute more toward economic growth than sectors that are more labor-intensive and rely on unskilled or semi-skilled workers.

Alongside structural change, new products, technology and workplace arrangements cause a change in skill needs. These skills are specific to occupations and take years to acquire—and are difficult to retain.[3] This explains the concern in South African business and policy circles about the skills shortage, and why it may not only be an educational problem.

The country's mining industry is, for example, facing critical labor shortages at all levels, as around a third of South Africa's engineers have left the country.[4] According to the Engineering Council of South Africa some 300 qualified engineers leave South Africa every year.[5] This growing labor shortage has become a significant threat to the industry because engineers fill a large segment of senior positions in the South African mining environment. When these engineers emigrate, it is a setback to the mining sector. Problems retaining skilled mining staff, combined with insufficient new graduates and an aging workforce, are affecting the mining industry.

Skills shortages are thus major obstacles to economic growth and job creation in South Africa.[6] The National Treasury appointed the Harvard Group to analyze growth prospects for South Africa. It drew a similar finding on skills shortages: human resource shortages limit economic growth prospects and impede socioeconomic growth and development.[7] The skills shortage affects the level of economic productivity and reduces the country's capacity to develop a knowledge society.

Notes:

1. Ellis 2008.
2. McCord and Bhorat 2003.
3. Richardson 2007.
4. Macartney 2008.
5. ECSA 2007.
6. CDE 2007.
7. Harvard Group 2008.

absolute number of out-of-school children was around 67 million worldwide in 2008, close to half of them in Sub-Saharan Africa (29 million).[19] In addition, many children and youth remain excluded from education due to financial, social, cultural or physical barriers.

Unemployment among tertiary-educated youth is staggering, which often leads to brain waste and overeducated hirings. In North Africa unemployment for those with tertiary-level education are among the highest in the world, at 21.4% in Algeria, 18.9% in Egypt and 17.4% in Morocco in 2010.[20] In Togo 41.7% of those working in elementary occupations are overeducated.[21] For those countries that have increased their investments as a share of GDP per capita in higher education, unemployment of graduates indicates inefficiencies. The skills acquired are seldom adapted to national labor markets, as reflected in high youth unemployment and underemployment. The combination of low education, poor health and substandard living conditions has thus restricted capacities to fully exercise the potential of human development, productivity and prosperity. For example, although youth unemployment in Sub-Saharan Africa is lower than in most other regions due to high rates of informal employment, it is far higher than adult unemployment (see chapter 19). Compared with adult unemployment of 5.9% in 2012, youths are twice as likely to be unemployed, with an estimated youth unemployment rate of 11.8% in 2012—a rate projected to remain close to 11.7% in coming years. In South Africa, Namibia and Réunion, youth unemployment exceeds 50%.[22]

Regional responses to improving skills and competitiveness

First, for the education sector to play a more dynamic role in regional integration and advancing the knowledge base and skill mix needed by the markets, robust regional interventions should be pursued. There are scarce resources for education. The lack of sufficient investment in tertiary education has undermined Africa's ability to realize its economic potential. A 2005 study showed that a one-year increase in the higher education stock of the region could boost growth rate by about 0.63 percentage points.[23] The creation of stronger regional areas of higher education—especially in a region like Africa—can also be an economically efficient way of facilitating greater investment in higher education to match the demands of a 21st century economy.

If each country invested in an uncoordinated manner, regions could risk fighting for the same faculties and producing similar skills. This would lead to overlaps and, more important, leave the region with gaps in skills, knowledge and technology. Regional centers of excellence are becoming more common in Africa—some offering online access—to increase the coordination of resources while expanding opportunities for regional communities. Examples include Carnegie Mellon Rwanda, the African Pan-University and the African Virtual University. The African Virtual University is mainly ICT-based—moving away from a classroom-based education model—and works across borders and languages (see chapter 18). Support to the Mulago Hospital in Uganda combines the promotion of a regional center of excellence and increased access to health service. Knowledge work will be particularly important to understanding the environment and conditions in which such regional networks can flourish.

Higher education is central to Africa's future of continued and more inclusive growth. It falls under pillar 2, "development, integration and cooperation," of the AU's Strategic Plan 2009–2012.[24] The objective is to strengthen universities, enhance research and development institutions, and coordinate technological development and its impact on Africa's comprehensive development. The AU's Education Plan of Action for the 2006–2015 recognizes the role of knowledge and innovation in the world economy, and highlights the need to fully exploit the "potential of higher education to provide African-led solutions to African problems in the spirit of Africa's collective vision."[25] The priorities include development and assurance of quality in African higher education in all its dimensions, as well as development and ratification

of regional and continental qualification frameworks to facilitate mobility of students and staff. Figure 5.2 illustrates recommended approaches for harmonizing education.

Second, if well managed, the cross-border and intra-African mobility of human capital can also provide opportunities to fill skills gaps and adjust labor market supply and demand at the regional level (see chapter 20). Labor mobility has indeed benefited host and sending countries, and mobility is high across borders. South Africa benefits from the inflow of mainly male workers from neighboring Mozambique and Zimbabwe for its mines, as well as all other categories of migrants to its numerous growing industries. In Côte d'Ivoire labor gaps were filled in industry and agriculture such as the coffee and cocoa industry from migrants from neighboring countries including Benin, Burkina Faso, Niger and Togo, which led to export-led growth. Landlocked sending countries have also reaped benefits through reduction of unemployment and poverty as well as through increased human development investment by those left behind, because of incoming remittances.[26]

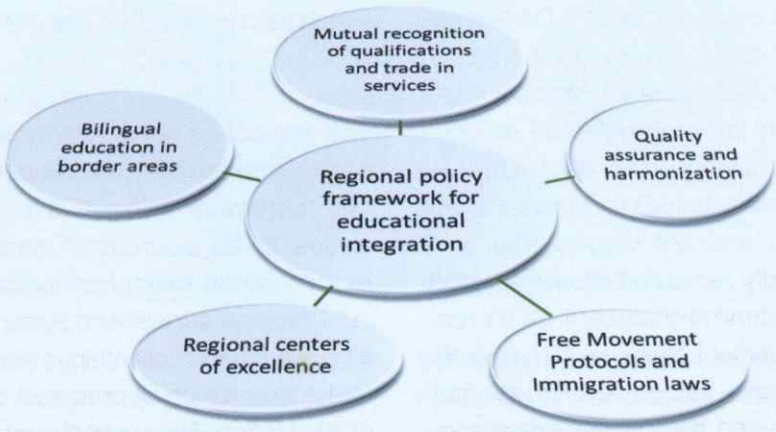
Limited integration restricts mobility across borders—for students, services and labor—starving economies of the potential benefits of competition.[27] Regional skill pooling is one of the least developed areas of regional integration in Africa, lacking implementation of the free movement of people in most RECs—except EAC and ECOWAS—and trade in services remains underdeveloped due to poor harmonization of regulations. Rwanda has filled positions that were not locally available through its liberal migration policy with entry visas for Africans, no work-permit requirements for EAC citizens and minor restrictions on foreign services in engineering and legal services.

Health care deficiencies in national contexts

Challenges

Taking the example of health workers, health care tends to be among the most heavily regulated sectors of an economy. Regulatory institutions can facilitate market expansion for health care services. For example, harmonization of professional accreditation and mutual recognition as well as of regulations for establishing doctors in other African countries might facilitate the large skills gap in health care. WHO (2006) estimated a shortage of 1.5 million health workers in the Africa region. Health professionals include not only doctors, nurses and midwives, but also health planners, policymakers and financing and procurement managers—who all work in a complex dynamic that defines overall health outcomes.

Figure 5.2 A regional approach to harmonizing education



Source: AfDB 2008.

Yet 57 countries—39 in Africa—are seriously constrained with their scarce stock of health workers of less than 2.3 per 1,000 people. Shortage of health professionals is often accompanied by urban–rural inequitable distribution where rural communities have little access to improved health care services. In the EAC there has been a standardization of curricula at university level health education, medical schools and dental schools.[28] The EAC has also made several gains in harmonizing policies, whether standardizing and collaborating on trade in services, movement of persons, education and health care integration.[29]

Beyond these examples, health is an economic and social resource and central to the development agenda in Africa. Empirical evidence suggests a positive link between investment in health and growth in Sub-Saharan Africa. Healthy individuals are critical for economic growth in Africa and mandatory for creativity and innovation to transform the continent. They can work longer and be more productive, earn, save and invest more, and consume more. Investing in health is not only a human rights mandate, but also essential for producing goods and services, accelerating economic growth and realizing development and prosperity.

Diseases are socially and economically devastating. Malaria alone costs Africa an estimated 1.3% of its GDP through sickness, reduced productivity and cost of health services.[30] The World Bank estimates that loss of productivity attributable to tuberculosis is 4–7% of some countries' GDP.[31] On average 35% of tuberculosis cases in Africa are coinfected with HIV/AIDS. Direct medical costs and productivity losses of HIV/AIDS resulting from infections diagnosed are substantial.[32]

But productivity losses far surpass direct medical costs and are disproportionately borne by minority races and ethnicities. More effective antiretroviral treatment (ART) regimens and universal access to ART over the last decade have helped reduce the burden of disease and improve life expectancy. Even so, Africa continues to show the lowest health indicators worldwide. It has the highest burden of infectious diseases like HIV, tuberculosis, yellow fever, meningitis, cholera and others, while the chronic (noncommunicable) disease burden is rapidly increasing: 85% of world malaria cases, 67% of the HIV burden, 57% of maternal mortality and 49% of child mortality.[33] Africa also holds a heavy burden of the neglected tropical diseases like schistosomiasis, onchocerciasis, lymphatic filariasis and others that cannot be eradicated without regional and global integration.

Further, food insecurity and malnutrition remain endemic in many countries and subregions. Africa's vision for sustainable development is tied to its ability to enhance food security and ensure availability and access to food for its billion inhabitants (see chapter 22). Across Sub-Saharan Africa hunger prevalence is the highest in the world. More than one in four Africans—close to 218 million people in 2006–2008—were undernourished.[34] Malnutrition is linked to more than a third of deaths in Africa.[35] Countries are increasingly committed to work together to fight HIV/AIDS (box 5.2), hunger, starvation and despair by strengthening local and regional systems and institutions and moving from food insecurity toward human development free of hunger.

Carrillo Roa and Santana (2012) noted that regional political and economic integration initiatives bring potential benefits to the health sector and act as an important mechanism to develop south-south cooperation. Regional integration agreements can benefit member states by providing economies of scale in the health sector, as further discussed in the next section.

The impact of regional integration on health and sustainable development

The framework in figure 5.3 illustrates the issues to be addressed in strengthening regional health sector harmonization.

A regional surveillance system would facilitate systematic collection, collation, analysis and interpretation of data and dissemination of information. The value of surveillance today is evident in the early detection of human diseases caused by potential pandemic

Box 5.2 Regional responses to the HIV pandemic

In the 1980s when the HIV pandemic started there were very few efforts for integrating and harmonizing country responses. This resulted in large human and economic costs. Although health coordination and collaboration have improved within RECs, especially the EAC, progress needs to be replicated in other subregions. Collective responses to infectious diseases and other health problems require coordination and efficiency in delivering comprehensive care, fairness in access and social protection, and multisectoral action across borders.

Increasingly, the traditional divisions between programs for HIV and noncommunicable diseases are being bridged, enabling countries to build on the success of scaling up HIV services to expand access to 21st-century primary care that includes services for both HIV and noncommunicable diseases. No single approach to combining services is appropriate in all contexts; the most appropriate strategies depend on the prevalence of the specific disease and the specific characteristics of the health system. Regional coordination for disease prevention and control is critical for pooling regional expertise and resources to ensure safety of travelers. Setting up regional guidelines and standards does not undermine country-focused solutions or involving local stakeholders in the regional public good.

Many clusters of countries across Africa have joined forces to address the impact of migration and displacement on HIV within the various subregions, putting aside political differences. Creating these plans makes it possible to provide HIV-related services to migrants and refugees. These mobile populations often did not have any access to HIV-related services until these subregional initiatives were created. Subregional plans help ensure that more comprehensive, integrated and better harmonized services are provided, and they can also improve program efficiency and lower costs in both HIV prevention and care.

The Joint United Nations Programme on HIV/AIDS has reported that more than 7.1 million people are now on HIV treatment across Africa, compared with only 1 million in 2005. Nearly 1 million were added in 2013 alone. New HIV-related deaths continued to fall, by 32% from 2005 to 2011. The number of new HIV infections fell by 33% from 2001 to 2011. This success is attributed to strong leadership and shared responsibility in Africa and among the global community.

Source: UNAIDS 2013.

Figure 5.3 Framework for health sector regional integration

Source: EAC 2011.

infections such as SARS, H1N1 and the like. In many African countries surveillance resources are scarce and hence regional surveillance demands resources and flexibility to respond to emerging threats effectively and benefit regional member countries. This cannot be left to individual countries. Additionally, a regional approach would reduce duplication in reporting, share resources among disease control programs and translate surveillance

and laboratory data into specific and timely public health actions.

Local production of pharmaceuticals and consumables can best take place through regional strategic investments so that African countries and regions can stand on their own feet and expand their industrial base to produce drugs and medical supplies in an incremental and sustainable approach (see chapter 15).

Procurement capacity has been weak in the continent but is catching up. Putting solid systems in place and building capacity among local professionals to procure goods and services for the best value for money is a transformative tool in Africa. Scaling up the bargaining power of the regional member states will procure high-quality health goods and services and save sizable resources.

Access to medicines is critical for health care. Medicines and other pharmaceutical products represent a large portion of health spending of countries. As such planning and managing the pharmaceutical sector at national and regional levels are crucial. For as long as this industry is in its infancy in Africa, countries are obliged to procure a good portion of their pharmaceutical requirements from non-African sources, and pharmaceuticals on average consume 30–60% of countries' health budgets.[36] There is a critical need for governments to kick-start the growth of this capital- and technology-intensive industry and to put a brake on overreliance on imports. Equally crucial are regional strategies and trade agreements on such costly products and services.

The ability to access regional pharmaceutical markets depends on competitiveness, product portfolio, product quality and price, as well as the ability to meet regulatory requirements and processes.[37] Market penetration and access also reflect the ability to adapt to different circumstances and speak to the need to revise and amend business models, form partnerships and do what is necessary to succeed in other markets. Access to markets is reliant on the sector having efficient internal regulatory processes, effective supply chains and willing buyers.

It is generally difficult for local manufacturers to access external markets because of potential buyers' perception that their products may be of poor quality and the general lack of faith in the competencies of regulatory agencies. Further, registration delays and the peculiarities of regulatory frameworks in external markets are problematic. Improved trade among African countries in the realm of pharmaceuticals is dependent on increasing the links between African companies and on supporting local industry to compete with imports in the short term while it evolves to a point of long-term sustainability.[38]

African governments and stakeholders, including civil society, should build on frameworks and policies on an intersectoral and integrated basis at continental, subregional and national levels. In Africa's changing health landscape, regional and subregional integration is a growing trend, with regional networks for policy development, operationalization and innovation already in place. Harmonization of policies related to health across Africa and in subregions such as EAC, ECOWAS and SADC is steadily growing.

The region's common health priorities should be articulated into regional health policies and a joint regional agenda toward green health goals. The key priority is to ensure that countries have the core capacities to fulfill their responsibilities under a regional health regulatory framework. This would include a regional referral system where health care is organized so that simple symptoms are dealt with at community level and, if higher-level skills are needed, patients are referred to the required level systematically and cost-effectively. Regional harmonization and adoption of the same referral model is ideal so that countries in a subregion can complement one another.

A reliable health information system is the foundation for building successful regional health care policies and service delivery systems. Africa's subregions need to develop strategies for creating a robust technical infrastructure cohesive and institutional information systems that work well for countries in the even more complex regional environment.

The challenges of aligning the various information sets and agendas in support of a regional health information system are complex, though potential rewards are enormous.

Finally, regional integration could expand markets for farmers and increase the availability and variety of food. Underdeveloped infrastructure, lack of regional trade policies and poor access to finance are among the key challenges for food insecurity. Regional institutions need to address and harmonize agricultural productivity, nutrition policies and regional trade agreements. Especially vital for landlocked countries, harmonization and integration will bring economies of scale. Natural resources that are shared by several countries like rivers, lakes and forests need regional policies and agreements to optimize equitable use and sustainable management.[39]

Conclusions

Countries alone cannot succeed in addressing challenges in health, education, and jobs—they need to collaborate. Regional integration can thus help turn common challenges via common solutions into factors of development by supporting the comparative advantage of each country through collaboration on human development issues such as unemployment, skills gaps and spread of diseases.

Fostering economic transformation requires larger markets, supporting intra-African trade and linking landlocked countries—including fragile states—to international markets. Integration is essential for Africa to sustain peace, share its countries' strengths and realize its full growth potential. It has to integrate in order to participate in the global economy and thus share the benefits of an increasingly interconnected global marketplace. Chances of success are small without physical, economic and sociopolitical machinery sustainably interconnecting Africa's 54 countries.

Regional integration is an overarching development strategy that leverages the comparative advantages of individual countries. Regional integration is also a relatively equitable form of globalization.[40] Integration would allow the smaller or less developed countries to enjoy several advantages, including increasing returns to scale, greater attractiveness to FDI, coordination, increased bargaining power, efficient and sustainable management of natural resources, and improved resistance to external shocks. Some countries may gain more from regional integration than others in the short term.[41] To secure benefits over the long term, however, states have to continuously improve policy harmonization.[42] These approaches would lead to broader intercountry harmonization and subsequently convergence of interests. Africa has some countries in financial-resource deficit but with expertise and knowledge surplus—and vice versa. The complementarities between countries can create jobs and help the continent exit the poverty trap.

Beyond building infrastructure such as bridges, roads, power plants and telecoms networks, it is important to further the soft elements of regional integration to maintain and expand such efforts and to spur economic development. Regional integration and human capital development should thus work in tandem to ensure that they equitably benefit all member states, urban and rural populations, the skilled and unskilled, as well as the poor and rich countries and communities. Human development, well-being and prosperity are determined by advances in health and education status—common challenges. While spillovers of low human development can hurt neighboring countries, benefits of integrated education and health care systems can contribute to regional development through the prevention of conflict and insecurity and instead generate opportunities for trade and employment—common solutions. This requires tools to reach the population, such as communications and transport infrastructure, driven by political will, engagement and good governance, and featuring private sector participation.

At the heart of integrated health care and education services are coordinated systems and committed states. Political leaders have

been playing historic roles to move from working in silos toward more dynamic and rewarding intercountry, subregional and regional interactions. Leadership and political will are crucial to drive the process and secure adequate public support and resources—and to harmonize national and regional changes.[43]

Notes

1. AfDB and others 2013.
2. AfDB and others 2012.
3. AfDB, UNECA and OECD 2008.
4. Carrillo Roa and Santana 2012.
5. UNDP 2011.
6. World Bank 2012.
7. AfDB 2012.
8. See AfDB and others (2013, 177): "Growth has averaged 5.1% since 2000, doubling the average growth rate of the 1990s. However, the employment-to-population ratio, which measures the share of the working-age population in active employment, has remained virtually unchanged over the last 20 years. It reached 60% in 2011, compared with 59% in 1991."
9. Akamatsu 1962. With Japan in the lead, followed by other East and Southeast Asian economies (Republic of Korea; Hong Kong SAR, China; Taiwan, China; Singapore), and then other future "tigers" (Thailand, Malaysia, Indonesia, etc.).
10. UNECA, AU and AfDB 2012.
11. Arab Maghreb Union (AMU), Community of Sahel-Saharan States (CEN-SAD), Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC), Economic Community of Central African States (ECCAS), Economic Community of West African States (ECOWAS), Intergovernmental Authority on Development (IGAD) and Southern African Development Community (SADC).
12. From the classification of Balassa (1961), economic integration by an FTA is based on the promotion of free trade through the elimination of tariffs, quotas and other trade barriers between partners. Therefore, there is no consideration at this stage either of common commercial policy, or of common external tariffs that characterize customs unions. There is no consideration either of production factors that are immobile between countries but mobile within a country. See also UNECA, AU and AfDB (2012).
13. UNECA, AU and AfDB 2012.
14. WEF 2013.
15. AfDB and others 2012.
16. Barnow, Trutko and Lerman 1998; Shah and Burke 2003; Trendle 2008.
17. ILO 2012.
18. UIS 2012.
19. Assié-Lumumba 2006.
20. ILO 2012.
21. ILO 2012.
22. ILO 2011.
23. Bloom, Canning and Chan 2005.
24. AU 2009.
25. AU 2006.
26. World Bank 2008.
27. UNDP 2011.
28. EAC 2011.
29. EAC 2011.
30. WHO 2010.
31. USAID 2012.
32. Hutchinson and others 2006.
33. Kinney, Lawn and Kerber 2009.
34. UNDP 2011.
35. WHO 2010.
36. WHO 2010.
37. AU 2012.
38. AU 2012.
39. UNDP 2011.
40. Robert 2004.
41. Trust Africa 2002.
42. Trust Africa 2002.
43. Hidetaka 2005.

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CHAPTER 6

Building human capital to set the Gazelles free: The informal economy

Ceyhun Elgin, Mohamed Arouri and Adel Ben Youssef

Understanding the informal economy's relationship to human capital and economic growth is essential for policymaking. Africa's booming youth population requires unprecedented job creation. And despite Africa's rapid economic growth in the last decade, the informal economy is not shrinking.

Smith (1994) defines informal economy as "market-based production of goods and services, whether legal or illegal, that escapes detection in the official estimates of GDP." Hart (2008) defines it as a set of economic activities taking place outside bureaucratic public and private sector establishments. Some characteristics of informal economic activity (excluding agriculture and paid domestic services) include unincorporated legal status, household ownership, incomplete sets of accounts, some market output and nonregistration of enterprise or employees.[1]

The informal sector contributes more than 50% of Sub-Saharan Africa's GDP and 80% of its labor force and employs 90% of rural African workers. It enables the most vulnerable populations—women, young people and poor people—to generate income and gain greater access to education and health services. But informal workers often lack social protection, secure incomes and decent working conditions. Informality is often associated with precariousness and poverty.

Africa's informal economy

Africa has a large, persistent informal economy. Several complementary factors have led to its emergence and expansion.

Informality's causes

Many of informality's causes relate to human capital formation: a weak labor market, rapid urbanization, entrepreneur dynamics and poor education outcomes.

Weak labor market. The main driver of Africa's informal economy is the private sector's inability to offer sufficient employment. Structural adjustment policies in most African countries have complicated the situation, as the sharp decline in clothing manufacturing illustrates.[2] Massive unemployment in the private sector has forced many Africans to subsist on low incomes from informal jobs. Many entrepreneurs exploit alternative business opportunities in the informal sector and develop unregulated businesses. Informal sector regulation is hampered by corruption and weak states. Concerned about unemployment, policymakers are passive toward the informal sector.

Rapid urbanization. Informality is linked to rapid urbanization and rural-urban migration.[3] Triggered by lack of resources, climate change, weak agriculture productivity and expansion of industrial and tertiary sectors, rapid urbanization has generated expansive slums in which the informal economy has taken root. Entrepreneurs create businesses and sell products and services without any regulation. Millions of people accept jobs in the informal sector rather than wait for formal employment. Lack of investment in basic infrastructure—including roads, transport, storage facilities and sustainable irrigation systems—leads to social exclusion and higher rates of informality.

Entrepreneur dynamics. African entrepreneurs reduce costs by avoiding tax payments, retirement pensions, social security contributions and other social benefits, and neglect

legal labor market rules such as safety standards, minimum wages, minimum age requirements and maximum working hours. Leaving the informal sector is also expensive: many firms—particularly small firms and the self-employed—continue to operate informally because formalization costs outweigh the benefits.[4] Limited access to finance and technology also pushes informality.

Poor education outcomes. Mismatch between education and training system output and required job market skills also drives informality. Africa is experiencing substantial emigration, informal employment and youth unemployment due to the gap between formal education and the economy's needs.

Size of Africa's informal economy

The estimated average size of Africa's informal economy (in percent of GDP) was 41% for 1999–2007 (table 6.1). Zimbabwe (61.8%), Tanzania (56.4%) and Nigeria (56.2%) have by far the largest informal economies. In the middle are Mozambique (39.8%), Côte d'Ivoire (45.2%) and Niger (40.2%). At the lower end are Guinea (31.4%), Namibia (30.4%) and South Africa (27.3%).

Sub-Saharan Africa has a large informal economy compared with Latin America and the Caribbean (figure 6.1). Informality levels in North African countries seem closer to those of other Middle East countries.

Informal employment in Africa

Employment in the informal economy entails no formal regulations and provides no legal or social protections. The International Labour Organization defined informal employment as comprising all jobs in informal sector enterprises, or all persons employed during a given period in at least one informal sector enterprise, regardless of their employment status or whether the job was a primary or a secondary job.[5] A recent Organisation for Economic Co-operation and Development (OECD) report explains informal employment as the result of exclusion from the formal sector or voluntary opting out of formal structures.[6]

Informal employment is the norm rather than the exception in Africa (table 6.2). It is more common in Sub-Saharan Africa than in North Africa. The informal sector employs more men than women in North Africa, but more women than men in Sub-Saharan Africa. Disadvantaged in the education system and the formal economy, many Sub-Saharan women are drawn to the informal economy to earn money.

Informal economy, human capital and growth

To capture interactions among the informal economy, human development and economic activity in Africa, this chapter's conceptual framework distinguishes several channels (figure 6.2). The informal economy affects economic activity directly by creating jobs, generating incomes, reducing taxes and producing goods and services. The informal economy also affects the economy indirectly through its impact on human capital. Numerous studies have shown that by generating revenue the informal economy improves human capital by facilitating access to education, training and health services.

But informality also harms the economy and human capital: tax evasion stifles economic growth and indecent working conditions compromise worker health and safety.

Employment

The informal sector has traditionally been viewed as a temporary solution to unemployment and poverty that tends to disappear as an economy matures and becomes more developed.[7] But recent evidence shows that the informal sector may persist in the long term, especially in Africa.[8] The African informal economy employs millions of poor and marginalized people. Most informal sector workers, despite comparable productivity, receive lower pay and have less access to social protection than their formal sector counterparts.

The economic literature assumes a wage penalty in the informal sector, explained mainly by difference in worker qualifications. El Badaoui, Strobl and Walsh (2008) show

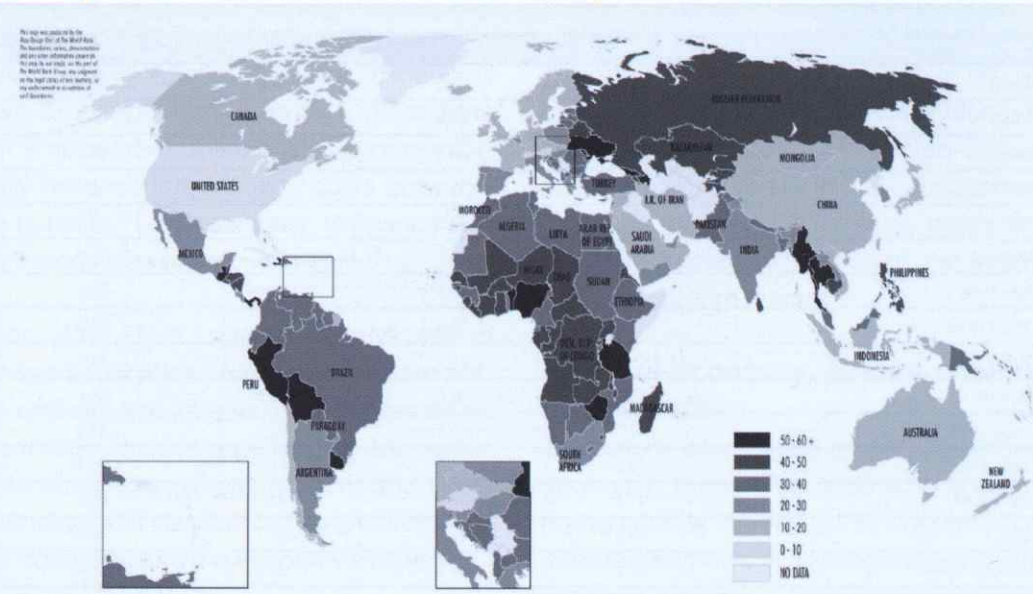
Table 6.1 **Informal economy size in Africa, 1997, 2003 and 2007 and average**

Economy	1999	2003	2007	Average
Algeria	34.2	32.5	31.2	32.5
Angola	48.8	47.3	42.1	46.5
Benin	51.2	49.3	49.1	49.8
Botswana	33.9	33.0	31.9	32.9
Burkina Faso	41.3	40.3	39.6	40.5
Cameroon	33.3	31.7	31.4	32.0
Cape Verde	36.5	35.7	33.4	35.4
Central Africa	42.8	46.9	45.1	45.0
Chad	45.8	44.2	42.2	43.7
Comoros	39.3	37.6	39.4	38.7
Congo, Dem. Rep.	47.2	47.1	46.7	47.3
Congo, Rep.	49.5	46.8	44.6	46.4
Côte d'Ivoire	41.4	46.0	47.0	45.2
Egypt	35.5	35.4	33.1	34.9
Equatorial Guinea	32.7	31.2	30.1	31.4
Eritrea	38.1	40.3	41.4	40.1
Ethiopia	40.6	40.1	35.1	38.6
Gabon	46.2	47.5	47.3	47.5
Gambia, The	46.1	45.4	40.9	44.3
Ghana	42.0	41.3	38.3	40.7
Guinea	39.7	38.8	39.2	39.0
Guinea-Bissau	40.4	41.5	41.6	40.9
Kenya	33.7	34.6	29.5	33.2
Liberia	44.2	45.0	44.2	44.2
Libya	34.7	34.9	30.9	33.7
Malawi	39.9	43.4	39.4	41.8
Mali	42.5	39.9	39.9	40.7
Mauritania	35.5	35.8	—	35.1
Morocco	36.5	35.0	33.1	34.9
Mozambique	41.1	39.8	—	39.8
Namibia	31.4	30.7	28.5	30.3
Niger	41.7	39.7	—	40.4
Nigeria	58.0	56.3	—	56.2
Rwanda	40.5	40.7	—	40.1
Senegal	45.0	44.4	41.7	43.7
Sierra Leone	48.6	44.8	42.9	45.6
South Africa	28.4	27.8	25.2	27.3
Sudan	34.1	—	—	34.1
Tanzania	58.6	56.6	53.7	56.4
Togo	34.4	34.9	—	34.9
Tunisia	38.7	37.4	35.4	37.2
Zimbabwe	59.6	63.7	62.7	61.8

Source: Schneider and Teobaldelli 2012.

that in South Africa 75% of the wage difference is due to observable differences in human capital and job characteristics. The informal wage penalty is about 18% after controlling for unobservable, time-invariant factors. Moving from the informal sector to the formal sector depends on the worker's ability to develop skills and the state's ability to direct entrepreneurs to the formal sector through fiscal incentives.

Figure 6.1 **Global informal economy levels**



Source: Schneider, Buehn and Montenegro 2010.

Table 6.2 **Share of informal employment in nonagricultural employment, 1990–1999 and 2000–2007 (%)**

	1990–1999		2000–2007	
Region/country	**Women**	**Men**	**Women**	**Men**
North Africa	*43.3*	*49.3*		
Algeria	40.6	43.1		
Morocco	46.8	44.0		
Tunisia	39.2	53.2		
Egypt	46.5	56.9	38.6	47.2
Sub-Saharan Africa	*84.1*	*63.0*	*77.1*	*62.6*
Benin	97.3	87.0		
Chad	95.2	59.5		
Guinea	86.7	65.6		
Kenya	83.1	59.1		
Mali			89.2	74.2
South Africa	58.4	43.6	64.9	51.0

Source: Schneider and Teobaldelli 2012.

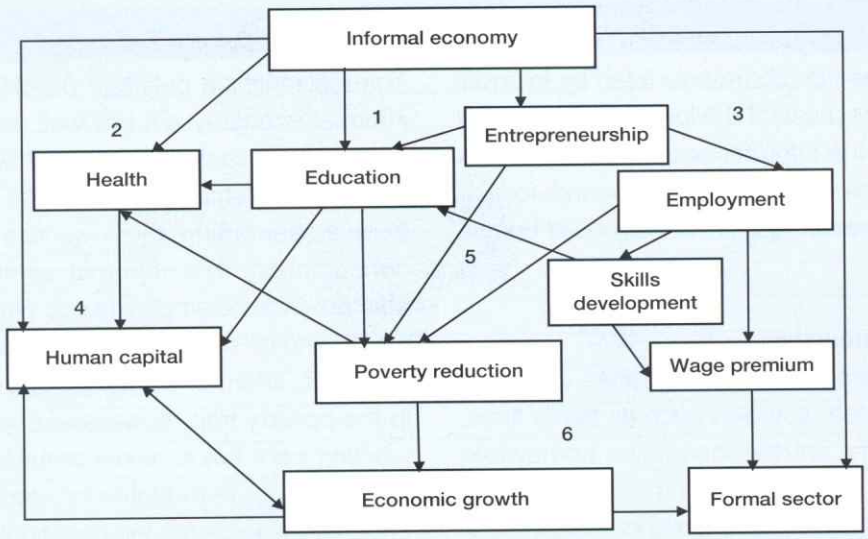
Skills development

In many African countries the informal economy is the main provider of jobs for poor and out-of-school people, whose skills and education do not give them access to jobs in the formal sector. This population faces double penalties. Their lower wages provide a lower living standard and may lead to limited access to education and health care for their children. The lack of opportunities for training and skills development in the informal sector also prevents them from moving to better, higher paying jobs.

Skills development for the informal sector may include skills upgrading and pre-employment training schemes. Some skills upgrading schemes offer training for apprentices and master craftspeople while they are on the job.

Traditional apprenticeship training is particularly well developed in West Africa.[9] In

Figure 6.2 **Conceptual framework**



Source: Authors.

Ghana it is responsible for 80–90% of basic skills training, compared with 10–15% of training from nongovernmental organizations and the public sector.[10] Palmer (2007) recommends a pro-poor informal economy strategy for specific skills development.

Education

The informal sector has at least two distinct links with education. The first is indirect: informal sector wages enable millions of people to finance more education for their children.

The second is direct: informal skills development. Incorporating skilled informal workers in formal training systems, especially in technical and vocational education and training programs, is highly recommended. Unfortunately, skills development does not appear in the Millennium Development Goals.

Many informal entrepreneurs do not observe the minimum legal working age. Children are thus employed in the informal economy and do not go to school. Thus, the informal economy may have both positive and negative effects on education.

Health

Informal workers often live in slums that lack health facilities and good sanitation. But few studies have investigated the interaction between the informal economy and health. We identify three main channels of interaction.

The first channel depends on revenue generation. Millions of people are improving their health through revenue generation. But since wages in the informal sector are lower than in the formal sector, salaries may not permit anything more than subsistence. Informal sector income is unlikely to permit the poor and near-poor to invest in health. More than 50% of health spending in Burkina Faso is out of pocket.[11]

The second channel is through work conditions. Inadequate health and safety standards and environmental hazards are particularly evident in the informal sector. Most informal workers operate in poor working conditions and are not covered by social protection or labor regulations. They suffer from malnutrition, parasitic diseases, asthma, skin allergies, cancers, chemical poisoning, food poisoning, heat stress and exposure to dust and chemicals. Most informal workers also operate in a nonergonomic manner and without safe water and sanitary conditions. Life expectancy of informal workers is lower than that of workers in the formal sector. Improving labor conditions and health provision in the informal sector can build human capital. Sufficient health facilities, professional health

workers, medicines and public health information should be made available.

The third channel concerns the potentially harmful medicines and drugs sold in the informal sector, commonly used by informal workers because of the low cost. Regulating health in the informal economy by increasing access to safe medicines and forbidding dangerous drugs will help build human capital.

Entrepreneurship

Informal entrepreneurial activities can overlap with other activities such as family firms, community entrepreneurship, homework, emerging firms and self-employment.[12] The informal sector attracts entrepreneurs for several reasons, including bureaucracy, lack of skills, tax evasion and opportunity for small-scale enterprise. When society fails to help individuals subsist and when there is distrust in formal institutions, entrepreneurs are more likely to operate in the informal sector.

The informal sector offers opportunities for poor and less educated people to create businesses. It can be considered a stepping stone to the formal economy.[13] As the economy grows and the state consolidates institutions, entrepreneurs will move from the informal to the formal sector, as long as sector demands overlap.[14] Microcredit programs and social business (producing goods and services that benefit mostly underprivileged people) can help start an informal business that can later move to the formal sector.

The economic literature identifies at least three types of informal entrepreneurs: upper-tier entrepreneurs with growth orientation, who share characteristics such as education, language skills, sector choice and basic management; lower-tier entrepreneurs with few skills, who focus on survival and subsistence; and middle-tier entrepreneurs, called "constrained Gazelles" in West Africa, who share characteristics with both upper- and lower-tier counterparts.[15]

Building informal entrepreneurship skills to boost returns and encourage growth orientation can reduce poverty.[16] Nguimkeu (2014) finds that training permits individuals with minimal wealth to start an entrepreneurial business.

Reducing poverty

The relationships between poverty and the informal economy are not well understood. The informal sector offers employment and entrepreneurship opportunities to poor people, permitting them access to basic consumption. The informal sector generates 60–90% of employment.[17] But with low wages and no social security or health benefit schemes, informal workers find themselves in the poverty trap. A massive population of working poor live in slums around the main African cities. With higher productivity, revenue and wages, the informal sector can lift them out of poverty. Informal sector productivity is essential for reducing poverty.

Empirical evidence of interactions among the informal economy, human capital and economic growth

This section presents regression results as evidence for the link among informality, human capital and economic growth.

Data

These regressions use several variables in addition to measures of economic growth, informal economy size and human capital (table 6.3): population growth rate, initial GDP per capita (for most countries the initial year is 1960), government spending (as percent of GDP), trade openness (the ratio of the sum of exports and imports to GDP) and capital–output ratio.[18] They also use a dummy for the North African countries and several development-related variables, including average life expectancy (in years), urbanization (urban population as percent of total population), employment–population ratio (ratio of employment to population as a percent) and employer–population ratio (ratio of employers to population as a percent) to proxy for entrepreneurship.

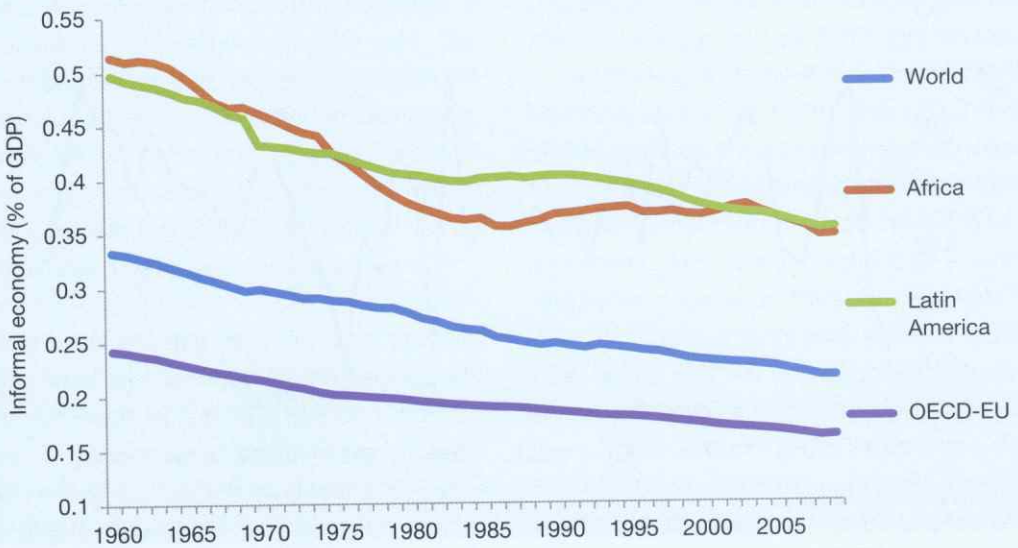
Informal economy size as percent of GDP has declined in all regions, but in Africa the decline came to an end in the 1980s (figure 6.3). The informal economy makes

Table 6.3 **Descriptive summary statistics: five-year averaged series**

Variable	Observation	Mean	Standard deviation	Minimum	Maximum
Informal economy (% of GDP)	449	43.14	10.22	21.94	75.01
Growth (%)	461	4.15	5.56	−34.21	58.89
North Africa dummy	48	0.10	0.31	0.00	1.00
Population growth (%)	432	13.53	5.48	−24.61	40.96
GDP per capita in 1960 (thousand USD)	48	1.31	1.30	0.24	7.00
Government spending (% of GDP)	461	11.90	9.48	0.79	56.49
Trade openness (% of GDP)	461	68.17	36.69	15.65	311.66
Average years of schooling (years)	370	3.31	2.03	0.22	9.35
Capital–output ratio	457	1.79	1.01	0.30	7.65
Average life expectancy (years)	480	50.40	8.65	28.61	74.10
Employment ratio (% of population)	192	62.44	14.13	32.32	87.65
Employer ratio (% of population)	65	2.63	3.79	0.00	17.52

Source: Informal economy series, Elgin and Oztunali (2012); growth of GDP and population, as well as government spending and trade openness, Penn World Tables (PWT) 7.1; schooling, Barro and Lee (2010); capital–output ratio, constructed using the perpetual inventory method with the investment series, PWT 7.1; life expectancy, employment–population ratio and employer–population ratio, World Development Indicators.

Figure 6.3 **Informal economy around the world (GDP-weighted regional averages)**



Source: Elgin and Oztunali 2012.

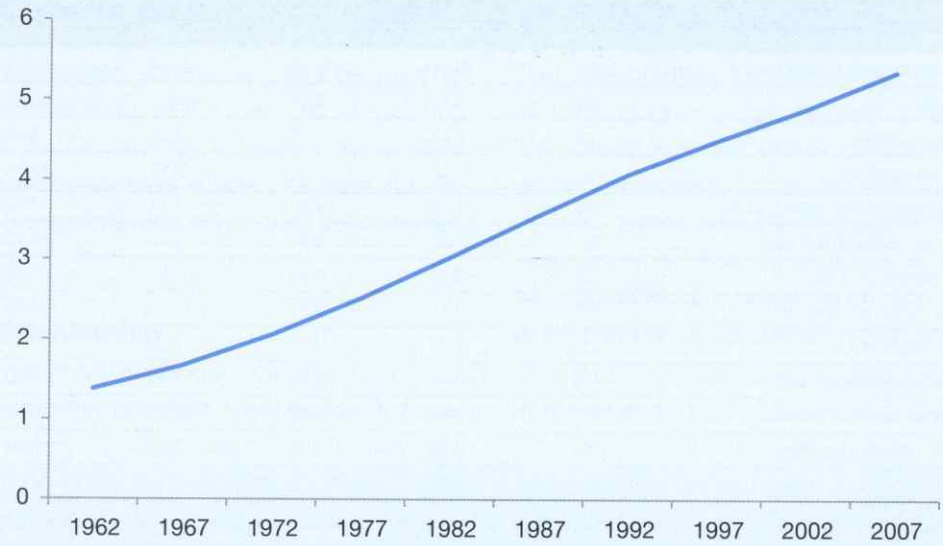
up a very large portion of GDP in Africa—comparable with Latin America but much larger than the world average.

Despite a steady increase, average schooling in Africa is still well below the world average, which is well above six years (figure 6.4). The average growth rate of African GDP from 1960 to 2009 was highly volatile (figure 6.5).

Regressions analysis

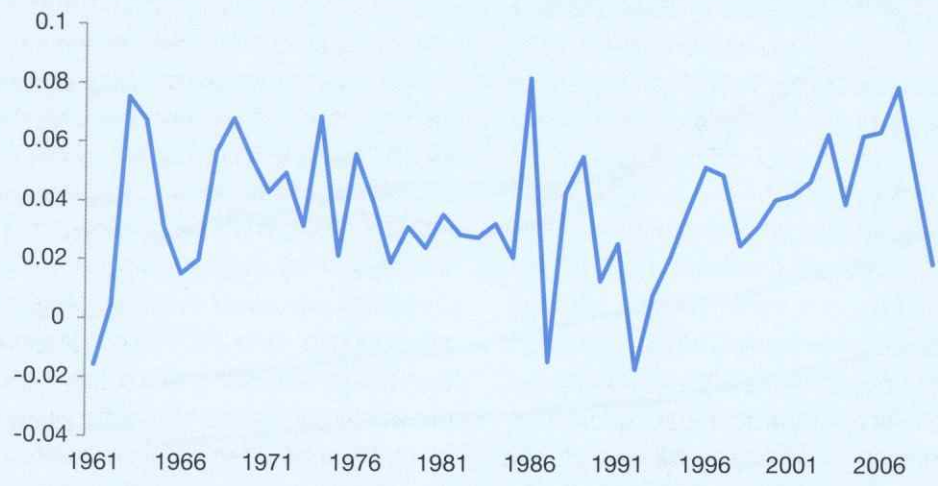
Impact of the informal economy on economic growth. The following equation is estimated using panel data to assess the impact of the informal economy on economic growth. Here, for country *i*, in year *t*, our dependent variable is GDP growth. *IS* denotes informal economy size as percent of GDP and *X*

Figure 6.4 **Average years of schooling in Africa**



Source: World Bank 2013.

Figure 6.5 **Average growth rate of African GDP from 1961 to 2009**



Source: Penn World Tables 7.1.

denotes the control variables. $e_{i,t}$ is the error term.

$$Growth_{i,t} = b_0 + b_1 IS_{i,t} + \sum_{k=2}^{n} b_k X_{k_{i,t}} + e_{i,t}$$

To rule out business cycle effects, the equation was estimated using five-year averaged data. To focus on the long-term relationship among growth, informality and human capital, regressions were run mostly without fixed effects (table 6.4). The first six regressions use the pooled OLS estimator to this end. But in regression 7 a dummy variable was included for North African countries. Regression FE reports regressions results using the fixed-effects estimator with time dummies.

In all regressions there is a strong relationship between informal economy and economic growth: informal economy boosts African economic growth. However, the relationship between growth and informality also strongly interacts with human capital (proxied by schooling). Accordingly, with lower average schooling levels (lower human

Table 6.4 Growth, informality and human capital

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(FE)
Informal	0.14* (2.80)	0.12* (2.85)	0.17* (2.90)	0.17* (2.94)	0.17* (2.92)	0.15* (3.07)	0.15* (3.06)	0.12** (2.52)
Schooling	0.01*** (1.89)	0.01** (2.29)	0.01** (2.21)	0.01** (2.32)	0.01** (2.30)	0.01** (2.41)	0.01** (2.46)	0.01** (2.08)
Interaction	−0.02*** (−1.71)	−0.03** (−2.13)	−0.03** (−2.14)	−0.03** (−2.25)	−0.03** (−2.25)	−0.03** (−2.27)	−0.03** (−2.26)	−0.02*** (−1.80)
Population growth		0.22*** (1.71)	0.22*** (1.73)	0.22*** (1.74)	0.23*** (1.75)	0.21*** (1.89)	0.23** (2.01)	0.25** (2.38)
Openness			0.01*** (1.88)	0.01*** (1.90)	0.01*** (1.85)	0.01*** (1.73)	0.01*** (1.76)	0.01 (1.54)
Initial GDP				−0.001 (−0.84)	−0.001 (−0.93)	−0.002** (−0.92)	−0.003 (−1.41)	−0.003 (−1.44)
Government spending					−0.03 (−0.68)	−0.04 (−0.95)	−0.04 (−0.85)	−0.03 (−0.76)
Capital						−0.005 (−0.67)	−0.006 (−0.77)	−0.004 (−0.57)
North Africa dummy							0.02*** (1.90)	0.02*** (1.91)
R-squared	0.03	0.08	0.09	0.09	0.10	0.10	0.11	0.20
Observations	354	323	323	323	323	323	323	323

Note: Robust *t*-statistics are reported in parentheses. *, ** and *** denote 1%, 5% and 10% level of significance, respectively. In all regressions a constant is included, but its coefficient is not reported. "Interaction" refers to the interaction variable between schooling and informal economy size. The dependent variable is growth.

capital values), a larger informal economy is associated with a higher growth rate. But with higher average schooling levels (above a threshold of between four and seven years), a larger informal economy is associated with a lower growth rate. Moreover, trade openness, population growth and the North Africa dummy also positively correlate with growth.

Impact of the informal economy on education, health and employment. We run two regressions for each of the four dependent variables. These are schooling, life expectancy, employment–population ratio and employer–population ratio (table 6.5). In each pair of regressions, the first one includes year fixed-effects, whereas the second one does not.

According to table 6.5, a larger informal sector is associated with less schooling, a shorter life span (qualitatively similar results are obtained when one uses measures of mortality rather than life expectancy), a larger employment–population ratio and a smaller employer–population ratio. Accordingly, the African informal economy affects education, health and entrepreneurship negatively, but at the same time it also boosts employment. Informal work is thus primarily a function of poverty. Informal workers, especially women and children, earn extremely low

Table 6.5 Education, health, employment and entrepreneurship versus informality

Dependent variable	Schooling	Schooling	Life expectancy	Life expectancy	Employment–population ratio	Employment–population ratio	Employer–population ratio	Employer–population ratio
Informal	−2.90* (−3.26)	−6.55* (−6.60)	−17.84* (−4.80)	−30.66* (−8.19)	61.52* (6.41)	60.09* (6.37)	−8.15* (−4.98)	−8.70* (−5.56)
North Africa dummy	0.26 (1.46)	0.15 (0.50)	11.43 (14.58)	10.84* (9.57)	−18.22* (−11.19)	−18.33* (−11.30)	6.02** (2.71)	6.06* (2.83)
R-squared	0.43	0.12	0.47	0.32	0.37	0.36	0.46	0.44
Observations	354	354	449	449	191	191	65	65

Note: Robust *t*-statistics are reported in parentheses. *, ** and *** denote 1%, 5% and 10% level of significance, respectively. In all regressions a constant is included, but its coefficient is not reported.

incomes. They could earn more if they were able to move into formal employment.[19] Due to lack of data, we cannot say more about the effect of informality on poverty. Even so, current results indicate that there is a strong association.

Policy implications

Build a bridge between informal and formal economies through education

Education can bridge the gap between informal and formal economies. Formal training can improve informal workers' skills and enable them to shift to formal jobs. The education system can also raise the awareness of informal entrepreneurs about their firms' potential in the formal economy. "The low level of education and vocational training of informal economy workers results in a vicious circle of low productivity, low income and low investment in skills. Improving the skills of informal economy workers is therefore key to their ability to access gainful and productive jobs."[20]

The talents and competencies of successful informal entrepreneurs can also be used in formal vocational schools and training programs. While most international organizations recommend the formalization of the informal economy, they should also consider the persistence of the African informal economy and its ability to provide jobs.[21]

Improve access to finance and encourage alternative formal financing channels such as microcredit

Africa's formal financial industry often refuses to finance informal businesses. Most informal economy activities are thus built upon informal and private finance, drawing on personal and family savings and pooled individual savings. But insufficient private assets constrain informal businesses. Relaxing financial constraints by facilitating access to credit and developing microcredit can foster informal sector productivity and ability to shift to the formal sector. "Microfinance loans, deposits and other service contracts contain elements of the formal economy, without being as sophisticated as mainstream banking services. Moreover, microfinance institutions which wish to grow encourage their clients to expand from livelihood activities to genuine microenterprises, and then to SMEs."[22]

Organize the informal economy, simplify legal procedures and improve business environment

Institutional and legal constraints may make it costly for small firms to formalize. Procedures are often long, complex and expensive. There is no incentive to formalize because public support for informal workers is weak. As Africa experiences better governance and law enforcement, the informal economy will move to formalization. South Africa, Mauritius, Cape Verde and Morocco have drastically reduced the informal sector. Institutional reforms are needed to enhance organization and formalization of the informal sector and increase its human capital dividend.

Conclusions

The informal sector includes high-performing, growth-oriented businesses ("Gazelles") and numerous subsistence businesses. About a third of businesses are "constrained Gazelles," businesses lacking skills and sufficient financing. As average schooling levels rise, informal entrepreneurial skills expand, leading to higher productivity.

Education and the informal sector contribute substantially to Africa's growth. Raising the average number of schooling years as a macroeconomic policy affects GDP by raising informal sector productivity. A threshold of four to seven schooling years is needed to change the growth dynamics in Africa through the informal sector. The current average schooling level is six years—many countries have already passed the seven-year requirement. Education can bridge the gap between informal and formal economies. The informal sector is a reservoir of talents and skilled people who can contribute to the formal training system, especially in vocational training.

Informal entrepreneurs have strong financial constraints and need greater access to formal financial markets. Microcredit and social business funds can alleviate these

constraints and facilitate the move to formal entrepreneurship.

Improving governance and strengthening the states should accelerate the shift to the formal sector. Young entrepreneurs also need fiscal incentives to join the formal economy. Developing skills and improving access to financial markets can set the Gazelles free and substantially boost informal economy productivity.

Notes

1. ILO 2000, 2014.
2. Rogerson and McCormick 2004.
3. Elgin and Oyvat 2013.
4. Maloney 2004; Ihrig and Moe 2001.
5. ILO 2000; Ralf Hussmanns 2004.
6. OECD 2009.
7. Fields 1975.
8. Charmes 2000.
9. World Bank 2004.
10. Palmer 2007.
11. WHO 2005.
12. Webb and others 2013.
13. ILO 2002.
14. Xaba, Horn and Motala 2002; Günther 2006; Böhme and Thiel 2011.
15. Grimm, Knorringa and Lay. 2012.
16. Calderon and others 2013; McKenzie and Woodruff 2012.
17. ILO 2009; UN-HABITAT 2006.
18. Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Democratic Republic of Congo, Republic of Congo, Côte d'Ivoire, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia and Zimbabwe.
19. Heintz and Posel 2008.
20. ILO 2014.
21. EOCD 2009; International Labour Organization 2014.
22. ILO 2014.

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CHAPTER 7

Transporting people and goods

Mohamed Arouri, Adel Ben Youssef, Caroline Jehu-Appiah and Cuong Nguyen Viet

Africa's inadequate transport infrastructure reduces mobility and hampers productivity. With recent economic growth, most African countries are investing substantially in transport infrastructure and becoming aware of the need to make these investments sustainable. How do these infrastructure investments affect human capital formation and by what channels?

Current investments are not fulfilling their potential to develop human capital. Examining transport's effects on health, education, employment and economic growth can enable future investments to develop human capital more substantially.

Africa's transportation system contributes to poverty. A proximity gap results from landlocked situations with long distances to markets and suboptimal agglomeration patterns.[1] Allocating sufficient transport resources may effect economic growth, improve travel safety and conditions, make employment more accessible and create more time for work and leisure by reducing travel time. By enabling individuals to reach school, health care and water and other resources, and by connecting friends and relatives, transport infrastructure may improve human capital variables such as health and education. Roads, rail lines, ports and airports also connect firms to national and international markets, facilitating trade and allowing small producers and farmers to break out of subsistence agriculture.

Without efficient transport, individuals and economic activity suffer. But good transport infrastructure is costly, and governments—especially in developing countries—must balance transport with other priorities. Evidence of transport's effects on economic and human capital varies considerably.[2] But overall the transport sector in Africa needs to be better oriented toward enhancing human and social capital.

The landscape of transport in Africa

Road, rail and air transport are underdeveloped and poorly maintained (table 7.1). All require substantial investment.

Table 7.1 Transport infrastructure in six African countries

Transport infrastructure	Egypt	Ghana	Mozambique	Nigeria	Senegal	South Africa
Road density (km of road per 100 square km of land area)	13.7	46.0	4.0	7.5	7.5	30.3
Roads, paved (% of total roads)	92.2	12.6	20.8	15	53.5	17.3
Roads, total network (km)	137,430	109,515	30,331	193,200	14,825	362,099
Rail lines (total route-km)	5,195	953	3,116	3,528	906	22,051
Railways, goods transported (million ton-km)	3,840	181	1,194	77	384	113,342
Railways, passengers carried (million passenger-km)	40,837	85	247	174	129	18,865
Air transport, freight (million ton-km)	412.9	1.2	8.1	8.0	7.5	1,092.6
Air transport, passengers carried	9,178,832	139,645	576,638	4,211,018	572,609	15,497,217
Air transport, registered carrier departures worldwide	87,697	5,790	12,940	59,411	6,441	183,482
Transportation (% of firms identifying this as a major constraint)	14.9	17.6	23.0	28.1	27.4	3.9
Transportation (% of managers surveyed ranking this as a major constraint)	3.1	1.5	6.0	7.5	4.4	2.3

Source: World Development Indicators.

Roads—the main means of transportation in Africa

Roads are the dominant mode of motorized transport in Africa, accounting for 80% of freight transport and 90% of passenger traffic. Africa's road-to-population ratio is 26 kilometers per 10,000 inhabitants. Only a quarter of the roads are paved, the remaining being subject to weather variability and easy deterioration. The proportion of paved roads varies substantially among countries, from 92.2% in Egypt to 12.6% in Ghana. Sub-Saharan Africa has on average only 16.8 kilometers of paved roads per 1,000 square kilometers (table 7.2), half that of low-income countries in the rest of the world. In fragile Sub-Saharan states, the proportion is 12.5, while it reaches 52.3 in middle-income countries such as Mauritius. In middle-income countries outside Africa, however, the proportion is 124.0. Africa's transport infrastructure suffers from major deficits and requires long-term investment.

Poor and weak railways

Railway infrastructure is poor and scarce in Africa (table 7.3). Most of the railway network was built with foreign investment during the colonial period to transport commodities and raw materials for export. When the colonial era ended, few countries expanded railways or invested in their maintenance, as the new governments lacked funding and management capacity. Most of the inherited railway was built for transportation of goods rather than persons. In Senegal and Ghana railways occupy less than 1,000 kilometers, and in Egypt only 5,195 kilometers (see table 7.1). South Africa, with 22,051 kilometers of railways, is an exception. But of these railway networks, 90% are designed to transport goods. Most African countries have very low railway densities, ranging from 1.6 kilometers of railways per 1,000 square kilometers to 8.8 in middle-income countries. In middle-income countries in the rest of the world, the figure is 141 (16 times more than in Sub-Saharan Africa). And 60–100% of the railways are dedicated to the transport of goods.

Emerging air transport industry

Air transport is less developed in Africa than elsewhere. Most African countries are investing in upgrading their airports in accord with recent economic growth. But the picture varies among countries. South Africa, with 15.5 million passengers a year and 183,482 departures worldwide, differs substantially from Ghana, which has only 139,645 passengers a

Table 7.2 **Paved roads in Sub-Saharan Africa and the rest of the world**

	Sub-Saharan Africa					Rest of world	
Road density	All	Resource rich	Low income	Fragile states	Middle income	Low income	Middle income
By land area, per 1,000 square km	16.8	9.9	16.0	12.5	52.3	37.0	124.0
By population, per million people	533	275	562	408	2,047	700	1,319
By GDP, per USD1 billion	483	253	308	110	36	1,210	2,080

Source: Carruthers, Krishnamani and Murray 2009.

Table 7.3 **Railway density in Sub-Saharan Africa and the rest of the world**

	Sub-Saharan Africa					Rest of world	
Railway density	All	Resource rich	Low income	Fragile states	Middle income	Low income	Middle income
By land area, per 1,000 square km	2.8	2.0	2.2	1.6	8.8	3.4	141.0
By population, per million people	83.1	62.4	56.5	45.9	417.6	63.3	74.0
By GDP, per USD1 billion	100.0	67.1	165.4	173.1	88.7	109.4	48.5

Source: Carruthers, Krishnamani and Murray 2009.

year and only 5,790 departures (tables 7.1 and 7.4). Egypt follows South Africa with 9.18 million passengers a year and 87,697 departures. Similarly, Mozambique and Senegal carry 0.57 million passengers a year. Although Nigeria is the most populous African country, it lags behind South Africa and North African countries, with only 4.2 million passengers and 59,411 departures a year. The underdevelopment of air transport constrains global connections and hinders foreign direct investment.

Maintaining transport infrastructure

Maintaining transport infrastructure is a major problem for three main reasons. First, drought and severe climate conditions make roads deteriorate rapidly.[3] Climate change will worsen these conditions, especially in coastal regions. Second, most African countries underinvest in maintenance, especially when financial resources are scarce, preferring to expand the paved road network. And third, Africa lacks human resources in the transport sector, especially engineers.[4]

But recent achievements suggest a positive trend. Road maintenance has improved, and most countries have established active road funds. Nearly half the main road network is in good condition, an increase of 100% from half a decade ago, enabling better access to services and markets. About half the small urban railway system is under concession agreements.[5]

With the rapid development of African megacities, huge investments are aiming to extend infrastructure and move toward passenger transportation (box 7.1). After the mid-1990s several African countries, including Burkina Faso, Côte d'Ivoire, the Democratic Republic of Congo, Mozambique and Togo, moved to a concession system involving the private sector. While many countries have recently renationalized their railway companies and ended the concession, the experience showed that the private sector managed railways better than the public sector.[6] New players are interested in investing in the Sub-Saharan railways. For example, China is investing in the TAZARA (linking Tanzania to Zambia), and proposed to invest in 25 railway projects in Ghana and Nigeria. Brazil is investing in Mozambique. The revival of African railways over the coming decades can offer alternatives to road and air transportation with lower greenhouse gas emissions.

As Africa builds the necessary transport infrastructure, it must also lower transport costs to make African firms more internationally competitive. Accounting for 30% of exports, compared with 8.6% for all developing countries, transport costs in Africa are some of the world's highest.[7]

Transport, human capital and growth: A conceptual framework

To capture interactions among transport, human development and economic activity in Africa, this chapter identifies two main channels of interaction: direct and indirect (figure 7.1). Transport affects economic activity directly by connecting firms to markets and reducing transaction costs, and indirectly through its impact on human capital. Good transport infrastructure improves human capital and contributes to GDP growth, while weak transport infrastructure hinders human development and contributes to economic stagnation and decline.

Table 7.4 **Airport runways in Sub-Saharan Africa and in the rest of the world**

	Sub-Saharan Africa					Rest of world	
Airport runway density	All	Resource rich	Low income	Fragile states	Middle income	Low income	Middle income
By land area, per 1,000 square km	0.02	0.02	0.02	0.02	0.05	0.12	0.24
By population, per million people	0.67	0.57	0.46	0.68	2.29	2.20	2.83
By GDP, per USD1 billion	0.81	0.62	1.35	2.56	0.49	3.81	1.85

Source: Bofinger 2009.

Box 7.1 Bus rapid transit: ReaVaya in South Africa and Lagos BRT-Lite

Thirty years after the first bus rapid transit model was developed in Curitiba, Brazil, some African cities are starting to build similar systems. These systems are attractive, cost-effective, high-frequency corridors designed for high volumes with off-board fare collection, elevated stations, separate lanes and environmentally friendly new buses with intelligent transport systems. Cities like these systems because of their speed; reliable service; equity, serving all people; economic growth potential, especially for real estate; and relatively low cost and ease of implementation and operation.

Lagos and Johannesburg pioneered Bus Rapid Transit (BRT) systems in Africa, with relative success so far. Each city is its country's largest and most important economic engine. After BRT, each city can claim that it has improved public transport speed, reliability and customer satisfaction while increasing usage.

Lagos inaugurated its version of BRT on March 2008 with a very cost-effective ratio of USD1.2 million per kilometer. The still-expanding 22-kilometer system carries nearly 175,000 passengers a day. ReaVaya, opening in September 2009 in Johannesburg, runs in dedicated lanes and is expanding its original 25 kilometers, built at a higher price of USD14 million per kilometer.

Source: Cruz 2013.

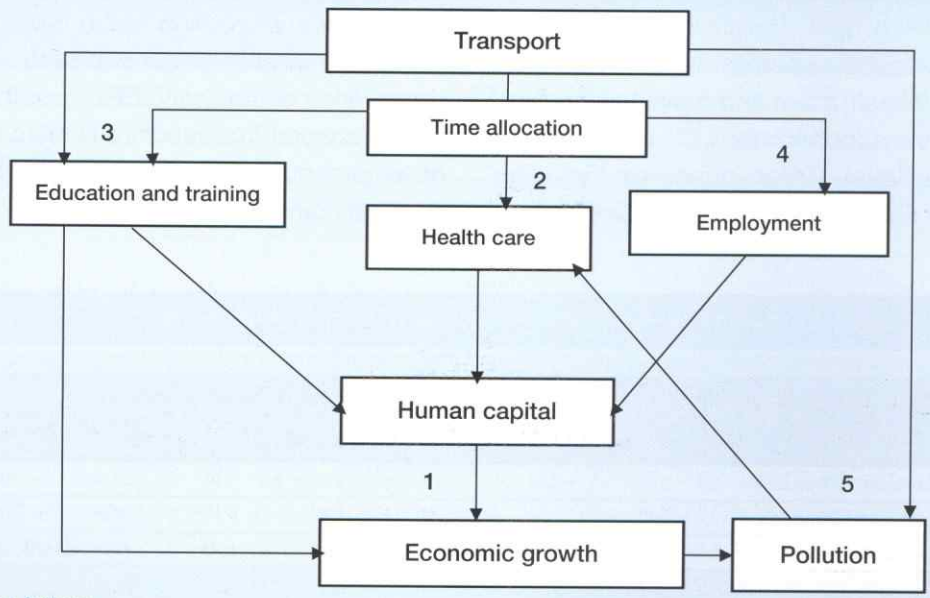
Economic growth

Lowering transport costs and improving mobility will boost economic growth and social and economic activity. By improving accessibility and efficiency, transport increases the market size for manufacturing; the quantity of goods and services transported; and tourism and labor, leading to greater competition and efficiency among firms and workers.

Transport also increases agglomeration economies, allowing for specialization and economies of scale and increasing the returns-to-investment.[8] This nonlinear process requires that a certain threshold be reached before positive feedback and scale effects come into force. A big push may be needed through coordinated government intervention, for instance, to steer the economy beyond this threshold.[9] In many African countries productivity is low because of ethnolinguistic fragmentation and distance between economic agents, which transport helps reduce.[10]

Transport also raises a country's export capacity. Akerman (2009) shows the impact of the bridge linking Copenhagen and Malmö in 2000 on Swedish firms' export outcomes and productivity. Martincus and others (2014) show how closing a bridge between

Figure 7.1 Conceptual framework



Source: Authors.

Argentina and Uruguay lowered both countries' exports. According to their findings, a 1% rise in transport cost causes a 6% drop in exports.

Several articles have shown how transport capital and infrastructure foster economic growth and well-being in developing economies. Canning (1999), estimating aggregate production function for 77 countries between 1960 and 1990, found that output elasticity with respect to physical capital is around 0.37. Canning and Bennathan (2000), observing 89 countries, reported a positive rate of return for paved roads ranging from 0.048 to 0.083. Transport infrastructure is thus necessary but not sufficient to trigger large changes in output. Boopen (2006) shows the importance of transport capital in the economic growth of Sub-Saharan countries between 1980 and 2000. Transport's output elasticity ranges between 0.158 and 0.226, depending on the method of estimation. Foreign direct investment also depends heavily on adequate transport infrastructure. Finally, by accelerating human capital formation, transport infrastructure may induce larger output change.

Education

By facilitating access to schools, transport raises enrollment rates. Because most schools are far from rural villages, many children need to travel great distances to attend. Lowering transport costs will enable families to invest more in their children's education. By increasing employment opportunities, transport also generates revenue that may be invested in education.

Due to lack of transportation, in rural Africa many household goods, notably water, fuel and food, are carried by pedestrian head-loading—mostly by women and children—rather than by motor vehicle.[11] The labor inputs in time and effort are enormous. According to Hemson (2007), children are more involved in water collection in South Africa than women. Porter and others (2012) confirm this finding for Malawi, Ghana and South Africa between 2006 and 2009, where much everyday transport work must be achieved through pedestrian load-carrying. Transport scarcity thus reduces time for education.[12] Improving transport conditions to facilitate access to energy and water could free up this time. The current burden affects all aspects of education: attendance rates, punctuality, absence, concentration, interest in schooling, dropout and performance.

Rural African areas often suffer from economic or social problems. By improving accessibility and mobility, transport may reduce these areas' isolation and improve school enrollment. Transport is also furthering urbanization. Since urban areas perform better in literacy and school enrollment, transport can advance African education.

Health

Increasing transport capital has conflicting effects on health. Enhanced mobility improves access to health services and pharmaceutical products. Roads and other means of transportation connect isolated regions and link them to medical centers and sanitary services. This increased access saves lives and increases life expectancy.

Improving transport may also lower pedestrian head-loading by children. Many children are now transporting loads between 20 and 40 kilograms.[13] Carrying such heavy loads may harm children's health and hinder their development. These negative effects need to be better investigated.

Traffic deaths in particular are an increasing concern. According to the World Health Organization (WHO), the number of deaths from road traffic accidents globally is expected to increase from 1.3 million a year now to 2.0 million by 2030. Low- and middle-income countries will see crashes match HIV/AIDS as a cause of death by 2030. (In the very poorest, the WHO expects deaths almost to triple.)[14]

Finally, improved transport networks increase the rate of transmission of communicable diseases, notably HIV. Recent work by Tatem and others (2012) using molecular epidemiological data confirms that the dissemination pattern of HIV closely follows established transport routes. The recent Ebola outbreak in West Africa serves as a

salient reminder of how roads can facilitate the dissemination of diseases. Accordingly, transport project proposals should include providing for adequate health facilities to provide prompt diagnosis and treatment.

Increasing transport has negative effects, however. Pollution and related health problems are rising due to increased traffic congestion, lax enforcement of regulations and an influx of substandard old and second-hand vehicles and technologies. Africa's demand for fossil fuels and energy will continue to rise, making the transport sector the fastest growing source of greenhouse gas emissions.

Employment

Transport has direct and indirect effects on job creation. The transport sector is a growing business, directly creating numerous jobs in construction and maintenance, especially as populations grow. By facilitating trade, reducing transaction costs and increasing efficiency and productivity, transport also improves business conditions and attracts foreign direct investment, indirectly boosting employment.

The transport sector's informality must also be considered. The sector contributes more to employment than official data depict. Its lack of regulation also contributes to safety problems. Formalizing the transport sector will help.

Empirical evidence of the links among transport, human capital and growth in Africa

Granger causality tests can provide empirical evidence of interactions among transport, economic growth and human capital in Africa. This chapter uses data from six African countries—Egypt, Ghana, Mozambique, Nigeria, Senegal and South Africa—on the following variables: total transport investment, total road network, percentage of paved roads, rail lines, GDP per capita, new HIV infections, mortality rate, life expectancy at birth, secondary education, CO_2 emissions, employment and the percentage of urban population. Except for variables that represent a percentage, the logarithm of variables is taken.

The analysis proceeds in three steps. First, to determine the order of integration of the series, three standard unit root tests are applied: Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski and others (KPSS) tests. The ADF and PP tests are based on the null hypothesis of a unit root, while the KPSS test considers the null of no unit root. Results suggest that the series appear to be integrated of order one, a standard result for such series. Second, three tests are applied of the null hypothesis of no cointegration between the considered series: ADF, PP and Johansen tests.[15] Third, Granger causality tests are implemented in level vector autoregressions (VARs) following the Toda and Yamamoto (1995) approach,[16] which requires only the specification of the lag structure (determined here using the Schwarz Bayesian information criterion and Hannan-Quinn criterion, and using global Fisher's tests).[17]

Table 7.5 reports the *p*-value for the causality running transportation to the other studied variables.

Railways affect economic growth more than transport investment and road expansion

Road and railway expansion is expected to boost economic growth. Analysis results show that railway expansion affects economic growth in Ghana, Senegal and South Africa (Sub-Saharan Africa), but, where data are available, paved roads and the total road network do not. And transport investment causes economic growth only in Mozambique.

North African countries have not expanded railway coverage for a decade and may gain from railway investment. Railway lines contributed to urbanization in Egypt, Ghana and Nigeria, thus boosting economic growth (see chapter 3).

Health

Transport investment has conflicting effects on health. Although it facilitates access to basic health commodities, it is also a vector of transmission of disease. It also causes pollution, which endangers the population's health.

Table 7.5 Causality tests: Transport's effects on economic and human capital variables

Panel A: Effects of investment in transport

Investment in transport does not Granger-cause . . .	Egypt	Ghana	Mozambique	Nigeria	Senegal	South Africa
GDP per capita	0.6542	0.9098	**0.0295**	0.3496	0.7586	0.2829
New HIV infections	NA	0.8442	**0.0899**	0.3092	0.1570	0.7025
Mortality rate	0.6394	0.7410	0.7923	0.7048	**0.0948**	0.5361
Life expectancy at birth	0.5149	**0.0187**	**0.0560**	0.1504	**0.0765**	0.9241
Secondary education	0.2666	0.7077	0.3857	0.5481	NA	0.9811
CO_2 emissions	0.2136	0.3910	**0.0499**	0.2541	0.7230	0.9443
Employment	0.8432	0.1476	**0.0031**	0.4580	0.4268	0.2118
Urbanization	0.6181	0.2725	0.5547	0.2553	0.2548	0.6066

Panel B: Effects of road network

Investment in transport does not Granger-cause . . .	Egypt	Ghana	Mozambique	Nigeria	Senegal	South Africa
GDP per capita	NA	NA	0.1568	0.7373	0.4368	NA
New HIV infections	NA	NA	**0.0801**	**0.0066**	0.1725	NA
Mortality rate	NA	NA	**0.0005**	**0.0038**	0.1349	NA
Life expectancy at birth	NA	NA	0.4265	**0.0017**	**0.0722**	NA
Secondary education	NA	NA	**0.0056**	NA	NA	NA
CO_2 emissions	NA	NA	0.2047	0.1705	0.3135	NA
Employment	NA	NA	0.4159	0.8004	**0.0756**	NA
Urbanization	NA	NA	0.5945	0.7651	0.5764	NA

Panel C: Effects of paved roads

Investment in transport does not Granger-cause . . .	Egypt	Ghana	Mozambique	Nigeria	Senegal	South Africa
GDP per capita	0.1249	NA	0.1247	NA	0.3662	NA
New HIV infections	NA	NA	0.1468	NA	0.8715	NA
Mortality rate	**0.0745**	NA	**0.0032**	NA	**0.0445**	NA
Life expectancy at birth	0.1482	NA	**0.0002**	NA	0.6928	NA
Secondary education	0.6072	NA	**0.0011**	NA	NA	NA
CO_2 emissions	**0.0902**	NA	0.1889	NA	0.1136	NA
Employment	**0.0584**	NA	0.3320	NA	0.7917	NA
Urbanization	**0.0030**	NA	0.9673	NA	0.6303	NA

Panel D: Effects of rail lines

Investment in transport does not Granger-cause . . .	Egypt	Ghana	Mozambique	Nigeria	Senegal	South Africa
GDP per capita	0.6966	**0.0291**	0.1883	0.7571	**0.0370**	**0.0313**
New HIV infections	NA	NA	0.9999	**0.0024**	0.7070	0.4396
Mortality rate	0.5944	**0.0003**	0.4108	0.4632	0.1889	**0.0069**
Life expectancy at birth	0.1804	0.3835	0.7788	0.5900	NA	**0.0001**
Secondary education	0.4082	**0.0505**	0.4021	0.5939	0.3885	NA
CO_2 emissions	0.5992	**0.0721**	0.6809	**0.0384**	0.8771	**0.0370**
Employment	0.1795	NA	0.9999	0.9404	0.5319	0.9877
Urbanization	**0.0286**	**0.0442**	0.5594	**0.0074**	0.9868	NA

Note: Bold figures denote significance at 10%. NA denotes that data are not available.

Source: Authors' estimation using World Development Indicators database.

Life expectancy is improved by transport investment in Ghana, Mozambique and Senegal, by paved roads in Mozambique, Nigeria and Senegal and by railway expansion in South Africa. Mortality rate is reduced by transport investment in Senegal, by total roads in Mozambique and Nigeria, by paved roads in Egypt, Mozambique and Senegal and by expansion of railway coverage in South Africa.

Some literature links HIV dissemination with road and transport expansion in Africa; this analysis finds evidence of such a link only in Mozambique and Nigeria, due to a lack of available data for other countries. Road networks in Mozambique and railways in Nigeria play particularly strong roles.

CO_2 emissions are worsened by transport investment in Mozambique, by paved roads in Egypt and by railways in Ghana, Nigeria and South Africa. While Africa contributes less than 5% of global CO_2 emissions, its emissions rise by about 30% a year. Road and railway expansion is causing CO_2 pollution and related diseases, especially in urban areas.

Education

This investigation found only weak evidence for transport's impact on secondary education (used as the key variable for education). In Mozambique paved roads and road networks led to higher secondary school enrollment, and in Ghana railway expansion had the same effect. But there is no evidence of transport's impact on secondary education in the remaining countries. Education seems to depend more on other factors, such as revenue, agriculture productivity, family structure, parents' education and availability of schools and incentives. Investing in local schools and road projects should be considered. Links between transport and higher education should also be investigated.

Employment

Evidence of transport's impact on employment must be considered carefully. Railway coverage did not boost employment in any country; transport investment boosted employment only in Mozambique; road networks did so only in Senegal; and paved roads did so only in Egypt. Two explanations may account for this. The first is the threshold effect: current investment and infrastructure are not sufficient to substantially affect employment. Transport can foster economic transformation in Africa, but boosting employment requires attending to macroeconomic setting, raising local investments and attracting foreign direct investment. Examining transport's impact on human capital formation in urban West and Central Africa, Diaz Olvera, Plat and Pochet (2013) find that insufficient supply, poor service quality, minimal coordination between operators and absence of integrated fares restrict access to transport. Interactions thus remain local, preventing employment and human capital development.

The second explanation is that in some African countries transport may have some indirect effects on employment by building human capital. As railways contribute to human development in Sub-Saharan Africa through health and education, improving the railway network is expected to substantially further human capital and employment.

Regression analysis

To provide further evidence of transport's effects on economic growth and human capital in Africa, additional regressions were run using panel data methods—specifically, we regress GDP per capita, education (proxied by secondary education) and health (proxied by life expectancy at birth) on transport (proxied by transport investment and rail lines) and other explanatory control variables: government spending (as % of GDP), urbanization (urban population as % of total population) and population density. Data were obtained over 1980–2011 from World Development Indicators and from Penn World Tables. Estimating the impact of a transport factor is very challenging due to endogeneity. The following model is used:

$$y_{it} = \beta_0 + \beta_1 y_{i,t-1} + \delta_1 T_{it} + \theta X'_{it} + v_i + u_{it}, \qquad (1)$$

where y_{it} is an outcome of interest (GDP per capita, education and health variables)

of country i in year t, and $y_{i,t-1}$ is the lagged dependent variable. T_{it} is the transport variable (transport investment or rail lines) of country i in year t. X_{it} is the vector of control variables. The error term is decomposed into time-invariant component v_i and time-variant component u_{it}. The effect of transport is measured by δ_1. Equation (1) is estimated on logarithm first-differences using the Generalized Method of Moments (GMM).

To test for possible threshold effects in transport, economic growth and human capital relationships, equation (2) is used:

$$y_{it} = \beta_0 + \beta_1 y_{i,t-1} + \delta_1 T_{it} + \delta_2 T_{it}^2 + \theta X'_{it} + v_i + u_{it}, \quad (2)$$

where T_{it}^2 is the square of transport. In equation (2), transport's effect is measured by δ_1 and δ_2.

Transport's effect on health, education and economic growth is positively significant at 10% (table 7.6). But evidence of threshold effects appears in education, when transport is proxied by transport investment, and in life expectancy, when transport is proxied by rail lines.

Conclusions and policy implications

Policymakers must consider at least four issues: increasing transport's impact on human capital accumulation, especially in health and education; boosting sustainability, especially for greenhouse gas emissions and the impact of climate change; formalizing the transport sector to increase efficiency and the human capital dividend; and building skills.

Increasing transport's human capital dividend

Transport cost and inaccessibility are barriers to school enrollment. Families, especially in rural areas, lack sufficient revenue and prefer to obtain immediate gains through child work in agriculture and the informal economy to the long-term returns of education. Making schools more accessible by lowering transport costs and shortening travel time can change family decisions and enable higher enrollment, thus contributing to economic growth and human capital formation.

But expanding road networks can also cause increased deaths from traffic accidents and contribute to the spread of major diseases such as HIV. Public health planners need to raise awareness of this issue when evaluating new transport projects.

Ensuring sustainability in transport investment

In selecting transport alternatives for investment (railways, roads, rivers, sea) governments must consider both sustainability and economic impact. One negative externality

Table 7.6 Transport's effect on economic growth and human capital in Africa

Panel A: Effect of transport investment

Dependent variable	Growth	Growth	Life expectancy	Life expectancy	Education	Education
δ_1	0.0280 (0.065)	0.0402 (0.074)	0.0032 (0.133)	0.0048 (0.138)	0.1117 (0.121)	0.1523 (0.076)
δ_2	—	−0.0030 (0.189)	—	0.0004 (0.546)	—	−0.0214 (0.016)

Panel B: Effect of rail lines

Dependent variable	Growth	Growth	Life expectancy	Life expectancy	Education	Education
δ_1	0.1204 (0.072)	0.1223 (0.081)	0.0165 (0.066)	0.0791 (0.016)	0.1506 (0.127)	0.1598 (0.145)
δ_2	—	−0.0206 (0.409)	—	−0.0271 (0.012)	—	−0.0081 (0.165)

Note: p-values are reported in parentheses. In all regressions, constant and control variables are included, but their coefficients are not reported to save space.

of improving transport is its environmental impact. Transport causes noise, destroys natural resources and lowers air and water quality. These negative health effects must be considered when setting up transport projects. Climate change must also be considered in transport investment. Coastal paved roads may not be sustainable as sea levels rise and floods become more frequent and severe. All affected countries and cities must develop strategies and action plans for coping with these risks.

Formalizing the transport sector

Because of the transport sector's informality, transport investment was not associated with more employment. Formalizing the transport sector will boost employment, especially among youth, which is critical for Africa's booming population. Formalizing the transport sector will also make transport safer and more efficient and expand the use of modern technologies (information and communication technologies). Strengthening logistics will enable African firms to compete in global markets and expand exports. Subsidizing fuel costs may help formalize the taxi industry in Africa, since high fuel costs are affecting their profitability.

Building specific skills for the transport sector

Africa needs to build more complex skills to manage this sector. Policymakers must acquire a holistic vision of transport, and skilled workers (engineers) are needed to implement transport policy initiatives. Lack of effective policy implementation is one of South Africa's main problems.[18] It is necessary to create and strengthen national and regional schools, university research programs and specialized training centers to address regional mobility plans and implementation.

Notes

1. Naudé 2009.
2. Porter and others 2012.
3. Banjo 2013.
4. Cruz 2013.
5. Cruz 2013.
6. Thompson 2013.
7. UNECA and others 2009.
8. Krugman 1991; Venables 2006.
9. Murphy, Shleifer and Vishny 1989.
10. Bloom, Canning and Sevilla 2003.
11. Porter and others 2012.
12. Andvig 2001; Shimarmura and Lastarria-Cornhiel 2010.
13. Porter and others 2012.
14. www.who.int/gho/road_safety/mortality/en.
15. Stationary and cointegration tests are not reported to save space but are available upon request.
16. Testing for noncausality is addressed in a time series setting, in particular by Phillips (1995) in the context of a VAR in levels estimated with the fully modified estimator, and also by Toda and Yamamoto (1995), who suggest augmenting the VAR by the maximal order of integration for the process being examined. The first method provides some very interesting results concerning asymptotic inference. The most important one is that statistical inference in this framework can be conducted by means of standard asymptotics; no unit root limit theory is required. Normal and mixed normal limit theory are applied to the stationary and nonstationary components of the VAR, respectively. This implies that optimal inference in level VARs and Wald test for noncausality can be obtained without prior knowledge of the number of unit roots or the order of cointegration rank in the system, and without the use of reduced rank Johansen-type regressions (which are subject to pretesting bias, as tests for cointegration ranks are extremely sensitive to the values of the nuisance parameters). The approach by Toda and Yamamoto (1995) also results in a standard Wald statistic for noncausality restrictions, although it does require some pretesting for determining the lag length of the VAR.
17. It is well established that the existence of a cointegration relationship between two series means that at least one of the two series Granger causes the other. We test for causality relationships in the two directions, but as we are interested in the effects to transportation variables on other variables we report only results for this causality direction. Complete results are available upon request. We notice also that causality between two variables can be driven by a common third process. For this reason, as a test of robustness we also make use of regression models to control for effects of other variables.
18. Walters 2013.

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CHAPTER 08

Developing access to modern energy sources

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In the last decade Africa grew rapidly with an annual average 5% increase in real GDP, more than twice what it achieved in the 1980s and 1990s. Seven of the 10 fastest-growing economies in the world were in Africa. This turnaround has attracted interest and changed its reputation from a region with civil war, instability and famine to one full of hope and business opportunities. But African countries still face serious challenges, including poverty, unemployment, pollution, disease, and high infant mortality.

One key issue of this rapid growth as well as other challenges facing Africa is energy. The use of energy fosters economic opportunities; decreases travel costs and times; and upgrades industry, helping modernize economies. Its production is also a key factor in economic activity. More specifically, electricity is a "general purpose technology" associated with a long-run perspective of growth. What is happening now is to some extent the electrification of Africa's economies, leading to rapid economic growth and social gains. And as the continent's energy consumption is still below those of other emerging countries, like China, India or Brazil, it has many years to run.

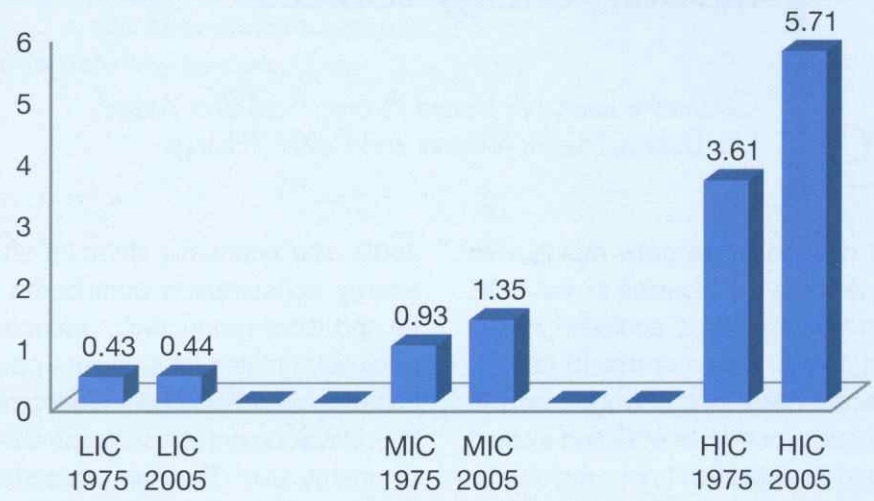
Europe's aggregate energy consumption in recent years has been around 10 times that in Africa, even though Africa has the larger population.[1] Africa, particularly Sub-Saharan Africa, will lift strongly its electricity and energy consumption in the short and medium term as the economy modernizes and as society urbanizes and changes demographically. Many implications flow from this, and two in particular need to be analyzed.

First, energy consumption over the past two decades has enabled greater human capital accumulation in Africa, leading to a rapid economic growth, especially since 2000. The economic literature shows that energy consumption contributes to capital and labor productivity, promotes export potential, creates jobs, lowers poverty and improves socioeconomic development.[2] Further, development is correlated with intensity of energy use. Thus an understanding of the dynamics between energy consumption and human capital accumulation in Africa in recent years is crucial for setting policy and mitigating the impacts of booming demand.

Second, Sub-Saharan Africa will need to build energy-generation capacity for its fast-growing population, rapid urbanization and economic modernization. IEA (2011) estimates that Sub-Saharan Africa will need to spend USD389 billion between 2010 and 2030 to achieve universal electricity access. For access to clean cooking facilities, the investment has been estimated at USD22 billion over the period. To secure such capacity, Africa needs to invest in skills and technology. This way will upgrade its current energy plants and build new ones.

Yet despite rapid economic growth in the last decade, Africa still has a reservoir of unexplored growth on supply and demand sides. Poumanyvong and Kaneko (2010) show that development stage is correlated with intensity of energy use (figure 8.1)—and one thus expects that intensity will rise in Africa. And, as chapter 2 stresses, there will be a rapid change in African demographics: the total population is expected to reach 2.3 billion in 2050 (from 1 billion in 2010), thus sharply raising energy needs. Last, urbanization is accelerating, stimulating energy demand but also offering opportunities for optimizing of energy use (see chapter 3). Taken together, these three effects will have a huge impact on the continent's energy demand.

Figure 8.1 **Intensity of energy use, by income group, 1975 and 2005 (per capita kilograms of oil equivalent)**



Source: Poumanyvong and Kaneko 2010.

Investing in skills development and in technology at all levels is thus vital to meet this demand. Nigeria, for example, despite belonging to the G20 and expected to loom large in the international arena, faces huge problems in electricity supply. Ubani (2013) attributes this to the "inability of energy planners to accurately forecast the effect of the various socioeconomic and physical factors that influence the electricity consumption across the country."

Africa can also benefit from its natural resources (such as oceans, deserts and forests) to improve and diversify its energy production sources. It will need to upgrade capacity absorption of modern technologies and to spend more on research and development, as it has weak research capacity in general, especially in energy. Solar energy has huge potential, and building the necessary skills will allow it to increase energy supply while creating jobs.

This chapter investigates the relationships between human capital and energy consumption and production in Africa. Policy-oriented, it seeks to give a rationale for new policies in skills and technology in Africa's energy.

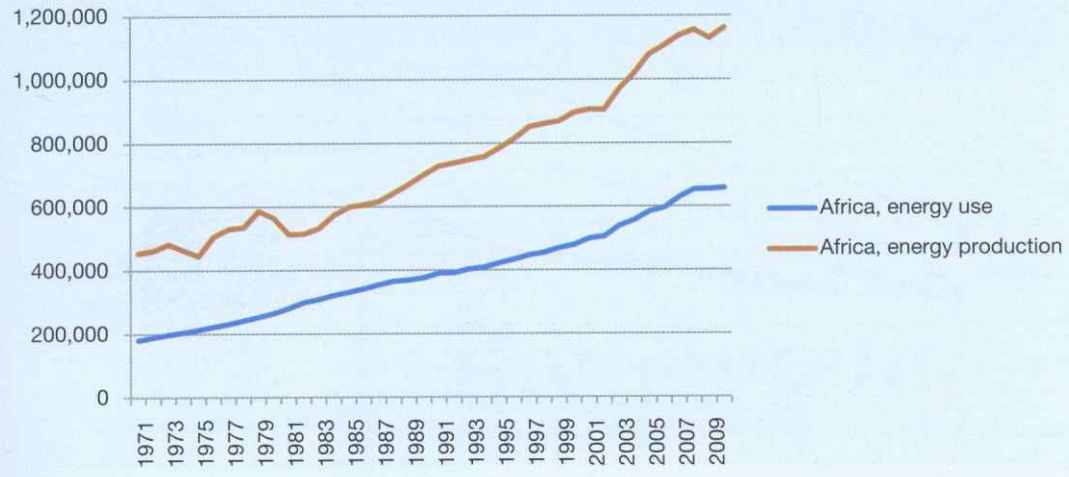
The landscape of energy in Africa

Overall, Africa is characterized by an abundance of energy resources. There are important resources of oil and gas in Africa, and currently Africa is a net energy exporter (figure 8.2). But in large parts of the continent, this abundance does not benefit local economies and people are unable to satisfy their basic energy needs. Despite the high economics growth rates on the continent over the past years, an important share of the African population is still in a situation of extreme poverty. The lack of access to energy contributes to the persistence of a vicious circle of energy poverty and lack of opportunities for the concerned populations.

In energy use, this lack of access to modern energy sources implies that large parts of Africa are still using traditional forms of energy (particularly biomass) as their main source of energy. In a context of sustained population growth, rapid urbanization (see chapter 3) and of climate change (see chapter 4), Africa will have to realize its energy transition. This requires the development of infrastructures for the supply of energy (especially electricity), a more sustainable use of locally available resources, especially of renewable energy, and an improved access of African populations to modern forms of energy as an alternative to traditional biomass.

This section makes an initial diagnosis of energy issues in Africa, analyzing supply and use over the last 40 years and comparing the data with those of other regions.

Figure 8.2 **Energy production and energy use, 1971–2010 (kt of oil equivalent)**



Source: World Bank, African Development Indicators Database (2013).

Trends and regional differences in energy supply

The analysis of energy supply should consider different aspects: first, the availability of energy resources; second, the actual production of energy (oil, gas and electricity); and third, energy access—that is, to what extent energy is supplied locally to satisfy the actual energy needs on the continent.

Availability of energy resources is difficult to assess. Current estimations are based on proven resources of fossil energies. According to these estimates, Africa holds 7.8% of world oil resources and 7.7% of world gas resources in 2012.[3] However, Africa's energy potential may be larger. In addition, to be complete, these kinds of estimates should include the potential of renewable energy sources including hydraulic energy, solar energy and biomass. An estimation of energy resources should also consider the differences in resource endowments between African countries for fossil fuels but also the different kinds of renewable energies. In a context of climate change, these questions are crucial: the perspective of a reduced availability of biomass and of especially of water is important for the energy sector, as highlighted by the 2014 *World Water Development Report*.[4]

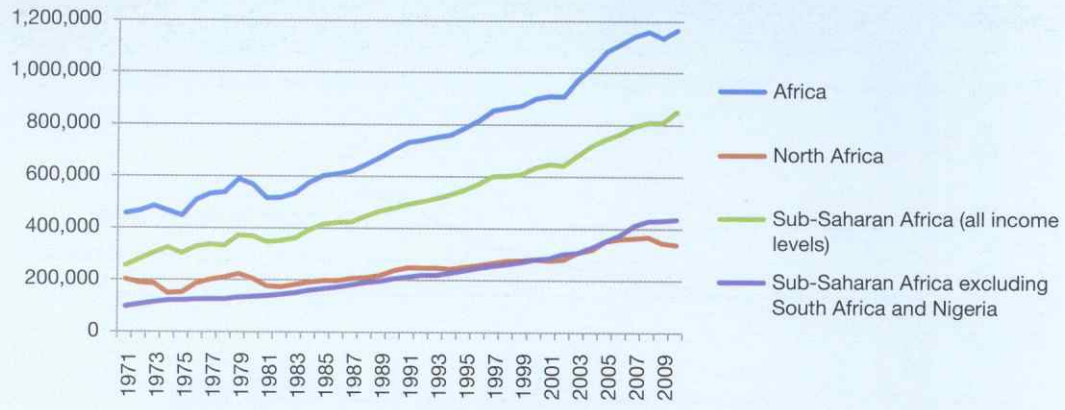
For the production of energy, the past three decades have seen a constant increase in production levels, with important regional differences (figure 8.3). A few countries concentrate most of the production of fossil energies: The main oil producers are Nigeria, Angola, Algeria, Libya and Egypt. The main gas producers are Algeria, Egypt and Nigeria. The two principal coal producers are South Africa and Zimbabwe.[5] In Sub Saharan Africa, South Africa and Nigeria represent a large share of the total energy production.

For electricity, the African production levels are much lower than in other regions (figure 8.4). In large parts of Sub Saharan Africa, electricity networks do not cover the whole territory, leaving most rural areas without access to electricity.

There are important differences between African countries regarding the development of electricity networks. Whereas access is quasi-universal in North Africa, only four countries in Sub Saharan Africa have rural electrification rates above 50%: Mauritius, South Africa, Nigeria and Ghana. Often, rural electrification rates are below 10% (table 8.1).

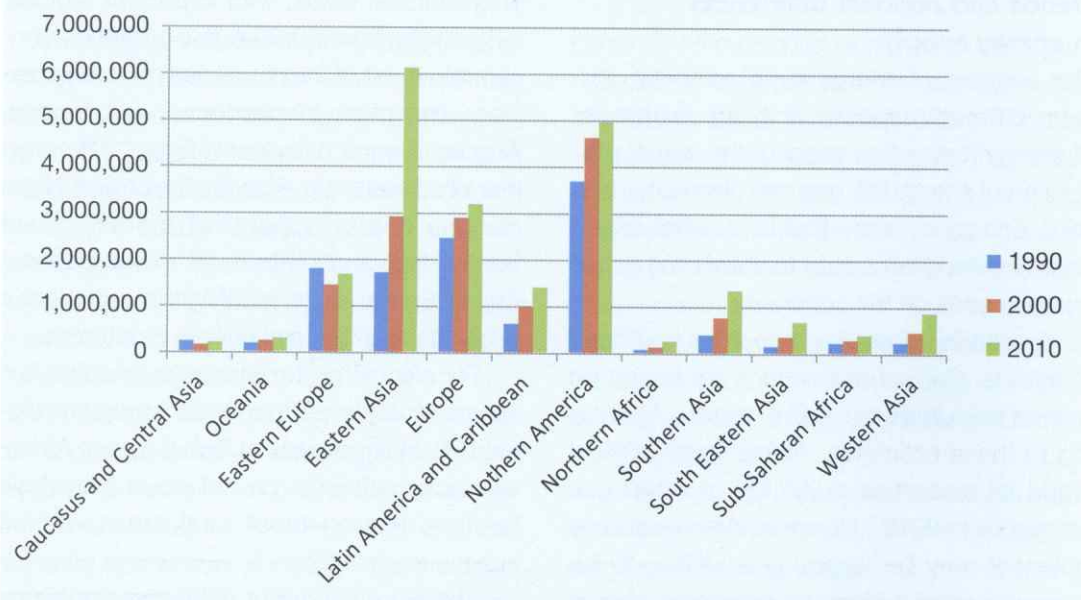
Many electricity systems in Sub Saharan Africa operate inefficiently. Excluding South Africa, the cost of supplying one kWh of electricity is the highest among developing countries.[6] These high costs can also be explained by low economies of scale in generation and limited regional integration of electricity systems (see chapter 5). Electricity tariffs are

Figure 8.3 **Energy production of different African regions, 1971–2010 (kt of oil equivalent)**



Source: World Bank, African Development Indicators Database (2013).

Figure 8.4 **Total electricity output, 1990, 2000 and 2010 (GWh)**



Source: SE4ALL database (2014).

often set ad hoc and cover, on average, 70% of the cost of power. In addition power utilities are subject to high line losses.[7] In that context, the feasibility of electricity network developments is highly constrained and universal electricity access will most probably not be realized through the development of main electricity grids.

To achieve universal access to modern energy sources, several innovative supply options will need to be developed on the continent. These include the development of decentralized systems for the provision of electricity, but also the deployment, at a large scale, of clean cooking technologies and fuels.

Trends and regional differences in energy use

Compared with other regions in the world, Africa is consuming only small amounts of energy (figure 8.5). The efficiency of this consumption, measured by the energy intensity of final energy, is relatively low: in 2010 only the Caucasus and Central Asia region has been less efficient (figure 8.6).

Table 8.1 **Electricity access in 2011**

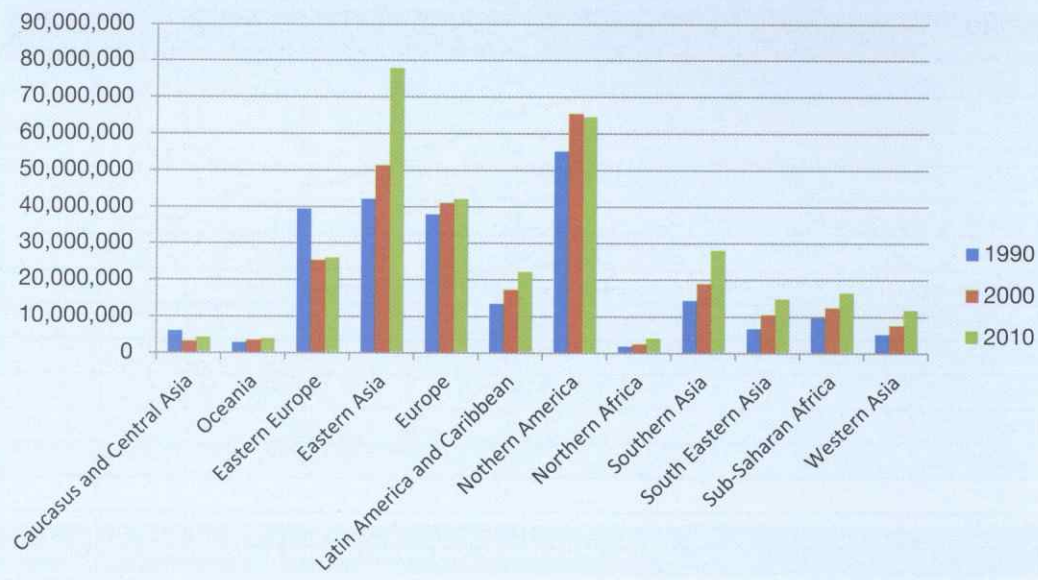
Region/country	Population without electricity (millions)	Electrification rate (%)	Urban electrification rate (%)	Rural electrification rate (%)
Sub-Saharan Africa	*599*	*32*	*55*	*18*
Angola	12	38	58	8
Benin	7	28	55	6
Botswana	1	46	68	10
Burkina Faso	14	13	39	4
Cameroon	9	54	88	17
Congo, Dem. Rep.	62	9	26	0
Congo, Rep	3	38	54	10
Côte d'Ivoire	8	59	85	32
Eritrea	4	32	86	17
Ethiopia	65	23	85	11
Gabon	1	60	64	34
Ghana	7	72	90	52
Kenya	34	19	58	7
Lesotho	2	19	45	9
Madagascar	18	14	62	9
Malawi	14	7	37	1
Mauritius	0	99	100	99
Mozambique	19	20	55	5
Namibia	1	60	83	46
Nigeria	85	48	35	61
Senegal	6	57	88	33
South Africa	8	85	96	67
Sudan	25	29	57	14
Tanzania	39	15	46	4
Togo	5	27	35	21
Uganda	30	15	55	7
Zambia	11	22	51	3
Zimbabwe	8	37	83	8
Other Sub-Saharan Africa	105	13	34	4
North Africa	*1*	*99*	*100*	*99*
Algeria	0	99	100	98
Egypt	0	100	100	99
Libya	0	100	100	99
Morocco	0	99	100	97
Tunisia	0	100	100	99
Africa	*600*	*43*	*65*	*28*

Source: IEA 2013.

In many African countries, the energy use per capita is low (figure 8.7): generally it was less than 1,000 kg of oil equivalent in 2010. Compare this with the energy use levels in Europe and the United States: between 3,000 and 4,000 kg of oil equivalent in many Western European countries, and around 7,000 in the United States in 2010.

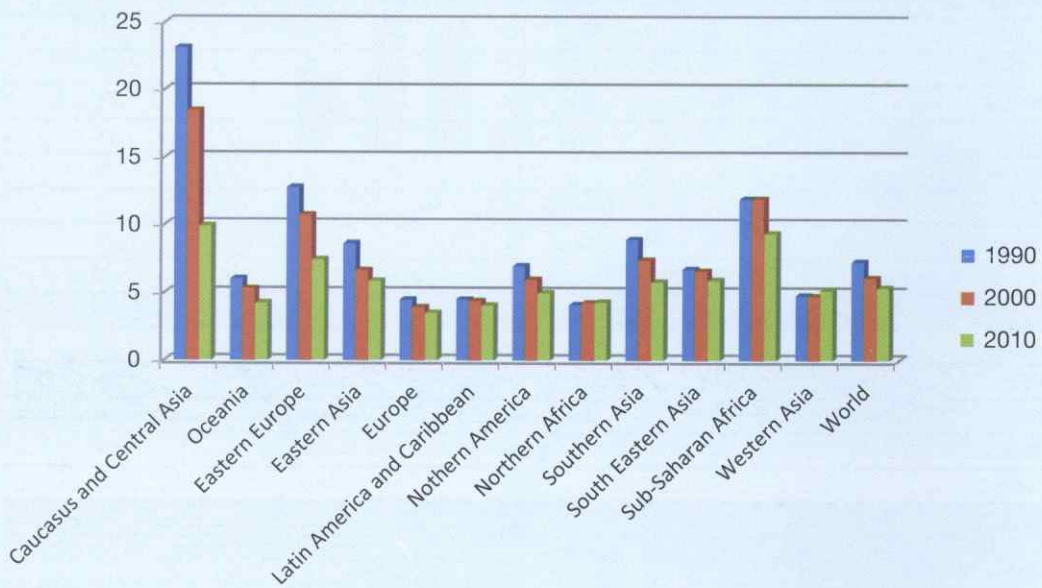
The share of renewable energy in the total final energy consumption is higher than 70% in Sub-Saharan Africa. This reflects the importance of the reliance on traditional fuels in Africa (table 8.2), and the lack of access to modern energy sources on a large part of the African continent. While traditional biomass is the bulk of energy consumption, modern biomass is only a small share of the final energy

Figure 8.5 **Total final energy consumption, 1990, 2000 and 2010 (terajoules)**



Source: SE4ALL database (2014).

Figure 8.6 **Energy intensity level of final energy, 1990, 2000 and 2010 (megajoules per 2005 PPP dollar)**



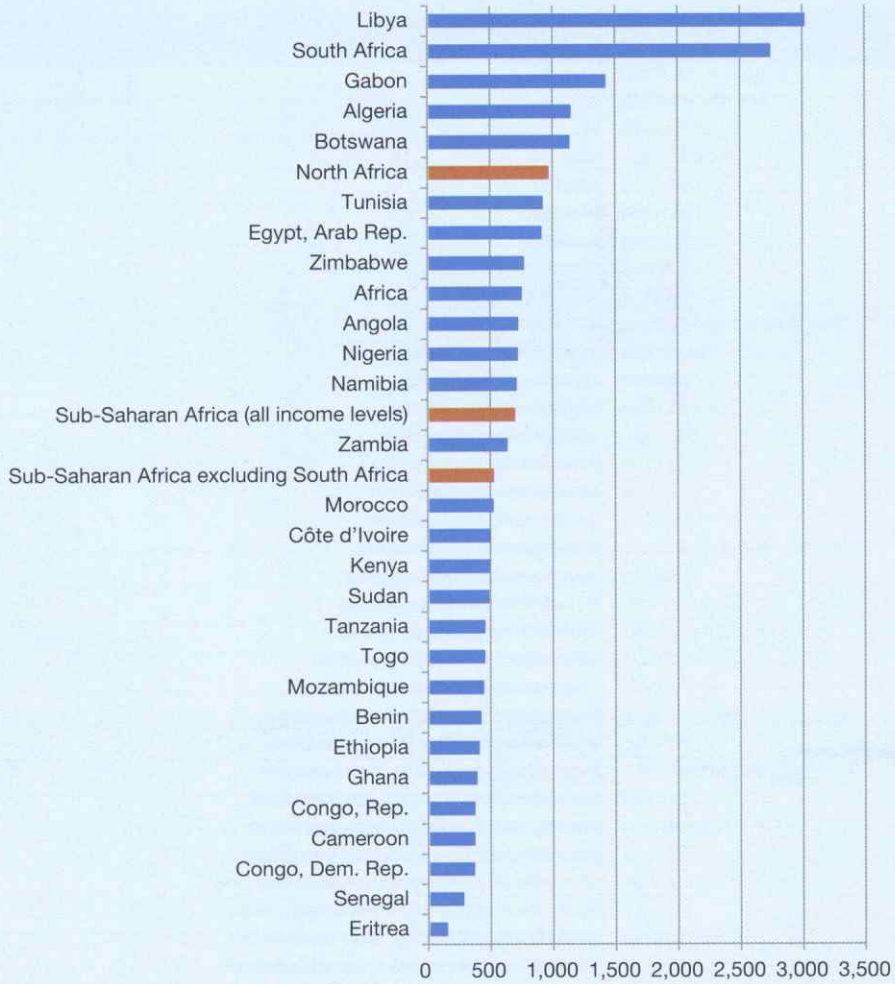
Source: SE4ALL database (2014).

consumption (7.4% in Sub Saharan Africa). Regarding the share of traditional biomass, there are significant differences between African countries (figure 8.8).

The lack of access to modern energy sources is also reflected by the figures on electricity consumption per capita, which are very low in Sub Saharan Africa, except for in South Africa (table 8.3).

Bringing access to modern and sustainable energy services to the population is the major challenge of the African energy sector for the next decades. The benefits of improved energy access are now widely recognized,

Figure 8.7 **Energy use per capita, 2010 (kg of oil equivalent)**



Source: World Bank, African Development Indicators Database (2013).

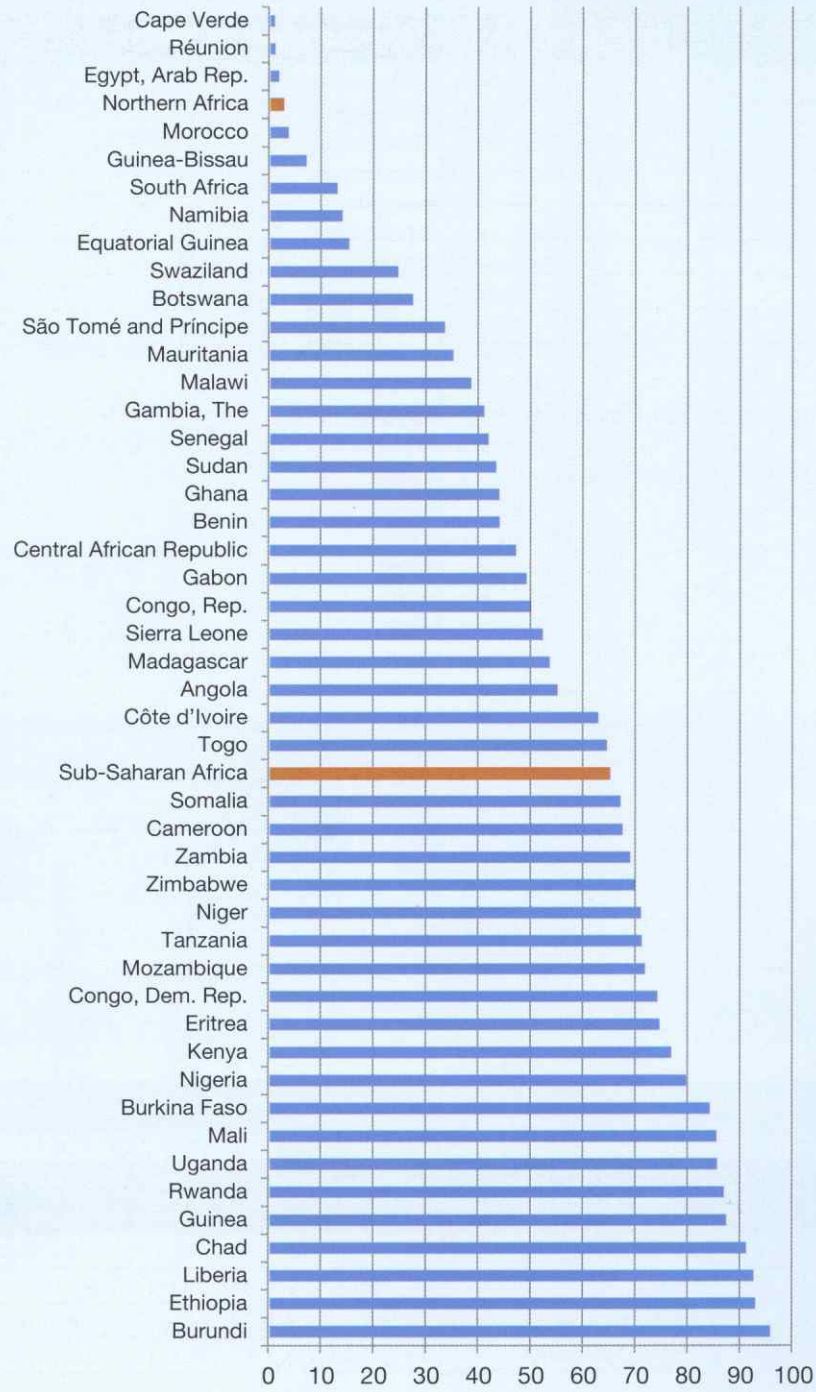
Table 8.2 **Main renewable energies consumed in 2010 (% in total final energy consumption)**

Region	Renewable consumption	Hydro energy consumption	Liquid biofuels consumption	Modern biomass consumption	Solar energy consumption	Traditional biomass consumption	Wind energy consumption
Caucasus and Central Asia	4.4	3.9	0.0	0.1	—	0.4	0.0
Oceania	15.1	4.0	0.3	9.1	0.3	—	0.5
Eastern Europe	5.4	2.1	0.3	1.8	0.0	1.1	0.0
Eastern Asia	15.3	3.2	0.1	0.3	0.5	10.4	0.2
Europe	14.1	4.1	1.3	6.0	0.3	0.3	1.1
Latin America and Caribbean	29.0	9.3	2.9	11.5	0.1	5.0	0.1
Northern America	9.0	2.8	1.7	3.4	0.1	—	0.5
Northern Africa	5.0	1.4	0.0	1.0	—	2.5	0.2
Southern Asia	34.8	1.6	0.0	6.1	0.0	26.7	0.2
South Eastern Asia	31.1	1.5	0.3	5.5	0.0	23.4	0.0
Sub-Saharan Africa	75.4	1.6	0.0	7.4	0.0	66.4	0.0
Western Asia	4.3	1.5	0.0	1.6	0.6	0.0	0.1
World	18.0	3.1	0.8	3.7	0.2	9.6	0.3

Note: — denotes not available.

Source: SE4ALL database (2014).

Figure 8.8 **Traditional biomass consumption in 2009 (% in total final energy consumption)**



Source: SE4ALL database (2014).

especially for poverty reduction and human development. The United Nations has declared 2014–2024 as the decade of Sustainable Energy for All. Three main goals have been defined for 2030: ensuring universal access to modern energy services, doubling the global rate of improvement in energy efficiency and doubling the share of renewable energy in the global energy mix. In Africa ensuring universal access will require major policy changes and huge investments in the energy sector.[8] Conventional approaches, through the development of the main electricity grid, are only a part of the solution. In remote rural areas, where energy demand is low, this kind of investment will be uneconomical. Access to electricity will

Table 8.3 **Electricity consumption per capita (kWh per capita)**

Country/region	1971	1980	1990	2000	2010	Evolution 2000–2010 (%)
Eritrea				47	52	10
Ethiopia	19	18	22	23	54	136
Tanzania	30	37	51	58	78	34
Congo, Dem. Rep.	160	147	124	92	95	4
Nigeria	28	66	85	74	136	85
Congo, Rep.	56	82	172	95	145	53
Kenya	78	105	125	113	156	38
Sudan	33	46	63	79	182	132
Sub-Saharan Africa (excluding South Africa)	104	137	138	133	192	45
Senegal	77	106	108	106	195	85
Côte d'Ivoire	91	173	153	173	210	21
Sub-Saharan Africa (excluding South Africa and Nigeria)	134		159	154	213	38
Angola	92	66	61	89	248	180
Cameroon	145	148	193	173	271	56
Ghana	310	421	323	330	298	–10
Mozambique	49	36	40	122	444	263
Sub-Saharan Africa (all income levels)	317	473	531	521	555	6
Sub-Saharan Africa (developing only)	317	473	531	521	555	6
Zambia	1,031	1,051	779	610	623	2
Africa	281	447	550	598	731	22
Morocco	130	242	360	490	781	59
Gabon	208	771	940	875	1,004	15
Zimbabwe	661	960	862	853	1,022	20
Algeria	141	338	541	695	1,026	48
Tunisia	154	402	638	991	1,350	36
North Africa	169	364	610	874	1,409	61
Namibia				1,179	1,479	25
Botswana			716	906	1,586	75
Egypt, Arab Rep.	196	368	669	994	1,608	62
Libya	191	1,177	1,614	2,276	4,270	88
South Africa	2,246	3,644	4,431	4,681	4,803	3

Source: World Bank, African Development Indicators Database (2013).

most probably be ensured through various means, including mini-grids and micro-grids, with the use of decentralized production technologies based on renewable energy (small hydro, photovoltaic) and on diesel generators.[9]

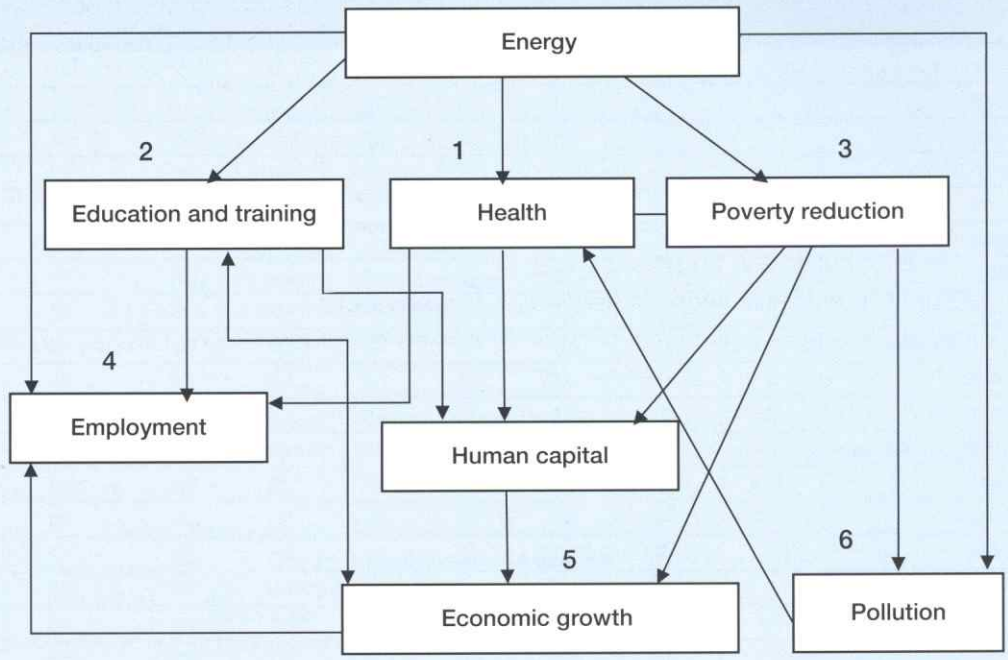
Energy, human capital and economic growth: A conceptual framework

To capture interactions among energy, human capital accumulation and economic growth in Africa, following the proposed conceptual framework we discuss various relationships in depth (highlighted in figure 8.9). These relationships are likely to be affected by energy use but that there are negative and positive effects depending on the considered variable and the total effect on human capital formation is rather ambiguous and needs to be empirically tested.

Health

The World Health Organization (WHO) estimates that 4.3 million people a year die prematurely from illness attributable to the household air pollution caused by the inefficient use of solid fuels.[10] Women and children in developing countries are particularly affected by the negative health outcomes of

Figure 8.9 **Conceptual framework**



Source: Authors.

indoor air pollution from the use of solid fuels. Since women are usually responsible for cooking while taking care of children, women and children are most exposed to indoor air pollution from the use of solid fuel and its subsequent health impacts.

Young children living in households exposed to indoor air pollution due to the combustion of biomass have a two to three time greater risk of developing an acute lower respiratory infection than others. They are more susceptible than adults to absorb pollutants, since their lungs are not fully developed until they reach their late teens. A study in rural Kenya found that the amount of pollution a child is exposed to correlates to the risk of developing pneumonia.[11]

Sterilized supplies, clean water supply and refrigeration of essential medicines are impaired in health facilities without adequate electricity. Lack of electricity is also a disincentive for doctors and nurses to live in those areas, further undermining service delivery. Electricity-access strategies should target public facilities such as health clinics, which benefit the whole population in an area, so that they can provide essential services needed to improve life quality and generate income. Modern energy provision also reduces child mortality, improves maternal health and combats HIV/AIDS, malaria and other diseases.

Energy—use and production—also affects less directly the health of humans. It generates revenues that can be used on hospitals and care centers and otherwise improves health services. Modern energy can allow reliable access to better sources of water and lowers the indoor air pollution from existing biomass-burning stoves. Poorly ventilated surroundings have been linked to chronic respiratory diseases like tuberculosis, bronchitis and lung cancer. Electricity enables better illumination in health clinics for safer night deliveries. Modern communication technologies can also aid information dissemination from public health officials (see chapter 11).

Thus, energy affects positively and negatively health. The sign of the total effect is not clear and needs to be discussed at the continental level as well as the subregional level.

Education

Issues such as universal access to education often cannot be adequately addressed

because schools and the community lack access to electricity or other energy. As with health practitioners, lack of electricity is a disincentive for teachers to live in such areas. Children's education is also impaired by inadequate illumination in poor households that rely on candles or kerosene lamps. Electricity-access strategies should target public facilities such as schools, which benefit the whole population in an area, so that they can provide essential services needed to improve life quality and generate income. Investment programs in education sectors are often not aligned with those for provision of electricity service so that these facilities are not properly equipped with energy services.

Energy access improves working and learning conditions in schools and other training facilities and lowers the "sustenance chore" burden on children (especially girls), allowing them more time for education. Energy can also improve the quality of schools and build connections to surrounding communities.

As energy becomes more available, access to classrooms and training usually picks up, allowing greater accumulation of human capital and better skills. But there is little empirical evidence on this relationship in Africa.

Poverty reduction

The primary energy insecurity for the poor and vulnerable is lack of access to modern forms of energy, particularly electricity and electricity-powered technology. Also for them, the primary low-carbon energy development challenge is moving from traditional energy (biomass in open stoves, kerosene lighting) to modern energy and technologies, including electricity and gas. Strategies to improve modern energy access for the poor will have direct welfare-enhancing effects on communities. At least two links can be seen between energy consumption and poverty.

Poverty reduces households' ability to buy energy to satisfy their basic needs, such that households either dedicate a high spending share to energy, or have to rely on alternative sources that are cheaper but can harm their health (such as biomass).

Insufficient access to modern and clean energy sources can intensify poverty. For example, people will need to spend time and resources collecting alternative sources like wood, cutting into their time for other, income-generating activities. And negative health effects of traditional energy sources can worsen poverty by reducing peoples' capabilities.

Employment

Access to modern energy can help generate jobs and industrial activities, power transport and modernize agriculture. Most African staple foods need processing, which modern energy can make more efficient. Changes in energy consumption and production affect education and health, and through them job creation and skills. Two perspectives open up. As energy consumption climbs sharply in the next few decades, this implies rising job creation in this particular sector (a direct effect). In addition, as electricity networks extend, economic activity, especially in industry, will rise, boosting job numbers in Africa. In short, industrialization hinges on reliable access to energy, especially electricity.

Down to the micro level, change in energy consumption may affect household decisions on the time spent on work. Household activities traditionally done by women could, for example, be made more efficient, leaving time for other means of self-development or productive economic input.

The total impacts of energy consumption and production on employment are expected to be positive.

Economic growth

Like water (see chapter 10), energy is directly and indirectly involved in economic activity: directly through production and consumption; indirectly, in particular, through its impact on education and health, which in turn affect the economy through a range of channels. For instance, educational capital determines a nation's ability nation to develop new, and adopt existing, technologies; it also stimulates employment.[12] Education also increases health outcomes by spreading knowledge of good

health practices and hygiene. Similarly, health influences economic activity directly through its impact on labor productivity—healthier workers are more productive. There is a wide empirical literature on the role of energy in economic growth that uses electricity consumption as a proxy for energy use, especially in developing countries. Economic growth is strengthened by investment in human capital and infrastructure. Endogenous growth theory suggests that human capital accumulation causes the economy to switch from agriculture to industry.[13] These impacts of energy on economic structures are expected to positively affect economic growth in Africa.

Some empirical evidence on the links among energy, human capital and growth in Africa

As to our knowledge the literature has not focused on the relationship between energy and human capital in Africa[14]—as a pathway to understanding economic growth—we now investigate empirically how energy in Africa affects economic activity directly and indirectly through effects on human capital.[15] But many indicators such as health, education and employment are available only during the recent years.

Causality tests

To examine the impact of energy use and production on human capital and economic activity in Africa, we proceed to Granger causality tests on data aggregated for all Africa, North Africa and Sub-Saharan Africa. (Causality tests are briefly presented in annex 8.1.)

We consider the following variables: child mortality, CO_2 emissions, employment, GDP per capita, government health expenditure, health expenditure, human development (which combines indicators of life expectancy, educational attainment and income into a composite index, the Human Development Index), life expectancy, reported malaria deaths, school enrollment (secondary and tertiary), unemployment and urban population. Data are sourced from the World Development Indicators.[16]

Results are summarized in table 8.4. We test for the following null hypothesis: Energy production or energy use does not Granger-cause the other variables of interest. Thus, we report the *p*-value for the causality running from energy production/use to the other studied variables. Recall that the *p*-value provides the smallest level of significance at which the null hypothesis would be rejected,

Table 8.4 **Results of causality tests**

Panel A: All Africa

Energy use does not Granger-cause		Energy production does not Granger-cause	
Variable	***p*-value**	**Variable**	***p*-value**
Child mortality	**0.0008**	Child mortality	**0.0010**
CO_2 emissions	0.7300	CO_2 emissions	0.4163
Government health expenditure	**0.0132**	Government health expenditure	**0.0262**
Health expenditure	0.1790	Health expenditure	0.2312
Life expectancy	**0.0003**	Life expectancy	0.2301
Reported malaria deaths	**0.0443**	Reported malaria deaths	0.5269
School enrollment-secondary	0.058	School enrollment-secondary	01452
School enrollment-tertiary	NA	School enrollment-tertiary	NA
Employment	**0.0327**	Employment	**0.0201**
Unemployment	NA	Unemployment	NA
Urban population	**0.1046**	Urban population	**0.0009**
GDP per capita	**0.0978**	GDP per capita	**0.0318**
Human development	**0.0459**	Human development	**0.0221**

(continued)

Table 8.4 **Results of causality tests** *(continued)*

Panel B: North Africa

Energy use does not Granger-cause		Energy production does not Granger-cause	
Variable	***p*-value**	**Variable**	***p*-value**
Child mortality	**0.0096**	Child mortality	0.3255
CO_2 emissions	**0.1087**	CO_2 emissions	**0.0024**
Government health expenditure	**0.0143**	Government health expenditure	**0.0254**
Health expenditure	0.2857	Health expenditure	0.5232
Life expectancy	**0.0070**	Life expectancy	0.2331
Reported malaria deaths	0.1905	Reported malaria deaths	0.2548
School enrollment-secondary	**0.0215**	School enrollment-secondary	0.4150
School enrollment-tertiary	NA	School enrollment-tertiary	NA
Employment	**0.0140**	Employment	**0.0114**
Unemployment	**0.0012**	Unemployment	**0.0023**
Urban population	0.1779	Urban population	**0.0350**
GDP per capita	**0.0536**	GDP per capita	**0.0251**
Human development	0.1902	Human development	0.7283

Panel C: Sub-Saharan Africa

Energy use does not Granger-cause		Energy production does not Granger-cause	
Variable	***p*-value**	**Variable**	***p*-value**
Child mortality	**0.0016**	Child mortality	**0.0008**
CO_2 emissions	**0.1066**	CO_2 emissions	0.1103
Government health expenditure	**0.0524**	Government health expenditure	0.2876
Health expenditure	0.6325	Health expenditure	0.3112
Life expectancy	**0.0272**	Life expectancy	0.2991
Reported malaria deaths	**0.0195**	Reported malaria deaths	0.8666
School enrollment-secondary	0.2545	School enrollment-secondary	0.3656
School enrollment-tertiary	0.7167	School enrollment-tertiary	0.1863
Employment	**0.0919**	Employment	0.9599
Unemployment	NA	Unemployment	NA
Urban population	0.1113	Urban population	**0.0553**
GDP per capita	**0.0034**	GDP per capita	**0.0103**
Human development	**0.0332**	Human development	**0.0786**

Note: NA denotes that the series is not available or that the number of observations available is too short to get robust results. Figures in bold indicate significance at 10% significance.

Source: Authors.

the smaller the *p*-value, the stronger the evidence is in favor of the alternative hypothesis of causality.

Panel A shows that when data aggregated over all Africa are considered, energy use and energy production affect human capital by causing most health, education and economic variables at 10% significance. It seems thus that human capital formation is significantly affected by energy variables. Moreover, our regression results show that this effect is rather positive: the more Africa produces and uses energy, the more it builds its human capital. Precisely, energy use Granger causes child mortality, government health expenditure, life expectancy and reported malaria deaths, while energy production Granger causes child mortality and government health expenditure. A part of revenues from energy production is invested in the health sector and this seems to significantly improve health services. The findings

also show that energy use improves education while energy production and education are not cointegrated, suggesting that revenues from energy production do not benefit to education in Africa. Moreover, we find as expected that energy use and production have a significant impact on employment. Energy seems also to promote urbanization in Africa. This confirms our analysis above and that energy use and energy production Granger-cause economic growth in Africa at continental level.

Health

It seems that there is a positive link between energy and government health expenditures if we consider data from all Africa or data from North Africa (see table 8.4): the dividend from energy use and energy production benefits to the African health sector and government health per capita expenditures increase as energy use and production rise. This seems to be confirmed by the negative correlation between energy (use and production) and child mortality and the positive correlation between energy and life expectancy. Revenues from energy production and use seem to improve access to hospitals and to care centers, health information and public health in urban and rural areas and thus improve population health.

But when data from only Sub-Saharan countries are considered (see table 8.4), energy use appears not to be linked to child mortality and to life expectancy; energy production appears to have a positive correlation with government health expenditure and life expectancy, and a negative correlation with child mortality. In other words it seems that in contrast to what we observe in North Africa, energy use does not benefit the health sector in Sub-Saharan Africa while there is a dividend from energy production.

Moreover, it appears that energy production and use are associated with increased pollution (proxied by carbon dioxide emissions). Still, the global effect of energy on human capital seems to be positive as in all cases we notice a positive correlation between energy (use and production) and our indicator of human capital development.

One must stress that the energy use and energy production do not cause health expenditure (by households). In fact, energy expenditure and health expenditure may be "alternatives." Further investigation is needed to understand how African households view these two expenditures as competing.

The results show small differences for energy use between North African and Sub-Saharan countries. Both subregions feel deep impacts in child mortality, government health expenditure and life expectancy. Sub-Saharan countries' energy use also affects reported malaria deaths. One important difference thrown up by the results concerns energy production and its impacts on government health expenditure: while in North Africa energy production Granger causes government health expenditure, in Sub-Saharan Africa there is no such relationship. The energy rent does not profit the health sector in Sub-Saharan Africa. Two alternative explanations are: government spending is less focused on health and human capital formation in Sub-Saharan Africa and corruption and possible deprivation (diverting money) are prevalent; or the health sector is characterized in Sub-Saharan Africa by large investments from international donors and thus the energy production rent seems not to be invested in government health expenditure.

Education

Energy use and energy production do not seem to Granger-cause school enrollment in secondary and tertiary education at 10% significance, except the case of energy use in North Africa. Energy use is perhaps a key factor in enrollment in primary schools but for the whole continent we found that it does not affect enrollment in secondary school, which seems more linked to family structure, availability of schools, distance between home and schools, and alternative activities, like domestic work. We found significant differences between North Africa and Sub-Saharan Africa. In North Africa there is a positive link between energy use and secondary school enrollment. Availability of energy implies better transport between home and school, better sanitary

conditions in schools, and better access to secondary school. At the same time this may also be explained by better energy coverage of rural areas permitting the extension of electricity provision to schools. Another significant difference is in urbanization: because North Africa is more urbanized than Sub-Saharan Africa, energy provision is increased in urbanized areas and this affects the enrollment rate in secondary schools (see chapter 3).

This result is very important as it shows the key role of energy in secondary school enrollment. Efforts are expected from most of Sub-Saharan countries in the next decades to increase enrollment at this level. Special attention must be given then to energy provision (for transport and electricity in the schools themselves).

Employment

Energy use and energy production cause employment at 10% significance. But unemployment is not linked to those variables. As Africa transforms its economies, energy needs grow in the shift from less energy consuming sectors (agriculture) to more consuming sectors (industry and services). This economic transformation leads to a change in the employment composition, which may explain the results.

Important differences are found when we compare the two subregions. While energy consumption causes employment and unemployment in North Africa, in Sub-Saharan Africa energy consumption causes only employment. Unemployment in North Africa may be explained partially by capital-intensive industries, reflecting substitution in the production factors as machines (capital) replace labor in manufactures—a substitution that needs more energy. This phenomenon is not seen in Sub-Saharan Africa now. These findings are corroborative when we look at energy production: in North Africa energy production causes employment and unemployment while there is no impact in Sub-Saharan Africa.

Poverty reduction

While in this chapter we have not empirically tested for the direct effect of energy on poverty reduction because of aggregate data availability, we try to discuss this link by looking at the findings from the economic literature.

Throughout Africa, access of populations to modern energy sources varies. Whereas in North Africa only 1% of people do not have access to electricity and 1% use biomass for cooking, in Sub-Saharan Africa 68% of people do not have access and 79% still rely on traditional biomass for cooking.[17] With rising energy prices, developing policies that will ensure affordability of energy and access to modern energy sources (including electricity, LPG, biogas and advanced cooking stoves) for the poor population is not easy. In North Africa energy price increases could lead to some vulnerable people's inability to afford reasonable levels of energy consumption, as already sometimes seen in some parts of Europe and more frequently in Asia and Latin America and the Caribbean.

In Sub-Saharan Africa the improvements of access to energy for the poorest people in a context of population growth and rapid urbanization mainly benefit urban households. Two-thirds of people gaining access are in urban areas, while the populations without access to electricity are concentrated in rural areas (populations of rural areas account for 79% of people without electricity access in Africa). This similar for the use of traditional biomass for cooking: rural populations accounted for 73% of Africans relying on biomass for cooking in 2011.[18] There are elements suggesting that lacking access to energy among the poor leads to a "vicious circle" of poverty: women spend much time collecting fuel, or people spend a large share of their income on energy. The use of traditional cooking fuels causes health problems, particularly for young children. Further, the collection of wood has consequences for deforestation, affecting agricultural production and food security.[19]

Economic growth

For all African countries energy use and energy production Granger causes GDP growth at 10% significance. As energy is an

essential input for producing goods and services, the more is used the more the GDP increases. No special differences between Sub-Saharan and North African countries are observed. Our results show that there is a weak positive relationship between energy use and economic growth, whereas energy production seems to have a nonlinear association with economic growth. Our results confirm recent finding on causality between economic growth and energy—in fact, several authors explored causality links at country level and found that this relation is valid.[20] The novelty with our approach is to mention the potential role of human capital in this link.

Conclusions and policy implications

This chapter's analysis shows the importance of energy in the future development of human capital in Africa, which needs to ensure universal access to energy and that energy access is pro-human. Several complementary policies may be pursued for sustainable and inclusive growth, as now discussed.

Bringing energy to the poor and stopping the vicious circle of energy poverty

With our results showing differences between North African and Sub-Saharan countries, we identify three types of situation. Type 1 occurs mainly in North Africa, where most people already have access to modern energy sources. Here the main future difficulty will be affordability of energy for the poorest. Type 2 relates to energy access problems in urban areas in Sub-Saharan Africa. Here, policymakers will have to face three challenges: the development of electricity networks in a context of fast urbanization; the increase of access rates to modern energy sources (which requires developing awareness on energy sources but also adapting certain types of buildings); and the affordability of these modern forms of energy. Type 3 relates to energy access in rural areas. When connection to electricity grids is infeasible, alternative solutions have to be developed, for example small (local) electricity production and renewable energy sources like biogas for cooking.

Developing new policies is particularly important given rapid population growth, especially with demand underpinned by rapid economic growth. The number of people without access to electricity according to IEA (2011) will increase by 10% between 2009 and 2030. Various options can be considered to reverse the trend, according to the types of countries: in North Africa the main difficulties relate to energy affordability for vulnerable households; in Sub-Saharan Africa to access to energy (electricity and modern fuels for cooking). In Sub-Saharan Africa, South Africa is in a peculiar position, due to high access rates and the country's reliance on coal as a primary energy source.

Policy implementation in each field will be subject to several feasibility constraints. It will probably depend on the local context (the institutional characteristics of each country, particularly investor friendliness); on the structure of the electricity sector and its governance; and on the other types of actors already present in each country. The feasibility of different technical options for access to electricity and the development of clean energies for cooking differs by area—urban or rural—and depending on the energy resources that are locally available. Whereas in rapidly growing urban areas an important challenge will be developing electricity connections, in rural areas improving access to clean energy sources will probably rely on more decentralized solutions (mini- and micro-grids, with different types of energies used for electricity production, including biomass, solar, small hydroplants and diesel generators).

Mainstreaming renewable energy and eco-efficiency in education

Energy and education are closely related as they enclose a multidisciplinary analysis and require interdisciplinary action. Having in mind generations to come, putting into practice actions that represent social objectives may be seen as an opportunity for current decisionmakers. The awareness of the necessity of change in behavior for the rational use of energy must reach the population through an educational process.

Recent research shows the need to create new programs that take into account education, establishing new methodologies that respect the social and cognitive limits of the target public.

Among these studies there is a preliminary study about energy conservation in Brazil. The authors perceived a lack of adjusted information about rational use of energy to a typical Brazilian consumer.[21] They recommend that this kind of program be applied within the education system (at all levels) coopting teachers as "multiplier" agents. For them, the contextualized knowledge learned at school will allow students to act in their families as educational agents by teaching, in an informal way, concepts and attitudes about energy conservation in daily life. The students will have a more complete and critical vision of the problem through a didactic exposition of the contents about energy questions. This will allow them to be the organizer elements that contribute for a higher participation of the society in this educational process.

Chen, Huang and Liu (2013) elaborate a framework for energy education that tries to capture the concept of energy saving, and carbon reduction by reviewing related literature and consulting an panel of experts on energy and education in Taiwan, China. Halder and others (2011) show that school, home and media all had statistically significant effects on student perceptions, attitudes and level of knowledge related to bio-energy. Thus bio-energy policies to be effective must consider the role of school, home and media.

Incorporating carbon reduction in the curriculum could improve awareness of energy conservation and related practices. Much research has been conducted on curriculum design and evaluation methods for energy education. But a comprehensive view of the educational objectives for improving energy literacy is still lacking. To our knowledge there is no academic work describing how to mainstream "civic responsibility for a sustainable society" or "low-carbon lifestyle" in the African education system. The launch of pilot projects is thus highly recommended.

Building skills in the energy sector

The energy sector (especially electricity) in Africa has undertaken a deep process of change since 1990, reflecting gradual liberalization and deregulation. These changes aim to rely on market forces and the private sector to correct electricity business ineffectiveness. This movement did not straightaway arouse strong support in countries because it pushed aside, by its construction and logic, the public decisionmaker. Indeed, one of the convictions for a long time expressed by this actor concerned the fact that the management of the sector in a vertically integrated monopoly was better suited to the strategic character of the sector because of its status and its impacts in economic and social progress. The public decisionmaker was moreover consolidated in his position by the manager of the sector despite weaknesses of sector performance on international criteria, particularly those of the World Bank. The change of management approach was akin to an abandonment of sovereignty. In these conditions the commitment of reforms was delayed by resistance from stakeholders. But since the 1990 the movement has accelerated, and many African countries, with international donors recommendations, started deep reforms of the energy sector.

The implementation of these reforms needs new skills and new profiles (jobs), which are scarce at the continental level. For example, as liberalization can only be effective with independent and skilled regulators, each country needs to set up an independent regulator of the energy (electricity) sector with specific skills in market regulations and interventions. Finding qualified people for this regulator is one of the main problems in some countries.

At the same time the emergence of new energy markets needs traders, agents and the like. Those skills are also lacking and the African education and training system needs to adjust to this. More generally, a complete mapping of needed skills is required.

Microfinance for energy needs

Without ensuring minimum access to energy services for a broad segment of the

population, countries have not been able to move beyond a subsistence economy. The energy sector has a strong link with poverty reduction. One key tool to address the challenge of energy needs by poor is to use microfinance, especially microcredit (see chapter 26). Rao and Priyadarshini (2013) have shown the potential of microcredit for energy needs in rural India. In 2012, 56% of rural households in India were still using kerosene for lighting and fuel for cooking. Renewable energy technologies, especially for cooking can be acquired by poor via microcredit. This leads to several human capital gains: first, saving time for rural households; second, reducing emissions of toxic gas; third, improving nutrition and thus health.

To conclude, our econometric analysis has highlighted that there are clear links in Africa between the energy sector and health outcomes. These links are less clear-cut in education: only in North Africa is there an impact of energy consumption on enrollment in secondary schools. There is also an impact of energy use and production (as an essential input) on employment. As African energy consumption and production increase, one expects deeper impacts on human capital, allowing for more sustainable and greener growth. Policy actions on better energy delivery, especially in rural areas, and better awareness of renewable energies, are recommended. Finally, with energy needed by 2.3 billion inhabitants in Africa by 2050, the continent has to build the skills for this strategic sector.

Annex 8.1 Vector autoregressive modeling and causality tests

Vector autoregressive modeling (VAR) aims to describe and capture the interdependencies between a set of variables, without making any a priori hypothesis on the value of the coefficients linking these variables. The concept of causality defined by Granger (1969) has the advantage of being both very operational in empirical studies and also easily implementable in the framework of levels VAR models following the approach by Toda and Yamamoto (1995). Therefore, it is commonly used by economists.

Vector autoregressive modeling

Let us suppose that the internal dynamic of the n variables of the $X_t = (X_{1t}, \ldots, X_{nt})'$ vector can be suitably captured by a vector autoregressive reduced form (VAR),[22] without making any other a priori than the choice of variables to describe the universe benchmark and the number of lags in the model.[23] More precisely, the VAR (P) representation we are referring to is defined as the regression of the X_t vector on its past, that is:

$$\begin{cases} B(L)\, X_t = \varepsilon_t, t = 1 \ldots, T \text{ with } \begin{cases} E(\varepsilon_t \varepsilon_{t+s}') = \Sigma \text{ for } s = 0 \\ E(\varepsilon_t \varepsilon_{t+s}') = 0 \text{ for } s \neq 0 \end{cases} \\ X_0, X_{-1}, \ldots, X_{-P+1} \end{cases}$$

where B (L) = $(Id_n - \sum_{i=1}^{n} B_i L^i)$ is a polynomial matrix in L, the lag operator, with $B(0) = I_n$, $\varepsilon_t = (\varepsilon_{1t}, \ldots, \varepsilon_{nt})'$ is a n dimensional vector of white noises, of regular, positive define variance-covariance matrix Σ, independent of time, but whose elements out of the diagonal can be different from 0. In addition, the root of the characteristic polynomial Det [B (z] is supposed to be of modulus strictly greater, or equal to one.

Causality tests

Causality is a subject of great controversy in economics and a definition of it which is accepted by all economists and econometricians does not exist. One can cite among the best known, the definitions proposed by Simon (1953), Wold (1953) and more recently by Granger (1969). The notion of causality introduced by Granger (1969) is defined in terms of forecast: a variable x causes a variable y if x contains a piece of information that permits one to improve the y forecast. This definition has been discussed and criticized by Zellner (1979). The latter refers to the definition proposed by Feigl (1953), for whom the causality concept cannot uniquely be defined in term of forecasting, but in terms of "forecasting according to a law or a set of laws." The main criticism of Zellner to Granger causality is that it is completely defined in statistical terms and does not make any explicit reference to laws of economic theory. But we will adopt in the following (like many other authors) this notion of causality defined by Granger, being aware of its limits, because it has the advantage of being very easily testable in practice and particularly in a VAR modeling framework.

Thus if one considers the partition of X_t in two sub-vectors such that $X_t = \binom{Y_t}{Z_t}$, $Y_t \in R^g$, $Z_t \in R^k$, with $g + k = n$, equation (1) can then be rewritten as follows :

$$\begin{bmatrix} \Phi_{YY}(L) & \Phi_{YZ}(L) \\ \Phi_{ZY}(L) & \Phi_{ZZ}(L) \end{bmatrix} \begin{pmatrix} Y_t \\ Z_t \end{pmatrix} \begin{pmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{pmatrix} \text{ with } \Sigma = \begin{pmatrix} \Sigma_{YY} & \Sigma_{YZ} \\ \Sigma_{ZY} & \Sigma_{ZZ} \end{pmatrix}.$$

And in this case the Granger non-causality null hypothesis from Z to Y following Toda and Yamamoto (1995), simply consists in testing the hypothesis $\Phi_{YZ}(L) = 0$. Likewise, Y does not cause Z in Granger sense if and only if $\Phi_{ZY}(L) = 0$. The usual Wald tests enable to test very easily this kind of causality in each equation.[24]

Notes

1. World Bank 2011.
2. Narayan and Smyth 2005, 2009.
3. BP 2013.
4. UN Water 2014.
5. BP 2013.
6. Alleyne 2013.
7. Alleyne 2013.
8. IEA 2013.
9. Szabó and others 2013.
10. WHO 2014.
11. Ezzati and Kammen 2001.
12. Aghion and Howitt 2009.
13. Tamura 2002.
14. Except Ouédraogo (2013a,b).
15. The data we use are from the World Development Indicators database. It has annual data on 1,301 indicators of countries throughout the world since 1960. It contains data on the share of countries' urban populations since 1960. See http://data.worldbank.org/.
16. We proceed in three steps. First, the analysis of the stationarity of the series is essential to determine the correct econometric specification to implement in our study. A stationary series is characterized by a time-invariant mean and a time-invariant variance. We have implemented three unit root tests. Results globally suggest that the series appear to be integrated of order one, which is a standard result in the literature for such series. Second, we apply tests of the null hypothesis of no cointegration between energy use and production and the considered series following Johansen. In most cases the considered variables appear to be cointegrated with the energy use and production variables, which suggest that production and use of energy move together over the long-run with human capital and economic activity in Africa. Third, we implement Granger causality tests in levels VARs following the Toda and Yamamoto (1995) approach.
17. IEA 2013.
18. IEA 2013.
19. WHO 2006.
20. Odhiambo (2009) investigated causality between economic growth and electricity consumption in South Africa. The findings suggested a feedback hypothesis between electricity consumption and economic growth. Similar findings are reached by Jumbe (2004), Kouakou (2011) and Ouédraogo (2010) for Malawi, Côte d'Ivoire and Burkina Faso. The authors detected bidirectional relationship between electricity consumption and economic growth. Adom (2011) investigates the causal relationship between electricity consumption and economic growth in Ghana by using Granger causality, and finds that electricity consumption is Granger-caused by economic growth. Solarin and Shahbaz (2013) explore the causal relationship between economic growth, urbanization and electricity consumption in Angola using Granger causality. They show the existing of bidirectional causality between economic growth, urbanization and electricity consumption in the case of Angola for 1971–2009 in the long run. They conclude that Angola is an energy-dependent country, and that continued rapid growth is dependent on its capacity to provide electricity for its economy in the near future. Solarin and Bello (2011) probed the electricity–growth nexus for the Nigerian economy by incorporating capital and labor in the production function. They validated the presence of growth hypotheses, which suggests the need for exploration of new sources of energy to sustain economic growth. Belaïd and Abderrahmani (2013) investigated the causality between electricity consumption, petroleum prices and economic growth for the Algerian economy. Their findings show a feedback effect between electricity consumption and economic growth. Arouri and others (2014) make use of a bootstrap panel analysis of causality between energy use and economic growth for a sample of 16 African countries over 1988–2010. Their results show that growth and energy use are strongly linked in Africa. But African countries are heterogeneous and there is no "one way" recommendation about energy-growth relationship that may work for all countries in Africa.
21. Dias, Mattos and Balestieri 2004.
22. The X_t vector can also include according to cases a constant and a linear trend.
23. The lag length choice used in the specification of VAR model is based on the results of two information criteria (Schwarz' Bayesian information criterion and Hannan-Quinn criterion), and on global Fisher's tests. The basic idea of the approach by Toda and Yamamoto (1995) is to artificially augment the correct order, say k_1, of the VAR by the maximal order of integration, say dmax, that might occur in the process. One can then estimate a $P = (k_1 + \text{dmax})$th-order VAR and ignore the coefficients of the last dmax lagged vectors. Next, one

can test linear or nonlinear restrictions on the $\check{z}$ first k coefficient matrices by means of a Wald test, using standard asymptotic theory.

24. See also Pradel and Rault (2003) for causality tests in a VAR-ECM framework.

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CHAPTER 9

Modernizing agriculture

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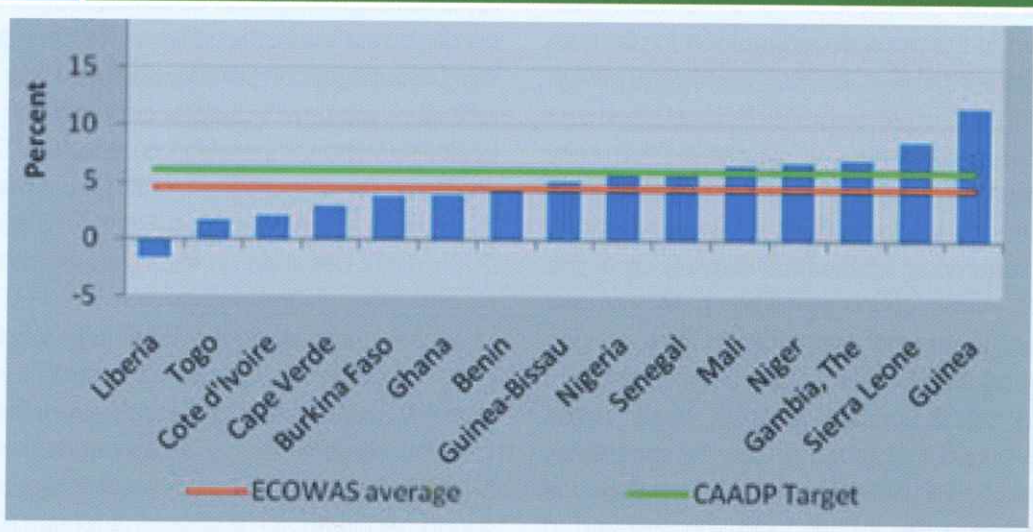
African agriculture is in crisis. The wealth it produces for the continent is far less than what it should be. Africa has the arable lands that should enable it to supply its food and to export agricultural produce. Agriculture is a key element in African economic growth, job creation and competitiveness, and in social stability in many African countries.

In Sub-Saharan Africa 70% of the economically active population works in agriculture, which means that the sector must expand if the continent is to develop. Specifically, in West Africa agriculture meets 80% of the food needs of 300 million people.[1] Faced with weak agricultural productivity and food crisis, governments have launched food aid programs, but these programs have not promoted sustainable agricultural growth. Only six West African countries have achieved the increase in agricultural productivity threshold set by African governments in the Maputo Declaration of 2003 (an increase of 6% from 2003 to 2009) (figure 9.1).

Since the 1990s Africa has yet to reap the economic dividend, especially in such labor-intensive sectors as agriculture. Many farmers have failed to invest in innovative systems—to make it more competitive, profitable and less threatened by the trade strategies of developed and other emerging economies. Yet agriculture continues to suffer from stark weaknesses due to a lack of human capital, including gaps in skills and knowledge management, and farmers' poor health.

This chapter explains how African human capital development—skills and knowledge improvement—contributes to the growth and modernization of the continent's agriculture. It highlights the sector's main characteristics and highlights weaknesses and potential, including the main human capital challenges holding back sustainable growth, job creation

Figure 9.1 **Average annual growth of agriculture, 2003–2009**



CAADP is Comprehensive Africa Agriculture Development Programme; ECOWAS is Economic Community of West African States.
Source: Regional Strategic Analysis and Knowledge Support System.

and poverty alleviation, which are linked to a lack of productivity and competitiveness.

Six main recommendations are offered:

- Improve farmers' skills. It is necessary to ensure that universities, technical and vocational training institutes and research institutes teach students about agricultural innovation and new technologies at sufficient scale.
- Modernize production methods to be more productive locally and more competitive internationally. Better use of inputs and techniques depends heavily on government capacity to operate policies directed at human capital development.
- Promote access to new agricultural technologies.
- Involve women in farm management.
- Increase the sector's attractiveness to educated young people by providing incentives to shift from subsistence to commercial agriculture.
- Link nutritional outcomes to increases in yields and productivity. Increased food production should tie into improving children's nutritional status as needed, especially for psychomotor development—which in turn improves, productivity over the long term, creating a positive feedback loop.

Characteristics

Agriculture is a key sector to Africa's socioeconomic development. It is the main livelihood of the poor, providing food for farmers and their families as well as for city dwellers, most of whom rely on local produce. Agricultural exports are profitable for many groups, such as producers, traders, retailers and the state, but often remain unexploited. For example, agricultural exports in some East African countries make up 47% of total exports—but not even 10% in Western and Central Africa despite high natural potential.

These examples illustrate some of the challenges that farmers face—to meet local demand by producing high-quality goods at a low price, to limit food imports, and to increase competitiveness so as to be better competitively positioned in international markets. African countries have to tap their natural comparative advantages in cotton, cocoa and sesame, for example, while improving the quality of inputs and modernizing production techniques, which are closely linked to upgraded training and education.

Performance and potential

Agriculture still employs around half of Africa's workers (49%), despite a slight decline in recent years. On current trends the continent has the potential to create up to 54 million stable jobs by 2020 in all sectors, thus increasing the share of stable employment from 28% to 32%. Agriculture will account for 20% of the additional jobs.[2]

In 2005 Sub-Saharan Africa had around 750 million residents, of whom two-thirds were farmers living in villages of less than 2,000 residents. Despite increasing urbanization (17% in 1960, 34% in 1990 and 50% predicted in 2025) and nonagricultural development in some countries, agriculture still employs 67% of workers and contributes up to 20% of GDP in Africa.[3]

The region continues to face both a shortage of skilled people and low demand for skills from farmers who continue working at low productivity. For example, "The average farmer in Sub-Saharan Africa harvests at most 2 metric tons of grain per hectare, which is half of what an Indian farmer gets, a quarter of what a Chinese farmer gets and a fifth of what an American farmer gets."[4] Beyond that, development assistance "is still an exceptionally low percentage compared with the 11.8% of [official development assistance] allocated to [agriculture and rural development] in 1995."[5]

The survival of 70% of rural people living in extreme poverty in Sub-Saharan Africa (218 million) depends on incomes generated by agriculture.[6] One reason is that 30–40% of sector incomes from nonagricultural rural activities depend on increases in agricultural incomes.[7] Around two-thirds of the labor force in Sub-Saharan Africa works in agriculture, a proportion that sharply increases among young people in some countries (annex 9.1). Nearly 50% of agricultural jobs are occupied by women in Sub-Saharan Africa (one of the highest proportions in the developing world).

The New Partnership for Africa's Development and the Maputo Declaration recommended African countries allocate up to 10% of their national budget to agriculture for it to achieve 6% sector growth a year (see figure 9.1). But in 2012 the budget allocated to agriculture was barely 4%. There is a need to develop a common vision, strong leadership, coherent tools and sufficient funding to spearhead agriculture's transformation in Africa and realize its potential. But when comparing current potential with poor performance, it is clear that there is no dynamism, requiring development policies and techniques to be rethought.

The failure of these policies seems due to an industrialization approach that fails to consider the importance of the sector, as sustained productivity is crucial for inclusive growth and harmonized economic development.[8] Three main factors have effects on growth: the volume and variety of production resources; technology; and efficiency of resource use. Human capital has to be mobilized and skills upgraded to implement these three factors effectively.

Tackling the efficiency factor in African agriculture starts with an analysis of regional differences in efficiency and potential productivity, based on a classic frontier production model or the approaches are based on total factor productivity.[9] In particular, a study by Nyemeck and Nkarmleu (2006) analyzes agricultural productivity by efficiency of resource use and technology gaps. Their model shows a large disparity between African regions, confirming that strategies to increase sector productivity have to consider technical and technological differences between regions.

Challenges and opportunities

Challenges. From a human capital perspective, limiting factors on total factor productivity include:

- Poor sector capacity to attract and retain highly skilled workers due to low remunerations and competition from other sectors with better-paid jobs.
- Limited value addition from the development of food production, food processing and agro-industry, partly due to little investment from the private sector (which finds agriculture too risky) and partly due to weak links among farmers' organizations and the education system.
- Lack of education and training for the overwhelming majority of rural people, particularly small farmers, due to scarce education opportunities in rural areas and poor schooling.
- Patchy access to technology, innovation and knowledge, hurting productivity and marginalizing farmers in the global marketplace. Trade regulations and tough international standards have led to falling African output in recent years.
- Paucity of efficient mechanisms to identify gaps and opportunities to meet agriculture's labor and skills shortages. This hampers investment and the development of small farmers and agribusiness in promising areas such as bio-agriculture and green technology.
- Lack of social protection networks for vulnerable small farmers, exposing them to poverty, malnutrition and HIV/AIDS.
- Gender imbalances, with constraints on access to land and other key resources for women, hindering them from responding to opportunities.

Opportunities. International changes in the last five years present unheard-of opportunities: increasing demand for meat and other food from Asia's fast-growing economies, alongside the green transformation owing to high energy prices and urbanization. The next decade also holds great promise because of a growing and collective consensus among governments of the need to invest in agriculture. Riding these trends, African agriculture can realize further opportunities from:

- Potential adaptation of low-cost modern technology, especially for power generation based on solar energy or windmills, and communication and access to market information.

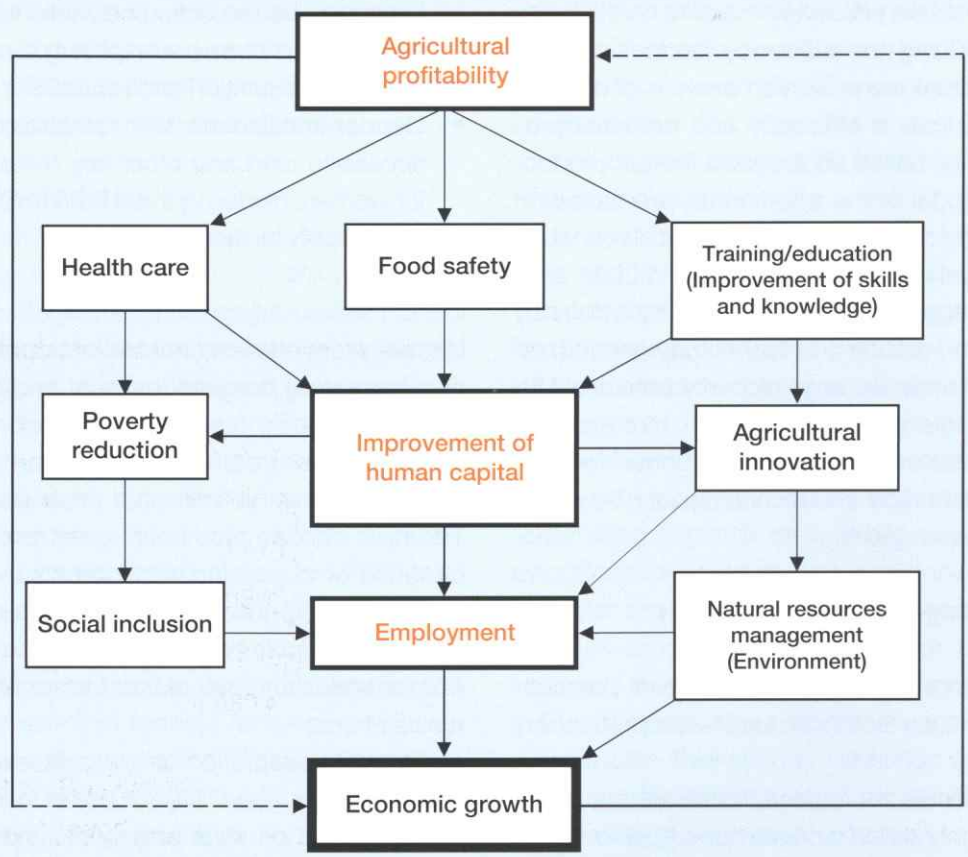
- A better understanding of agriculture by many countries as a powerful engine for inclusive economic growth, industrialization, employment and food security. Some governments have already increased sector investment and prepared the ground for more effective private sector interventions.
- Small farmers' specialization in traditional crops, thus increasing product diversification.
- Tighter local networking (on production and marketing sides).
- Emerging community-based organizations and powerful local farmers' nongovernment organizations (though they need to be strengthened).

Conceptual framework

The structural links between human capital development and agriculture are multiple (figure 9.2), with human capital in agriculture crucial in economic growth. Indeed, agricultural growth and training are two interdependent variables on which we focus—farmers need to acquire the skills to modernize agriculture and make it more productive. The interaction between these variables also has to improve health and nutrition and improve the job outlook so as to reduce poverty.

There is a structural dependence among profitability of African agriculture and food safety, the health and nutrition of populations and farmers' skills. Thus an education system adapted to creating skills (and knowledge) needed in agriculture or in new production techniques should directly—and certainly positively—affect sector employment. In return, better sector employability promotes better population health. Expected improvements in agricultural management on inclusive agricultural growth (based on mobilizing human capital) should be used to promote gains in knowledge and skills acquisition—in

Figure 9.2 **Structural links**



Source: Author.

turn playing a major role in innovation and management of natural resources. Hence the need to make agriculture more attractive to young people and to involve women more broadly.

Findings from the literature

Education and training

Huge swathes of the economic literature have sought to identify the relationship between human capital and agricultural productivity. Work by Christiaensen and others (2006) shows that education reduces poverty among small farmers because it encourages disclosure of potential, strengthens organizations and structures, reduces inequalities and improves access to information, knowledge and business strategies—and to markets. Authors writing along similar lines, like Weir and Knight (2007), explained that education facilitates adoption and diffusion of technological and organizational innovations (such as precision farming and biotechnology—discussed below), but indicated that a minimum threshold of education has to be reached to observe a measurable positive impact on agricultural growth and on rural poverty reduction.

Most studies show that developing countries that have adopted policies to improve their education system or its processes, when applied to agriculture, could benefit from sustainable growth. In addition, by facilitating and promoting technological change in agriculture, education allows for increased employment. Such results have been demonstrated by Munshi (2004) and Yamauchi (2007) for India and Behrman, Ross and Sabot (2008), Satriawan and Swinton (2007) for Pakistan. Education also has a central role in protecting the environment, and thus indirectly enabling poverty reduction.[10]

Education also helps farmers adopt yield-enhancing innovations such as chemical fertilizers in Ethiopia.[11] A one-grade increase in educational attainment increases the probability of adopting chemical fertilizer by 2.7% for adult members, or 1.5% for the household head. Arguably, the role of education remains particularly pronounced in more traditional areas of Sub-Saharan Africa where mass media and communications are weak and the importance, method of application, and even the existence of modern inputs (such as fertilizers) are not well known. Knowledge of fertilizer, along with the skills to use it efficiently, are required to increase its use and boost crop yields from their low levels.[12] Such best practices could then help cut pollution and optimize use of natural resources in accord with sustainable development objectives. Greater employment should reduce disparities among individuals and allow more people to take part in socially inclusive growth.

Innovation and growth

Agricultural innovation is a key driver of economic growth and development.[13] Many studies have endeavored to highlight the links among actors, network effects, those sharing knowledge and those resulting from social interactions.[14] They confirm a "natural" positive correlation between human capital and innovation.

Irrigation and management inputs need to be at the heart of agrarian reforms: many consider irrigation the best way to increase agricultural production while reducing sector vulnerability to climate change.[15]

Optimizing human capital in agriculture

Impact of human capital on productivity

Why is Africa still lagging behind, despite its agricultural assets such as land, water, labor and indigenous know-how? The green revolution elsewhere was based on four factors: inputs (manure, water management and varietal seeds), technology (mainly water sciences), trade (access to local, national, regional and global markets) and institutions (rural markets, rural education and other services). But these conditions have yet to be satisfactorily met in Africa (despite various experiments).

Prospects are not entirely bleak, however, especially as the solutions are largely already known. Beyond the economic progress of the

last decade, the lower birth rate has led to a demographic dividend that could continue beyond 2030, if the working-age population is gainfully employed. And the data suggest that agricultural yields are accelerating (figure 9.3).

Still, economic growth in Sub-Saharan Africa has not been inclusive or effective enough to reduce poverty, such that many of the continent's people remain food insecure, especially in Sub-Saharan Africa: an estimated 239 million people—30% of the population—suffer from chronic hunger and malnutrition.[16] To realize the demographic dividend, two major challenges have to be settled. First is stimulating the economy (agriculture particularly) to create high-skilled jobs. As Diao and others (2007) put it: "Most African countries cannot significantly reduce poverty, increase per capita incomes and transform into modern economies without focusing on agricultural development."

Second is structurally reforming education and training to equip citizens with the right skills (see chapter 16). Stimulating agricultural productivity is crucial because growth in agriculture, backed by productivity gains, can reduce poverty much more effectively than growth in other sectors.[17] More specifically, when rural poverty is widespread and most of the labor force is in rural areas, the gain in agricultural productivity is likely to generate faster economic growth and poverty reduction (figure 9.4), bringing forward the achievement of food security and accelerating human development.

To maximize agriculture's contribution to resolving these two challenges, the return on investment needs to be high and immediate. Take Ghana: rural poverty fell sharply after 2000, and the country became the first in the subregion to achieve the Millennium Development Goal of reducing poverty by half (by 2015). The reason partly relates to the expansion of land for growing cocoa on small farm holdings using a high intensity of labor.[18]

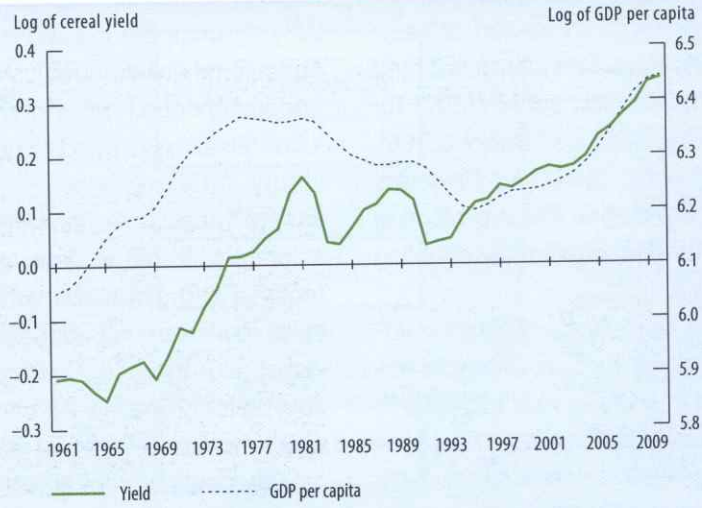
Several authors stress a positive relationship between yields and poverty reduction, with Asia—where irrigation is important—a prime example (figure 9.5).

Stimulating agricultural productivity in Africa thus requires a comprehensive approach, as productivity depends on variables such as climate and effective use of factors of production (land, water and labor), as well as inputs such as fertilizers, seeds, irrigation and capital equipment, and farmers' skills.

Food security

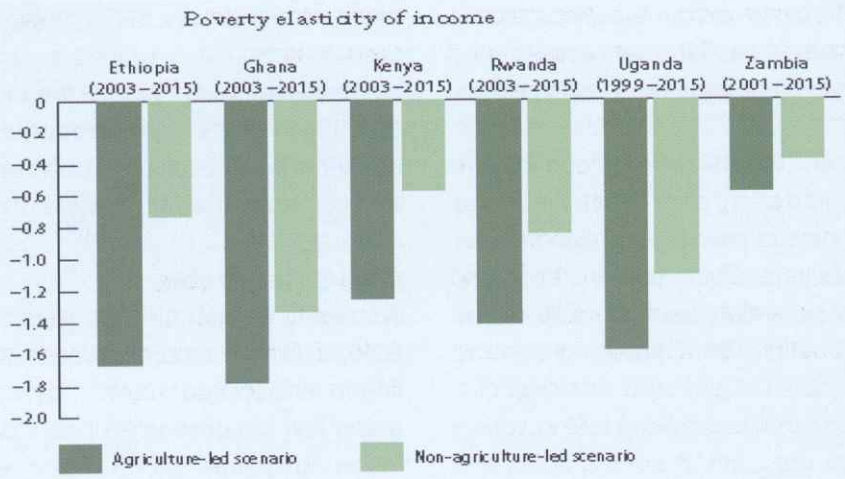
Food security is a prerequisite for human capacity development (figure 9.6). Well-nourished people are more likely to be educated, better informed and prepared to use

Figure 9.3 **Income per capita in Sub-Saharan Africa has risen with sustained yield gains since 1961**



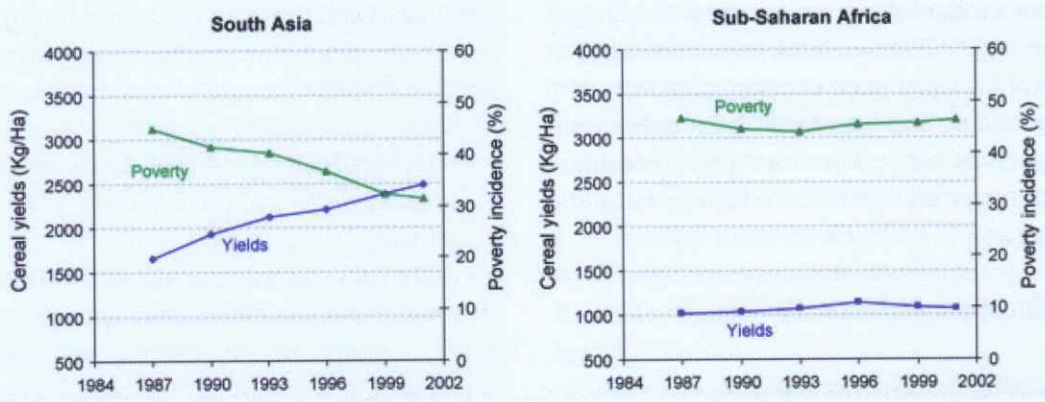
Source: UNDP 2012.

Figure 9.4 **Growth in agriculture is often more effective in reducing poverty**



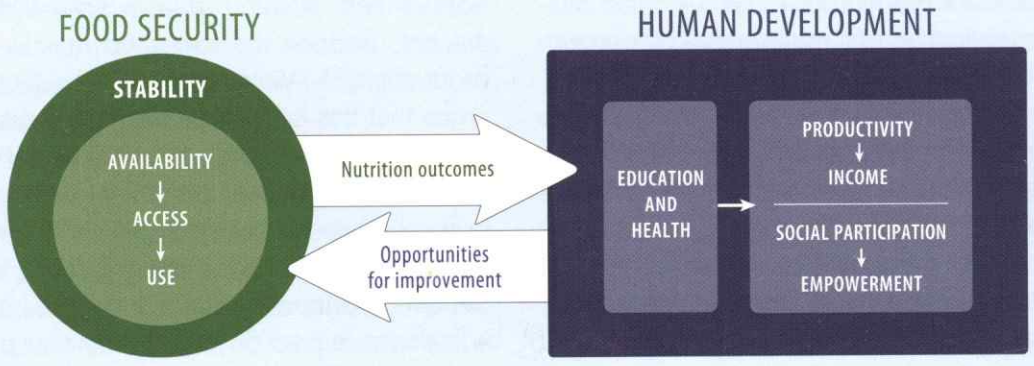
Note: Based on economywide models simulating the impact of growth on poverty reduction. Both scenarios have an acceleration in the economic growth rate (relative to actual growth), one coming exclusively from agriculture and the other exclusively from industry.
Source: Diao, Hazell and Thurlow 2010.

Figure 9.5 **Cereal yields and USD1 a day poverty incidence, 1984–2002**



Source: World Bank 2007.

Figure 9.6 **Food security and human development**



Source: UNDP 2012.

new technologies, engage with the community and participate in political and social life. They are often more productive. Reciprocally, increased human capital contributes to food security, thus creating a virtuous circle (see chapter 22).

Conversely, the link among food insecurity, lack of education, poor health and social status can extend over several generations. Food insecurity results in poor nutrition and hunger that potentially lead to mothers suffering from malnutrition, exposing them to the risks of maternal and child mortality; children in such families enrolling late in school and likely to drop out at early grades; and their descendants becoming vulnerable to disease, thus perpetuating intergenerational poor human development.[19] Thus food insecurity threatens society by increasing mortality, causing diseases and illness, and leading to high economic costs primarily due to chronic health problems, absenteeism and poor productivity at work, and poor student learning.[20] Thus a twin-track approach that combines pro-poor economic growth with agriculture-led development—and direct nutritional support for the most vulnerable—is a preferred means to reduce poverty and hunger.

Education and training

A driving force for productivity

T. Schultz (1951) explains that "the major production factors to improve the well-being of poor people are not space, energy or arable land, they are rather the improvement of people quality and the progress in knowledge." Africa thus has to focus more on human capital development if it wants sustainable growth in agricultural productivity.

But much of Sub-Saharan Africa has weak schooling and literacy rates, with disparities between girls and boys.[21] The weak literacy of farmers and their weak skills in accounting for costs and managing their farms are two major obstacles to improving agricultural productivity and adoption of new technologies.[22] At the end of the 1990s, empirical studies analyzed the link between literacy and agricultural productivity. Among coffee producers in Kenya and Tanzania, for example, Pinckney (1997) showed that "the findings in the two countries are amazing. . . . At the same level of inputs, the production is 30% higher in the case where the chief famers know how to calculate decimals and read and understand simple paragraphs."

Knowledge and skills

According to IFAD (2010), "given that around 80% of African food production takes place within smallholder farms, which support about half the continent's population, investing in agriculture is one of the most effective and sustainable methods of combating unemployment." Beyond that, Africa's demand for skills and labor in agriculture is expected to grow sharply in the next decade, and so there is an urgent need to develop innovative instruments to enhance workforce planning and forecasting, especially among universities and research institutions (box 9.1).

African countries have shown several approaches to education and training for farmers:

- Functional literacy centers, block-release training and rural jobs centers in Côte d'Ivoire.
- AGRISUD—farmer training in peri-urban areas in Angola, Congo and Gabon.
- Agricultural training centers for young couples in northern Cameroon.
- Agricultural secondary schools promoted by those in charge of agricultural organizations in Madagascar (box 9.2).

Farmer training must, though, be made participatory. Several studies show that popularized training before the 1980s did not produce the expected results for productivity[23]—Violas and Gouton (2007) argue that this failure was because producers (trainees) were "infantilized." More participatory approaches were subsequently seen in many Sub-Saharan countries:[24] Family Farm Advisor Services and Farmer Field Schools Programs, for acquiring skills and knowledge based on experience and personal history.[25] These practices had encouraging results.

Box 9.1 Role of African universities in agricultural development and market access

Agricultural development in Africa, market access and fair domestic and international trade regimes require capabilities and in-country competence for knowledge generation and education of skilled personnel. Universities should also be able to provide independent, critical voices in society useful for challenging the establishment and coming up with new ideas, theories and models for improving agricultural development.

Universities should be able to provide relevant policy knowledge and recommendations based on empirical research and to analyze relevant data and come up with theories and models helpful for their governments to make the best policy choices.

For example, through university collaboration, African universities are addressing the impact of climate change on agricultural production, assessing both national and local options for adaptation and mitigation. They are also involved in reduced emission from deforestation and degradation initiatives. African universities are also involved in research on food prices, biofuels, changing diets, market liberalization, fair trade regimes, food safety, fertilizer subsidies and conservation farming—this kind of knowledge generation is needed to inform policymaking.

However, there is a huge need for strengthening the capacity of African universities in these areas, particularly for policy analysis. It is indeed important that they get the opportunity to develop capacity to address the many challenges facing agricultural development by doing research, generating knowledge and being universal through collaboration with academia in other places in the world. University collaboration contributes to decreasing the knowledge gap between Africa and the rest of the world. Africa needs the capability of universities to do better when it comes to agricultural development aimed at reduced poverty and hunger.

Source: Haug 2008.

Box 9.2 Malagasy agricultural high school

FIFATA is a confederation of Malagasy agricultural organizations that decided in 2002 that initial training should be at the heart of agricultural activities. This confederation created three high schools that welcome 118 students (14–18 years old) who want to become farmers. The objectives are to train young people in three years to acquire technical, economic and social skills without taking them from their parents' farms, and to create a network of high schools that train young people to set up professional projects.

Source: Blein and others 2007.

Empowering women

Women can play a far bigger role in sustainably raising agricultural growth and productivity (see chapter 25). They account for more than half the workforce, and are crucial in transporting, processing and selling produce, among other activities.

Empowerment activities should focus on boosting women's participation in agroprocessing, value chains and access to markets, on providing affordable funding instruments that enable them to own land and other production factors, on reducing the burden of domestic work and child care by providing public and community-based services such as early childhood care and development and access to clean water nearby, and on building capacity of female groups to increase their involvement in decisionmaking.

Innovation and R&D

Improving and developing human capital should help set up innovative agricultural systems and promote adoption of new agricultural technologies, linked to greater investment in research and development (R&D) (see chapter 13).

Agricultural growth in Africa requires diversification and new products to allow the continent to be fully competitive in international markets. Thus farmers need to be better informed and trained to understand these markets and better equipped with basic skills and affordable technology to adjust their production model, reduce transactions costs and maximize profits. Farmer capacity could be built through flexible and adaptable training models for market penetration and product diversification.

Access to technology and information is critical for farmers to penetrate global markets. Hence African governments need to design and adopt alternative technologies. An integrated approach to enable a smooth integration of adaptable technologies in

agriculture should stress partnership between universities and research centers in technology design, transfer and adoption based on joint-production and research programs and with on-farm demonstrations; adjustment by universities and research centers to improve interaction with agriculture, so as to serve the technological needs of farmers and enhance the sector's transformation capacity; and dissemination of best practices that will enable farmers to tap opportunities offered by technology and knowledge transfer.

Access to new technologies and limited use of agricultural innovations is weak, especially among small farmers. Still, agriculture can benefit from new forms of productivity by adopting production technique enhancement, better irrigation, precision farming and biotechnology. The following promising examples show that farms or regions that have modernized have increased their productivity, which has improved working conditions, expanded agricultural employment and reduced poverty.

Production technique enhancement. Using new knowledge, agricultural production requires greater mechanization and better use of fertilizers. In the Maradi-Kano region, for example, despite a considerable population increase over the last few decades, intensified agriculture has improved soil fertility and productivity. Many local agreements (drawn up and enforced by local institutions) spread through the Sahel.[26] The Zaï mechanization in Burkina Faso is a successful technical innovation.[27]

Irrigation. Irrigation is the best way to increase agricultural productivity while reducing variability in output and vulnerability to climate change.[28] Some authors are ardent believers in expanding the irrigated areas.[29]

At the moment, though, the irrigated area as a share of the total cultivated is only some 6% in Africa, versus 37% in Asia and 14% in Latin America.[30] Moreover, more than two-thirds of the irrigated area is concentrated in five countries—Egypt, Madagascar, Morocco, South Africa and Sudan—each with more than 1 million irrigated hectares. Ample groundwater resources in much of the continent remain largely untapped, except in southern Africa and parts of northern Africa, where contrariwise overexploitation of the resource is common.

Africans withdraw only a quarter as much water for human use as the world as a whole, and the irrigated share of their cropland is less than a quarter the world average.[31]

African farmers must modernize their agriculture with irrigation if they are to be more competitive through increased yields.[32] Such modernization is necessary for sustainable growth of African agriculture,[33] and farmers need to acquire the relevant management capacities and knowledge.

Precision farming technologies. Precision agriculture,[34] described as the next great revolution in agriculture, is "an integrated information and production-based farming system that is designed to increase long-term, site-specific and whole farm production efficiency, productivity and profitability, while minimizing unintended impacts on wildlife and the environment."[35] It has the ability to manage land by the square meter instead of the square mile. It adapts to variability, whether spatial or seasonal, and can be predictive (predicted versus actual results). Through precision agriculture, local disease situations can be assessed to enable a farmer to optimize use and vary the rate of inputs, such as fertilizer, across a single field based on GPS.

Satellite positioning and navigation have played a catalytic role in precision agriculture. The technology encompasses four information technologies: location determination (via GPS), GIS (geographic information system), computer-guided controllers for variable rate application of crop inputs, and sensing technologies for automated data collection and mapping. Among the four, GPS and GIS have been more widely established and used.[36] Precision agriculture has been used to increase yields for row crops, hay production, pasture management, animal grazing and other agricultural activities.[37] It also has the inherent capacity to disseminate

research and experience and to assess natural resources variability, weather forecasts and remote sensing.

Precision agriculture has been unevenly diffused in developed countries, and adoption is weak in Africa. Examples of precision agriculture adoption in Africa include:

- The Mauritius Sugar Industry Research Institute at experimental level in sugarcane production.[38]
- South Africa, where farmers are using an aspect of precision agriculture for irrigation with groundwater, and this has ensured a sustainable and efficient system based on soil type, soil water capacity, potential yield and topography.[39]
- An international company with ASBNACO—a Sudan-based company.
- The Arab Authority for Agricultural Investment and Development, to introduce the use of an auto-steer tractor, fitted with a GPS satellite guidance system that controls its steering.[40]
- Zimbabwe's Nemakonde Agricultural Development Company.[41]
- The Kou watershed in Burkina Faso.[42]

Biotechnology. In the 21st century many countries have developed biotechnology strategies to improve productivity. In developing countries their formation is mostly a strategic response rather than based on a real appreciation of environmental threats. Some analysts maintain that this technology provides potential contributions to sustainable agricultural productivity and new inputs for resource-poor and small-scale farmers.[43]

The application of genetically modified organisms (GMOs) has been proposed within the technology mix to improve Africa's agricultural productivity.[44] But Africa took a long time adopting genetically modified (GM) technology for many reasons: lack of political support, lack of access to proprietary technologies and scientific uncertainties and anti-GMO activism. But increasing food insecurity, rapid scientific and technological advances and increasing commercialization of GM crops elsewhere have led to a paradigm shift, moving the debate on GMOs from the confines of scientific and environmental groups to the center of public policy and politics in Africa.[45]

Policies of information to improve human capital knowledge in biotechnology are necessary to promote their diffusion.[46] Despite debate about advantages or inconveniences of biotechnology, it has been adopted in many African farming systems, where it has had a positive impact.

Investment in R&D

Empirical studies show that investments in agricultural R&D have contributed to economic growth and poverty reduction in developing countries.[47] These investments have allowed diffusion of new technologies that have increased and improved agricultural production and sustainability, lowered food consumer prices, enabled market access for rural producers and somewhat balanced the distribution of resources and tasks between men and women. These results argue that to improve agricultural productivity in Africa, investments in R&D are essential.

They should also consider the local characteristics so that farmers improve their knowledge and skills, including soil more vulnerable to erosion and containing very few nutrients; dominance of smallholders and disparities between them; and the dependence on nonirrigated agriculture (95% in Africa). Goverey (2006) and Jayne and others (2003) confirm the idea of rational government investment in agriculture, showing that in Zambia more than 80% of budgetary allocations for agriculture were used for fertilizer subsidies, management of food reserves, staff remuneration, agricultural research and popularization, which helped increase sector productivity.

Thus to promote sustainable growth, Africa should favor stronger links between human capabilities and institutions that promote agricultural R&D and agricultural support.

Policy implications

Empowering farmers

Strong institutions and empowerment are critical for farmers to take part in social,

economic and political life and express their voice adequately. Such an approach should be based on focusing on poverty reduction, recognizing the potential of indigenous knowledge and promoting participatory approaches.[48] Urgent actions are needed to strengthen the capacity of farmers' organizations to engage markets, as well as to negotiate with governments and the private sector.

Potential areas of intervention include interconnecting farmers with capacity-building institutions through long-term technical assistance, strengthening skills of producers' organizations to deal with buyers and strong clients, promoting alternative and accessible funding mechanisms for building farmers' capacities, and developing safety nets for the most vulnerable groups among rural producers.

Adopting agricultural policies

Human capital is a principal driving force in African agricultural growth and necessary to adopt a new agricultural policy. African states should commit to set up reforms that take into account a number of variables. Some trails can be offered.

- Propose institutional reforms in property and land rent rights to improve access to land for poor families.
- Target women and small and poor farmers.
- Promote education and training in rural areas by building schools, training teachers and encouraging students to attend school.
- Encourage farmers to take part in designing and running programs. Local participation has been effective in sectors like water management, agricultural research, popularization and rural finance.
- Promote agriculture's attractiveness for young people. It attracts too few educated young people, who usually regard it as having lower social standing. Thus from an economic and social perspective, governments have to make the sector more attractive to youth, by promoting technology, for example.[49]
- Invest in rural infrastructure, particularly in irrigation, transport, electricity and communication.
- Develop viable institutions for the rural sector, especially for water and rural finance.

Conclusions

Human capital plays a key role in advancing Africa's agriculture. But given the various impediments the sector is facing, an integrated approach based on skills development and strong farmers' social protection systems is needed.

With the continent's young age profile and diverse potential in green resources, well-focused investments are paramount to enable Africa to cash in its demographic dividend and achieve food security. Through agricultural programs, better nutrition (especially during the 1,000 days between conception and age 2) will help develop human capital over the long term.

Agriculture must be more participatory, allowing greater responsiveness to the needs of farmers, who will be motivated to address their individual, and common, problems and to determine the process and direction of agricultural innovation, including adoption of new agricultural technologies. In this way, growth is a motivation underlying empowerment—helping farmers help themselves—through the creation of human capital and institutional resources.

In short, Africa must focus on three main areas: skills development for green jobs and food security; agricultural technology production for agro-industry; and empowerment of small farmers.

Annex 9.1 Share of the economically active population in agriculture in Sub-Saharan Africa (%)

Country	1999–2001	2011
Angola	72	69
Benin	54	43
Burkina Faso	92	92
Burundi	91	89
Cameroon	60	46
Central African Republic	73	62
Chad	75	65
Congo, Dem. Rep.	62	57
Côte d'Ivoire	49	37
Eritrea	77	73
Ethiopia	82	77
Ghana	57	54
Guinea	84	77
Kenya	75	70
Malawi	83	79
Mali	81	74
Mozambique	83	80
Niger	86	83
Nigeria	33	24
Rwanda	91	89
Senegal	73	70
Sierra Leone	65	59
South Africa	9	6
Tanzania	81	75
Togo	60	53
Uganda	80	74
Zambia	69	63
Zimbabwe	63	56
Mean (excluding South Africa)	*72*	*66*

Note: Includes only countries with more than 1 million economically active people in agriculture.

Source: For 1999–2001, FAO (2010); for 2011, UNDP (2012).

Notes

1. World Bank 2011.
2. McKinsey Global Institute 2012.
3. Dixon and others 2001; UN 2004.
4. World Bank 2008, 15.
5. IFAD and AfDB 2010, 28.
6. Ravallion and Shaohua 2007.
7. Lipton 2012.
8. Nyemeck and Nkamleu 2006.
9. Nkamleu 2004a, 2004b; Fulginiti and Perrin 1997.
10. Bekalo and Banguay 2002.
11. Asfaw and Admassie 2004.
12. Jayne and others 2003; Kelly 2006.
13. UNDP 2009.
14. See Leeuwis and Van den Ban (2004), FARA (2008) and Röling (2009).
15. Rosegrant and Cline 2003; Diouf 2008; Turral and others 2010.
16. AfDB and others 2012.
17. Thirtle, Lin and Piesse 2003.
18. Conway 1998; Royal Society 2009; Godfray and others 2010.
19. Hoddinott and others 2008; Victora and others 2008.
20. Alderman and others 2005.
21. UNDP 2009.
22. FAO 2004.
23. Röling 1995; Anderson, Feder and Ganguly 2006.
24. Gafsi and others 2007.
25. FAO 2001; Davis and Place 2003; Braun and others 2006.
26. Toulmin and Guèye 2003; Djiré 2004.
27. Barro, Zougmoré and Taonda 2005.
28. Rosegrant and Cline 2003.
29. Paillard and others 2010; Turral and others 2010.
30. AQUASTAT database; NEPAD and AU 2009.
31. Svendsen and others 2009.
32. FAO 2001; Woltering and others 2009.
33. Case studies on the effects of modernized irrigation systems on poverty and agricultural productivity in African countries include: Benin (Heidecke 2006), Burkina Faso (Reardon and Taylor 1996), Côte d'Ivoire (Diagne 2006), Egypt (Haddad and Ahmed 2002), Ethiopia (Makombe, Kelemework and Aredo 2007; Tesfaye and others 2008), Gambia (von Braun and others 1989), Ghana (Yilma and others 2004), Kenya (Nguyo and others 2002; Swallow and others 2005), Madagascar (Minten and Barrett 2005), Malawi (Mulwafu and Msosa 2005), Mali (Van Beukering and others 2005), Nigeria (Ayanwale and Alimi 2004), Senegal (Connor and others 2008), Sudan (Elhiraika 1999), South Africa (Schreiner and others 2004; van Koppen 2008), Tanzania (Lankford 2003), Tunisia (Hill and Woodland 2003), Uganda (Krishna and others 2006; Pender and others 2004) and Zimbabwe (Makombe and others 1998). Long-term (1988–1994) multicountry studies by the International Food Policy Research Institute in Botswana, Ethiopia, Tanzania, Niger and Zimbabwe (von Braun 1995), and a major synthesis from 11 Sub-Saharan countries, including Ethiopia (Mosley 2002), and recent findings from West Africa (Sakurai 2006), all show that irrigation almost always contributes to poverty reduction, however measured.
34. Also called precision farming, information-intensive agriculture or target farming.
35. Srinivasan 2006; Taylor and Whelan 2005.
36. Swinton and Lowenberg-Deboer 2001.
37. GIS Development 2006.
38. Autrey and others 2006; Jhoty and Autrey 1998.
39. Dennis and Nell 2006.
40. Golder 2007.
41. Nell, Maine and Basson 2006.
42. Wellens and others 2008.
43. See, for example, Morris and Hoisington (2000), OECD (2003), Thirtle and others (2003) and Cohen and Paarlberg (2004).
44. Juma and Serageldin 2007; FARA 2011.
45. Mugabe 2003.
46. OECD 2006.
47. See, for example, World Bank (2007) and EICASTD (2008).
48. Atchoarena and Holmes 2004.
49. Juma 2007.

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CHAPTER 10

Supplying water

Raymond Besong, Bineta Ba-Diagne and Cuong Nguyen Viet

Water is essential to human life. The Union Nations Water Conference, in Mar Del Plata, 1977, noted that: "All people . . . have the right to have access to drinking water in quantities and of a quality equal to their basic needs." Water is also a vital element in any society and any ecosystem. Indeed, water plays a crucial role in the productive process, and almost all sectors that serve as a foundation for economic growth depend on it. Thus unavailability of water at sufficient quantity and quality is a major constraint for social development and economic growth, especially in developing countries, particularly in Africa.

Economic development and urbanization have accelerated water consumption, threatening countries' sustained economic growth and health, given their unequal access to water and differing rates of environmental deterioration, which makes use of water resources a tradeoff between different human activities.

Developing water resources and infrastructure can contribute to reaching the items on the post-2015 agenda. Socioeconomic benefits include gains in job creation, economic and social integration, trade, foreign direct investment, local company competitiveness and basic social services. But to make these outcomes sustainable, human capital must also be developed. Only human capital development can bring innovation to Africa's water sector (and to overall economic development more widely), allow countries to maintain their newly built systems and enable policy reform.

This chapter therefore closes with general guidelines on integrating human capital development with water infrastructure programs and projects—for improving job creation, company competitiveness, productivity and access to basic social services.

Access to improved water in Africa: The landscape

Difficulties in accessing water exacerbate the lack of water supply in many countries, especially in rural areas (box 10.1). Africa's water and sanitation infrastructure deficit is a serious challenge to growth and socioeconomic development, contributing to the continent's low competitiveness. Weak human capacity, inefficient service delivery and poor transparency

Box 10.1 Challenges for Africa's water supply

Lack of skills hamper water sector development and management. While specific tools, such as local development plans, have been promoted to aid decentralization, local governments often lack the necessary skills and political maturity to plan their sector development and management effectively, frequently resulting in unrealistic, nonimplementable and inequitable local development plans and programs.

Weak capacity in implementing medium-term expenditure frameworks (MTEFs). MTEFs have become common tools to strengthen policy and spending linkages in macro-level expenditure planning. But the capacity of many African countries to implement them effectively is uncertain, particularly in the water sector.

Capacity weakness impedes decentralization. Participatory planning and budgeting involving users and local governments is essential for improving allocation distribution, subsidy targeting and equitable service provision. Yet capacity weaknesses, especially at local government levels, have proved to be a significant constraining factor.

Source: AfDB 2009.

and accountability are all factors. Heavy costs include overburdened public health systems and stifled productive capacity.[1]

Low proportion of households with access to improved water

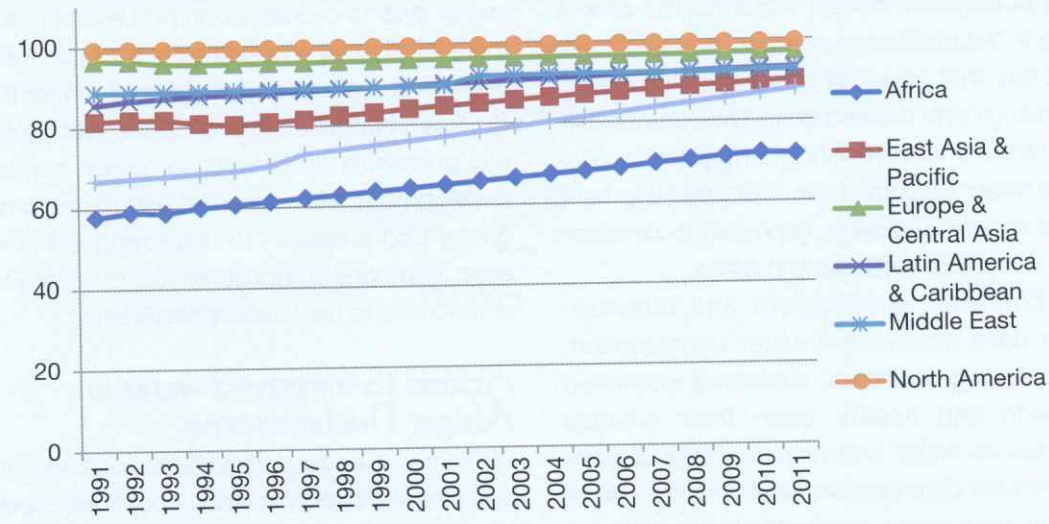
According to the World Development Indicators,[2] the share of Africa's population with access to "improved water" was 71.8% in 2011[3]—much lower than in other world regions (figure 10.1). Although this share has increased in Africa, it failed to do so in 2010–2011.

Inequalities within and between African countries

Although the share of the population accessing improved water has risen in North Africa and Sub-Saharan Africa, there is a significant difference between urban and rural areas as well as North and Sub-Saharan Africa (figure 10.2). Worrying, too, is that the share in urban Sub-Saharan Africa has declined in recent years.

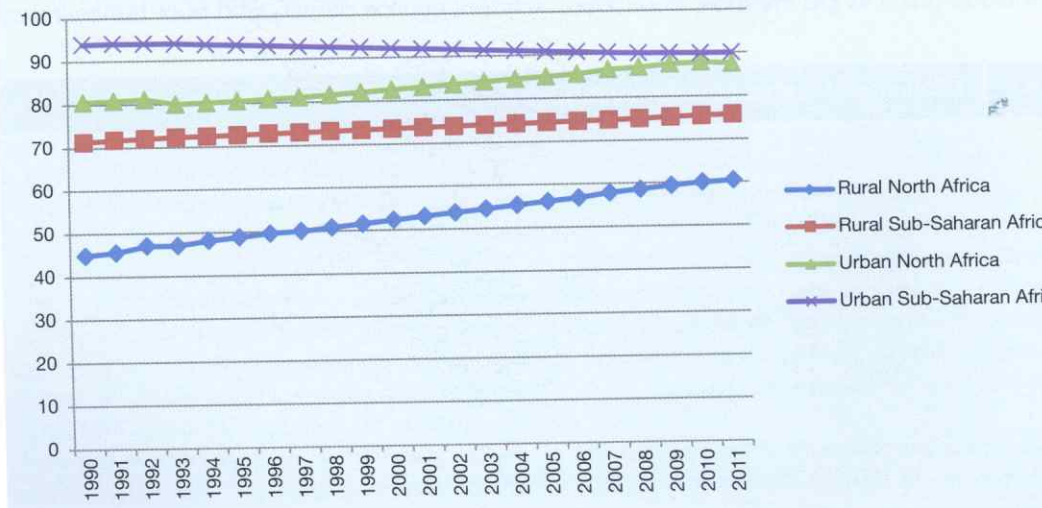
There is a large gap in access to improved water among African countries (figure 10.3).

Figure 10.1 Percentage of households with access to improved water by region



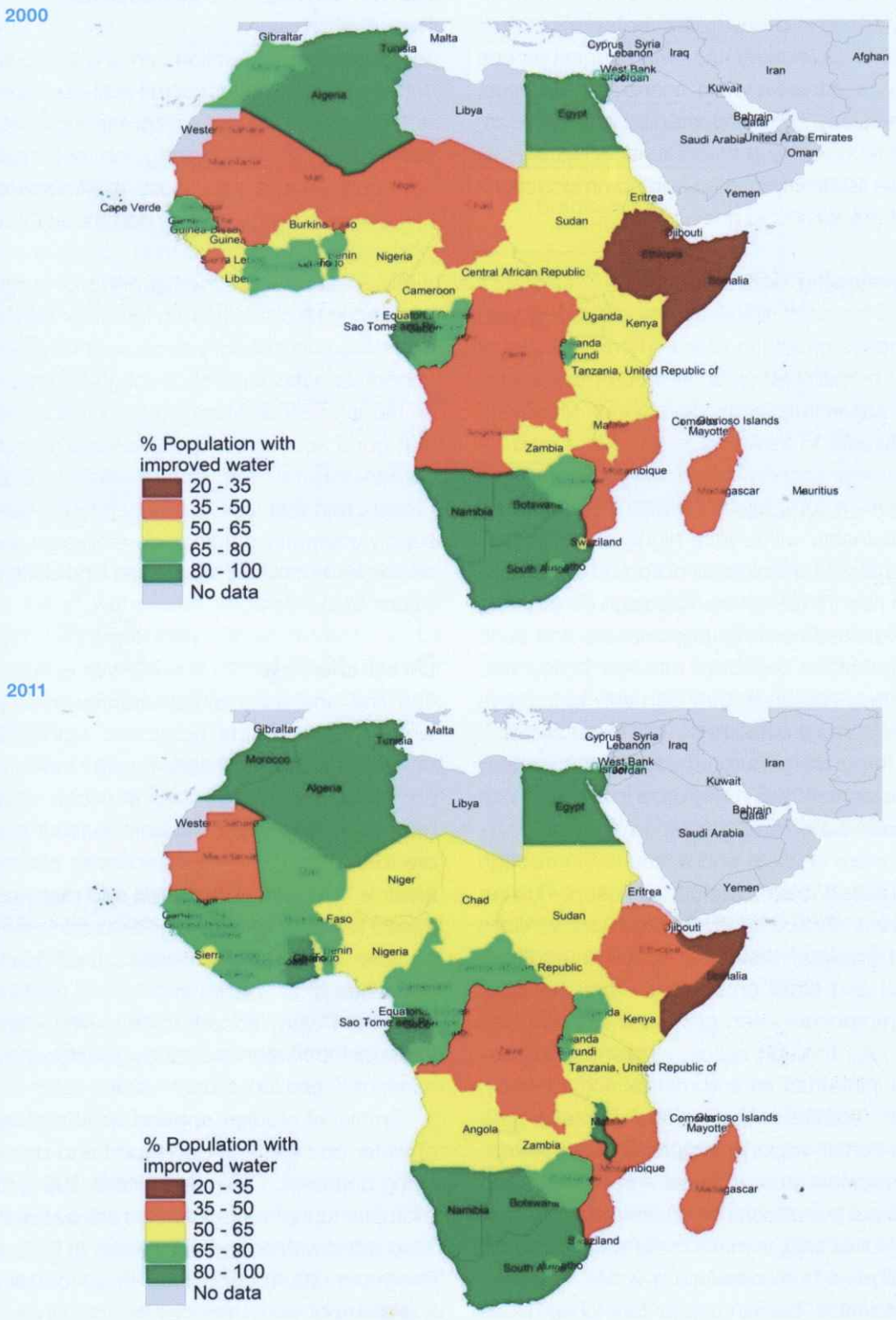
Source: Authors' analysis based on World Development Indicators.

Figure 10.2 Percentage of households with access to improved water in Africa, 1990–2011



Source: Authors' analysis based on World Development Indicators.

Figure 10.3 **Percentage of population accessing improved water, 2000 and 2011**



Source: Authors' analysis based on World Development Indicators.

Some, such as Ethiopia and Somalia, have very low access and made little progress during 2000–2011.

Given the harm being wrought in the water sector by climate change (extreme rainfall, floods and droughts), the sector should look to developing its human capital as one way to attract climate financing resources, particularly its managerial, institutional, financial technical and scientific skills, as well as expertise in information and communications technology.

Developing skills

Poor capacity reduces competitiveness and impedes growth in Africa. There is no doubt that human resources in Africa's water sector are insufficiently developed. Moreover, programs to train and inform water users—and other economic actors in the sector—are unsatisfactory. Making investments in water sustainable will require highly qualified personnel with the skills to build and then maintain new infrastructure. Research centers and universities can evaluate impacts and build stakeholder capacity: through policy and strategy research, they can aim to improve development outcomes in the water sector.

Integrating human capital with water development has many other benefits. It can render water and sanitation service delivery more efficient and accountable through increased participation by users—giving citizens a voice in developing basic services can improve these services. In addition, local and small enterprises—and individual entrepreneurs—can gain business and create jobs through building water and sanitation infrastructure and maintaining it. Finally, new regional water sector infrastructure can tighten regional integration, by developing regional labor markets and by improving regional populations' living conditions.

But as said, to make these socioeconomic outcomes from developing water resources sustainable, human capital has to be developed. Only stronger human capital can bring innovation to Africa's water sector (and to overall economic development more widely), allow countries to maintain their newly built systems, and enable policy reform—as discussed in the following sections.

Access to improved water and human capital: A conceptual framework

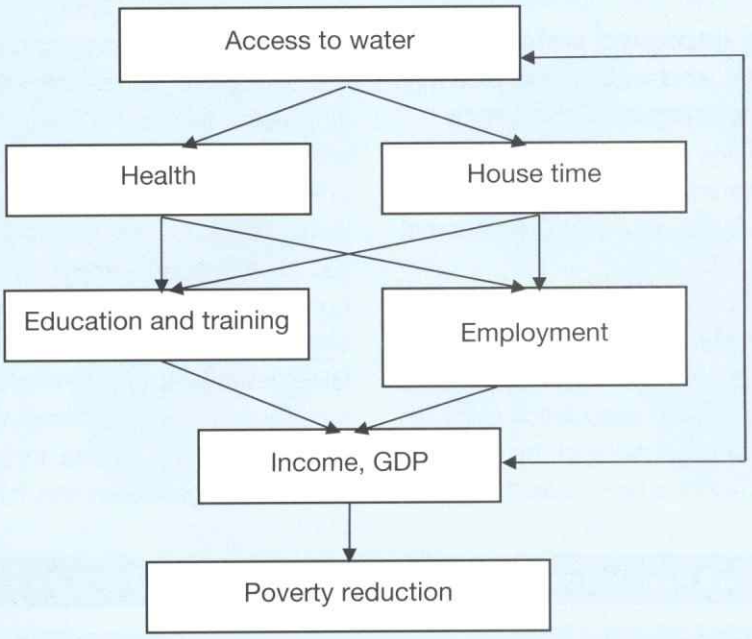
To capture the interactions among improved water access, human capital and economic activity as measured by gross domestic product (GDP), we distinguish two main channels—direct and indirect. Water—as a natural resource and a commodity that costs money to extract, treat, process and distribute—affects the economic activity directly because it is an input for several industries and indirectly because it facilitates economic activity mainly through its impact on human capital. Many studies have shown that good access to improved water boosts human capital and contributes to GDP growth, and that lack of a dependable water supply undermines human development and reinforces economic stagnation and decline (figure 10.4).

Direct channels

The first and most direct channel through which water affects economic activity is human capital, especially health. Individuals producing goods and services must have access to water for their health if they are to be productive. But access to potable water is not evenly distributed and many are forced to buy drinking water or to drink non-potable water, which threatens their health and leads to sick leave and loss of working potential. Patchy access to clean water and treatment for water-related diseases cost the economy—and individuals—dear.

Empirical studies abound on the effect of water on health, in developed and developing countries. Collin and others (1981), for example, found that epidemics are positively associated with poor quality water in France. Dasgupta (2004) concluded that increased availability of water reduces the incidence of water-related diseases in India. Several studies such as Galiani, Gertler and Schargrodsky (2005), Macinko, Guanais and Marinho de Souza (2005), and Gamper-Rabindran,

Figure 10.4 **Conceptual framework**



Source: Authors.

Khan and Timmins (2010) found that access to clean water was negatively associated with infant mortality. Other studies can be found in Fewtrell and others (2005), Günther and Fink (2010) and Waddington and others (2009).

The second direct effect of improved water is on the time people waste collecting water. Individuals engaged in economic activity need convenient access to improved water so that they can spend time working, being educated or caring for children and the elderly rather than procuring water, as they do in numerous African and Asian countries. Devoto and others (2012), for example, showed that water connections in urban Morocco could improve households' leisure and social activities.

Indirect channels

Nearly every sector of the economy is influenced by water. Water is used in the direct production of goods such as foods and beverages and it is used to produce energy (electricity and gasoline) and to extract mineral resources from the earth. As far as improved water is concerned, at the household level, it might have effects on household incomes by improving health. Figure 10.4 suggested that through better health and time savings, access to clean water can have indirect effects on education and employment, and thus on household income and GDP—increased income helping households escape from poverty, of course, given the link between household income (and GDP) and households' access to water. Note that improved water and household income may have two-way linkages. Households with high income are more likely to have access to better improved water than households with low income.

Consequences

Thus if Africa fails to develop its human capital, its overall development will suffer. Failing to integrate development of human capital with that of water will mean fewer socioeconomic benefits from infrastructure expansion—in job creation, entrepreneurship development and sustainable access to basic services. Integrating human capital with water sector development requires a more holistic approach in designing and executing water operations: water experts should be trained and sensitized on human capital concepts;

likewise, human development experts should take more part in water operations.

Links among improved water access, human capital and economic activity in Africa: The empirical evidence

We now investigate empirically how improved water is associated with human capital and economic activity, using World Development Indicators data.[4]

Descriptive analysis and causality test

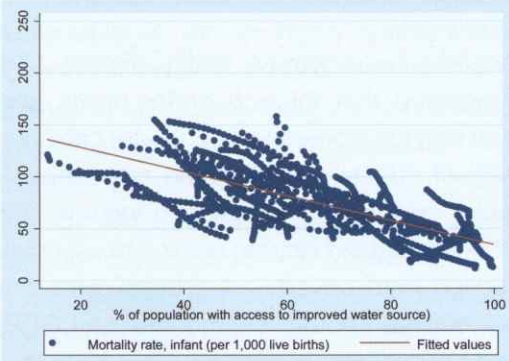
Clean water is essential for health and living, as seen in the negative association between access to improved water and the mortality rates of infants and children (figure 10.5).

And as the share of the population with access to improved water rises, malnutrition problems fall (figure 10.6).

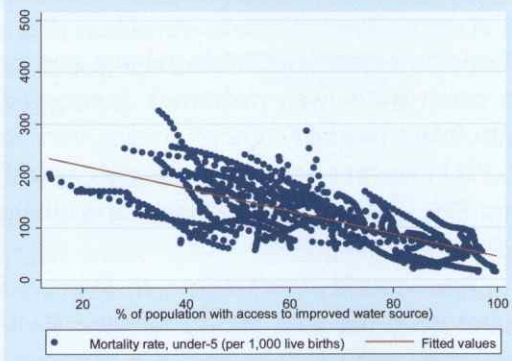
There is a positive correlation between improved water access and economic activity in Africa (figures 10.7 and 10.8). Countries with high GDP per capita tend to have higher proportions of households with improved water than countries with low GDP per capita. As mentioned above, correlation does not mean causality and there may be a two-way linkage between improved water and GDP per capita: growth improves access to clean water and improved water may help increase GDP per capita. In what follows we test for Granger causalities in order to better

Figure 10.5 Improved water and mortality rates

Share of population accessing improved water and the infant mortality rate



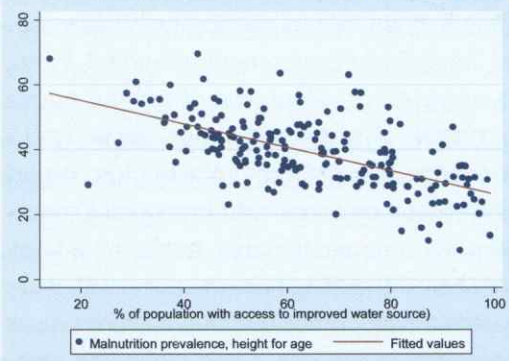
Share of population accessing improved water and the under-five mortality rate



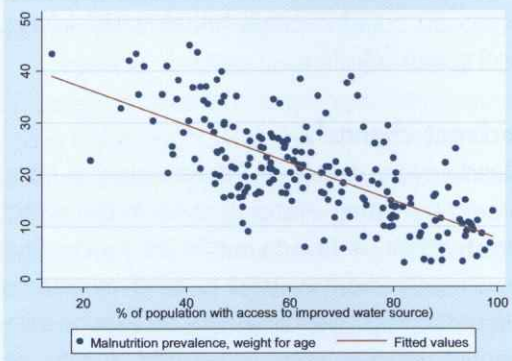
Note: Mortality per 1,000 live births.
Source: Authors' analysis based on World Development Indicators.

Figure 10.6 Improved water and malnutrition

Share of population accessing improved water and malnutrition prevalence height for age

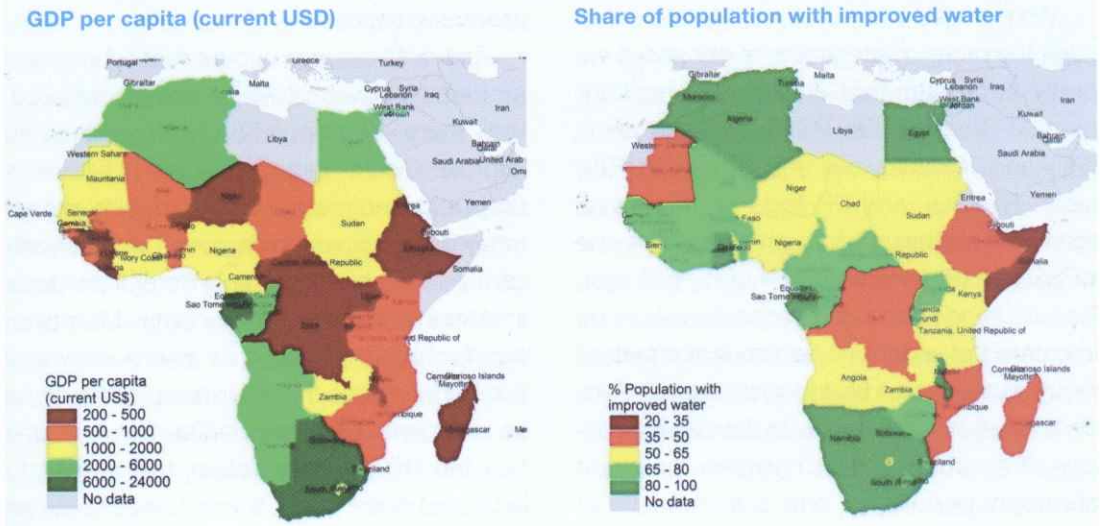


Share of population accessing improved water and malnutrition prevalence weight for age



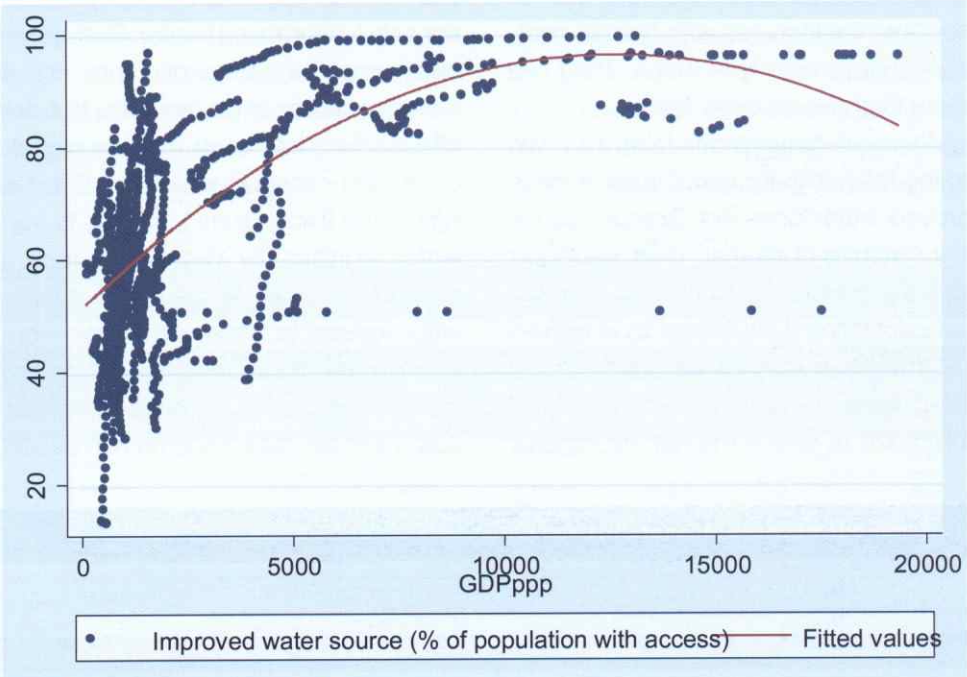
Source: Authors' analysis based on World Development Indicators.

Figure 10.7 **Improved water and GDP**



Source: Authors' analysis based on World Development Indicators.

Figure 10.8 **Improved water and GDP (PPP constant price 2005)**



Source: Authors' analysis based on World Development Indicators.

understand the direction on links between variables.

Granger causality analysis

To examine further the impact of improved water access on human capital and economic activity in Africa, we proceed to Granger causality tests on data aggregated for all of Africa, North Africa and Sub-Saharan Africa. We consider the following variables: child mortality, employment, GDP per capita, the Human Development Index (which combines indicators of life expectancy, educational attainment and income into a composite index, the HDI), life expectancy, reported malaria deaths, school enrollment (secondary and tertiary) and the share of population with access to improved water. Except

for variables that represent a percentage, we take the logarithm of variables.

We proceed in three steps. First, to determine the order of integration of our series we apply three standard unit root tests: Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski and others (KPSS) tests. The ADF and PP tests are based on the null hypothesis of a unit root, while the KPSS test considers the null of no unit root. Results suggest that the series appear to be integrated of order one, which is a standard result in the literature for such series. Second, we apply three tests of the null hypothesis of no cointegration between the share of urban population and the considered series: ADF, PP and Johansen tests.[5] In most cases the considered variables appear to be cointegrated with the share of population with access to improved water, which suggests that access to improved water moves together over the long run with human capital and economic activity in Africa. Third, we implement Granger causality tests.

Results are summarized in table 10.1. We test for the following null hypothesis: Access to improved water does not Granger cause the other variables of interest. Thus, we report the *p*-value for the causality running from the share of population with access to improved water to the other studied variables. Recall that the *p*-value provides the smallest level of significance at which the null hypothesis would be rejected; the smaller the *p*-value, the stronger the evidence is in favor of the alternative hypothesis of causality.

The first column shows that when data aggregated over all Africa are considered, the share of population with access to improved water Granger-causes child mortality, reported malaria deaths and life expectancy. Thus access to improved water significantly improves health and life of individuals in Africa and reduces mortality. Moreover, our findings suggest that improved water access increases the rate of employment and so augments GDP per capita. But it seems that the share of population with access to improved water is not linked to education as the variables on access to water and education are not cointegrated, and thus do not necessarily move together over the long run.

For North Africa, the middle column shows that the share of population with access to improved water Granger-causes employment and life expectancy, and weakly Granger-causes child mortality, but does not affect education, such that the global effect on human capital is weak. For Sub-Saharan Africa (the third column), access to improved water significantly Granger-causes all the studied variables: as the share of population with access to improved water increases, employment, life expectancy and education all improve. Access to imported water improves both GDP per capita and human capital.

Table 10.1 **Results of causality tests**

Access to improved water does not Granger-cause (*p*-value)

Variable	All Africa	North Africa	Sub-Saharan Africa
Child mortality	**0.000**	**0.082**	**0.000**
Employment	**0.040**	**0.004**	**0.076**
GDP per capita	**0.000**	**0.001**	**0.000**
Human capital development	NA	0.624	**0.014**
Life expectancy	**0.000**	**0.008**	**0.000**
Reported malaria deaths	**0.003**	—	**0.002**
School enrollment—secondary	—	0.334	**0.050**
School enrollment—tertiary	NA	NA	**0.046**

Note: NA denotes that the series is not available or that the number of observations available is too short to get robust results. — denotes that the considered variable is not cointegrated with the share of urban population. Figures in bold indicate significance at the 10% level.

Source: Authors' analysis based on World Development Indicators.

Regression analysis

Estimating the effects of access to improved water is very challenging because access to improved water is not random. Unobserved variables can be correlated with access to improved water and cause the impact estimates to be biased. In what follows we use country fixed-effects regressions to further examine the effect of access to improved water on health, education and poverty. The main advantage of such regression is that it uses panel data to eliminate time-invariant unobserved variables such as geography and culture, thus lessening selection bias.[6]

Table 10.2 presents the regressions of life expectancy and mortality on access to improved water. We use simple models with more exogenous variables including population density and the proportion of children and elderly. GDP per capita is a very important variable to determine water access, but it can be endogenous. Thus we present both models with and without controlling for GDP per capita. For all regressions, we include the dummy variables of years. (The list of variables is presented in annex 10.1.)

Table 10.2 shows that countries with higher access to improved water tend to have lower mortality rates than those with lower access to improved water even if they have the same GDP per capita, population characteristics and other time-invariant characteristics. A one percentage point increase in the proportion of population accessing improved water is associated with a decrease of 0.45 and 0.89 in the mortality rate. If we consider the mean of the proportion of improved water and mortality rate, we can compute the elasticity of the mortality rate with respect to the improved water proportion (see the annex for the variable mean). The elasticity is estimated at around 0.3 and 0.4: a 1% increase in the proportion of improved water is associated with a 0.3% and a 0.4% decrease in the mortality rate of infants and children under five, respectively.

The access to improved water is also significantly negatively correlated with malnutrition (table 10.3). Even for countries with the same economic level (measured by GDP per capita), those with higher access to improved water tend to have lower malnutrition rates.

Table 10.2 Country fixed-effects regression of life expectancy and mortality

Explanatory variables	Life expectancy at birth, total (years)	Mortality rate, infant (per 1,000 live births)	Mortality rate, under-5 (per 1,000 live births)	Life expectancy at birth, total (years)	Mortality rate, infant (per 1,000 live births)	Mortality rate, under-5 (per 1,000 live births)
% of population with access to improved water source	0.0358*	−0.5228***	−1.0367***	0.0219	−0.4484***	−0.8945***
	(0.0212)	(0.0662)	(0.1262)	(0.0210)	(0.0639)	(0.1234)
Log of GDP per capita (2005 constant PPP$)				1.7602***	−13.6759***	−20.8546***
				(0.4994)	(1.5230)	(2.9386)
Population ages 0–14 (% of total)	0.6022***	−2.2161***	−5.2969***	0.5810***	−2.5884***	−6.0178***
	(0.0657)	(0.2016)	(0.3844)	(0.0674)	(0.2012)	(0.3883)
Population ages 65 and above (% of total)	0.4679	−2.7287**	−3.2959	0.3475	−2.9112***	−4.0548*
	(0.3695)	(1.1394)	(2.1725)	(0.3744)	(1.1227)	(2.1663)
Population density (people per square kilometer of land area)	0.0881***	−0.1216***	−0.2786***	0.0878***	−0.1057***	−0.2445***
	(0.0059)	(0.0183)	(0.0350)	(0.0058)	(0.0177)	(0.0341)
Dummies of year	Yes	Yes	Yes	Yes	Yes	Yes
Constant	21.3295***	204.8308***	411.4524***	10.2644*	316.9768***	587.0044***
	(3.9072)	(11.9579)	(22.8000)	(5.3921)	(16.2449)	(31.3449)
Observations	1,075	1,085	1,085	1,025	1,035	1,035
Number of countries	51	51	51	49	49	49
R-squared	0.4412	0.6841	0.6943	0.4578	0.7259	0.7287

Note: Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' analysis based on World Development Indicators.

Table 10.3 **Country fixed-effects regression of malnutrition and health spending**

Explanatory variables	Malnutrition prevalence, height for age (% of children under 5)	Malnutrition prevalence, weight for age (% of children under 5)	Health expenditure per capita, PPP (constant 2005 $ international)	Malnutrition prevalence, height for age (% of children under 5)	Malnutrition prevalence, weight for age (% of children under 5)	Health expenditure per capita, PPP (constant 2005 $ international)
% of population with access to improved water source	−0.2823**	−0.1464*	−1.3167**	−0.2549**	−0.1348*	−0.5950
	(0.1166)	(0.0764)	(0.5440)	(0.1150)	(0.0737)	(0.5046)
Log of GDP per capita (2005 constant PPP$)				−10.556***	−7.3253***	122.28***
				(3.490)	(2.2541)	(10.57)
Population ages 0–14 (% of total)	0.3193	−0.2366	−2.0954	0.1421	−0.3363	−2.8904**
	(0.3947)	(0.2598)	(1.5167)	(0.3940)	(0.2534)	(1.4250)
Population ages 65 and above (% of total)	−4.6501*	−3.4809**	121.9098***	−4.7248*	−3.4411**	116.6436***
	(2.5428)	(1.6670)	(8.5137)	(2.5271)	(1.6189)	(7.9116)
Population density (people per square kilometer of land area)	−0.0042	−0.0291	−0.0534	0.0049	−0.0237	0.0242
	(0.0324)	(0.0213)	(0.1362)	(0.0320)	(0.0205)	(0.1247)
Dummies of year	Yes	Yes	Yes	Yes	Yes	Yes
Constant	59.271**	56.847***	−148.03	140.95***	107.15***	−1,029.76***
	(23.135)	(15.186)	(90.20)	(33.98)	(22.14)	(114.03)
Observations	204	202	836	197	195	816
Number of countries	50	50	51	48	48	49
R-squared	0.3112	0.4311	0.5312	0.3660	0.5014	0.6140

Note: Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' analysis based on World Development Indicators.

Per capita health spending is also lower in countries with higher access to improved water. Possibly, improved water helps people improve health and reduce the health care cost.

The effect of improved water on school enrollment of children is seen in table 10.4. It shows a positive correlation with primary school enrollment, but at higher school levels the correlation is not statistically significant.

Finally, we investigate the role of improved water in economic activities. Although there is a very weak correlation between access to improved water and GDP per capita, there is a strong correlation between access to improved water and poverty (table 10.5). Countries with higher proportions of the population accessing improved water are more likely to have lower poverty rates.

Policy implications

Incorporating human capital development in water sector operations would increase job opportunities, enhance company competitiveness, foster inclusive growth and development and improve the quality of basic social services. Several policy recommendations logically flow.

Strengthening institutional arrangements and capacity

Many countries have long-term human capital development strategies and water sector strategies. Diagnosing the human resources needs in the water sector is a critical step that could integrate them more closely, through an operational framework for integrating human capital measures in the water sector, and joint multidisciplinary teams and operations that demonstrate the value added of such integration. At the same time, water management institutions need strong training and capacity building. Strengthening capacity of institutions that train water engineers and technicians in financial management, civil engineering and hydrogeology—by introducing these fields or strengthening existing ones in national universities and regional centers of excellence—is highly recommended.

Strengthening the computerization of institutions responsible for water management and training staff to work with up-to-date

Table 10.4 Country fixed-effects regression of school enrollment

Explanatory variables	School enrollment, primary (% of net)	School enrollment, secondary (% of net)	School enrollment, tertiary (% of gross)	School enrollment, primary (% of net)	School enrollment, secondary (% of net)	School enrollment, tertiary (% of gross)
% of population with access to improved water source	0.1919**	−0.0179	0.0141	0.1935**	−0.0048	−0.0387
	(0.0972)	(0.0873)	(0.0243)	(0.0976)	(0.0859)	(0.0249)
Log of GDP per capita (2005 constant PPP$)				3.3489	8.2965***	3.3261***
				(2.6036)	(2.9450)	(0.8154)
Population ages 0–14 (% of total)	1.5266***	−0.9855***	−0.3601***	1.5463***	−0.9429***	−0.2798***
	(0.2748)	(0.2401)	(0.0772)	(0.2769)	(0.2364)	(0.0750)
Population ages 65 and above (% of total)	−0.0417	0.1470	4.5840***	−0.1847	0.0920	4.3778***
	(1.7189)	(1.7719)	(0.4011)	(1.7241)	(1.7411)	(0.4029)
Population density (people per square kilometer of land area)	0.0618	−0.0431	0.0248***	0.0664	0.0015	0.0203***
	(0.0413)	(0.0364)	(0.0071)	(0.0414)	(0.0391)	(0.0069)
Dummies of year	Yes	Yes	Yes	Yes	Yes	Yes
Constant	6.222	72.832***	5.464	−20.305	6.7692	−17.454**
	(17.428)	(15.546)	(4.373)	(27.147)	(27.986)	(6.892)
Observations	570	256	564	569	256	559
Number of countries	48	37	50	48	37	49
R-squared	0.5840	0.6017	0.7069	0.5850	0.6174	0.7328

Note: Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' analysis based on World Development Indicators.

Table 10.5 Country fixed-effects regression of poverty indexes

Explanatory variables	Log of GDP per capita (2005 constant PPP$)	Poverty gap at $1.25 a day (PPP) (%)	Poverty headcount ratio at $1.25 a day (PPP) (%)	Poverty gap at $1.25 a day (PPP) (%)	Poverty headcount ratio at $1.25 a day (PPP) (%)	School enrollment, tertiary (% of gross)
% of population with access to improved water	0.0002	−0.811***	−1.291***	−0.822***	−1.253***	−0.0387
	(0.0014)	(0.2047)	(0.2444)	(0.2142)	(0.2552)	(0.0249)
Log of GDP per capita (2005 constant PPP$)				1.2185	−4.1637	3.3261***
				(6.4496)	(7.6847)	(0.8154)
Population ages 0–14 (% of total)	−0.0023	−0.1884	−0.3552	−0.1879	−0.3570	−0.2798***
	(0.0043)	(0.5837)	(0.6968)	(0.5879)	(0.7004)	(0.0750)
Population ages 65 and above (% of total)	0.0753***	3.9117	−2.4056	3.7397	−1.8178	4.3778***
	(0.0237)	(3.1053)	(3.7070)	(3.2571)	(3.8808)	(0.4029)
Population density (people per square kilometer of area)	−0.0004	−0.0033	−0.0599	−0.0057	−0.0517	0.0203***
	(0.0004)	(0.0711)	(0.0849)	(0.0727)	(0.0866)	(0.0069)
Dummies of year	Yes	Yes	Yes	Yes	Yes	Yes
Constant	7.4420***	66.704*	155.1***	59.085	181.1***	−17.454**
	(0.2465)	(39.495)	(47.148)	(56.642)	(67.489)	(6.892)
Observations	1,035	140	140	140	140	559
Number of countries	49	46	46	46	46	49
R-squared	0.3353	0.6186	0.6174	0.6188	0.6190	0.7328

Note: Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' analysis based on World Development Indicators.

information technology systems for the technical, financial and commercial management of water services should improve service delivery and accountability in water operations (see chapter 11). Public expenditure tracking surveys and quantitative service delivery studies to track resource flows and examine efficiency of public spending can also be run—partly to address pervasive corruption in the water sector (see chapter 28).

Creating job opportunities

The construction and maintenance of water infrastructure should be labor intensive. Rather than using machines for pipeline excavation—and batching and mixing plants for concrete production—use of smaller machines and hand tools could increase job opportunities. This labor-intensive approach will require training for small and medium enterprises and preparation of operations manuals. Encouraging small manufacturing of water supply and irrigation equipment such as treadle pumps and wind and solar pumps nationally or regionally could boost employment opportunities in the water sector. Manufacture of spare parts nationally or regionally would equally create opportunities for entrepreneurship and job creation (see chapter 19). Developing multiuse water supply schemes and promoting water-related income-generating activities would improve job-creation opportunities in agricultural food production, horticulture, fishery and agribusiness. And increasing research in the sector could introduce new and more efficient technologies and methodologies.

Improving the possibilities for small enterprises to engage in building and maintaining water infrastructure generates revenues in local communities, which could be helped by training local entrepreneurs in technical norms, entrepreneurship skills and business management aspects relevant to the water sector.

Promoting research and development

National research institutes and universities have been engaged to evaluate socioeconomic development impacts of water sector operations (see chapter 13). Such collaboration could be expanded by investigating the training needs of project or other stakeholders who are having difficulty in maintaining their water infrastructure and are designing operations to meet these needs. Developing science and technology, cooperation can enable the following activities to be mainstreamed in water sector operations: support to institutions that train water sector engineers and technicians—and support for specialized training in the sector (satellite imagery, telemetry, water information systems, Geographic Information Systems, climate-change risk modeling and management, and renewable energy systems for the water sector). These areas provide ample opportunities for job creation.

Conclusions

Africa's water and sanitation infrastructure deficit remains a serious challenge for the continent's growth prospects and socioeconomic development, and partly accounts for its weak competitiveness. Weak human capacity, inefficiencies in services delivery and poor transparency and accountability are all factors. The implementation of the Human Capital Development Strategy through the water sector will have the dual benefit of developing human capacity on the continent as a whole and of improving—and sustaining—access to water and sanitation.

Annex 10.1 Summary statistics of variables

Variables	Observation	Mean	Standard deviation	Minimum	Maximum
% of population with access to improved water	1,086	64.9	19.5	13.6	99.8
Life expectancy at birth, total (years)	2,666	50.5	8.7	26.8	74.8
Mortality rate, infant (per 1,000 live births)	2,536	97.2	41.7	11.2	237.4
Mortality rate, under-5 (per 1,000 live births)	2,536	159.9	78.8	13.1	486.0
School enrollment, primary (% net)	930	66.5	22.2	9.7	100.0
School enrollment, secondary (% net)	371	25.1	21.0	0.1	97.6
School enrollment, tertiary (% gross)	1,181	3.9	5.7	0.0	37.1
Malnutrition prevalence, weight for age (% of children under 5)	239	20.4	9.4	3.1	45.0
Malnutrition prevalence, height for age (% of children under 5)	245	38.7	11.1	7.7	69.6
Health expenditure per capita, PPP (constant 2005 international $)	847	150.3	204.6	0.0	1,806.5
Poverty gap at $1.25 a day (PPP) (%)	157	19.8	14.8	0.0	63.3
Poverty gap at $2 a day (PPP) (%)	157	33.3	18.6	0.0	75.6
Poverty headcount ratio at $1.25 a day (PPP) (% of population)	157	45.3	25.7	0.0	92.6
Poverty headcount ratio at $2 a day (PPP) (% of population)	157	64.5	25.4	0.0	98.5
GDP per capita (constant 2005 international $)	1,557	2,851.3	3,904.3	101.6	27,346.4
Population ages 0–14 (% of total)	2,756	43.5	4.4	20.2	50.3
Population ages 65 and above (% of total)	2,756	3.3	1.0	1.1	8.4
Population density (people per sq. km of land area)	2,601	56.9	87.7	0.7	633.5

Source: Authors' analysis based on World Development Indicators.

Notes

1. AfDB 2011.
2. Data come from the World Bank's World Development Indicators database. This has yearly data on a raft of indicators for many countries since 1960, though for water, education and health, the data are available only for recent years. See http://data.worldbank.org/.
3. Access to an improved water source refers to "the percentage of the population with reasonable access to an adequate amount of water from an improved source, such as a household connection, public standpipe, borehole, protected well or spring, and rainwater collection. Unimproved sources include vendors, tanker trucks, and unprotected wells and springs. Reasonable access is defined as the availability of at least 20 liters a person a day from a source within one kilometer of the dwelling" (World Bank 2013, 61).
4. See http://data.worldbank.org/.
5. Stationary and cointegration tests are not reported to save space but available upon request.
6. See, for example, Wooldridge (2010).

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CHAPTER 11

Building e-skills in Africa

Adel Ben Youssef, Coetzee Bester, Aduba Chuka, Mounir Dahmani and Beverley Malan

The opportunities and reach of information and communications technology (ICT) in Africa are expanding rapidly. If the ICT market continues its impressive double-digit growth, expenditures in ICT within Africa could exceed USD150 billion by 2016.[1] ICT is now widespread, with the continent bridging the digital divide by riding on the crest of the explosion of mobile phone communications that enabled Africa to leapfrog to contemporary technology without going through the mill of older technologies. Falling costs of ICT equipment and deregulation in telecommunications have been the main drivers of change. The next challenges now focus on the use of these technologies and on their impact on social and human development.

Across the world ICT is increasingly fundamental to a nation's socioeconomic development. This is causing major changes in our societies by transforming the ways of consuming, working, producing, training and occupying leisure time. ICT even played a crucial role in the Arab Spring. Virtually all international development organizations refer to ICT as critical for economic and social development.

For the last decade increasing competition in the ICT sector, technological change (like cloud computing or open source) and public policies, such as free public Internet access areas and free access to Internet in schools, have heavily reduced the cost of ICT and helped bridge the digital divide. Most African countries are doing this through expanding access, with new projects and investments geared toward improving infrastructure.

The key focus in this chapter is on how best to improve the uptake and use of ICT in Africa. It is a contemporary challenge based on the knowledge that ICT's transformative impacts on societies have come to parallel the role that basic education or literacy played in earlier times. Knowledge of ICT has become both a basic skill in modern society and a pathway to other endeavors. It is basic because most commercial, educational and social services are increasingly delivered through ICT, and a pathway to new employment opportunities because most employers now require ICT skills as some minimum condition for effective functioning in the modern enterprise.

Inequalities between countries and people are becoming more and more related to people's own ability to use these technologies—and how efficiently they use them (as seen in the E-readiness Index[2] and the Research ICT Africa survey[3]).

Africa needs e-skills (digital literacy or ICT skills)—a core set of skills equipping all citizens for a knowledge-based economy and society—to benefit fully from the "digital dividend" and ICT.[4] Empirical studies have demonstrated their crucial role in education, the job market and social inclusion. Insufficient digital literacy among citizens is a barrier to growth, employment and social inclusion in Africa. A strategy toward e-skills in Africa is a step to linking Africa to the global economy and to the benefits of its growing and youthful population.

This chapter discusses what kind of strategies are needed to improve people's e-skills. A hybrid between technological and organizational skills, e-skills are becoming the cornerstone of human development in the 21st century. They allow ICT to be used to its full extent—fostering economic growth, social inclusion, health and education services, and poverty reduction.

E-skills: Definition and scope

The last decade and more has seen many attempts in the academic literature to define e-skills in terms of "technological literacy,"[5] "digital literacy,"[6] "technological proficiency,"[7] "self-assessment"[8] and "disorientation in hypermedia."[9] According to the European Commission, e-skills means "the efficient and critical use of information and communication technologies." Several attempts have been made by scholars since the seminal work of Gilster (1998) and subsequently Steyaert (2002) to define the scope and the aims of e-skills. There is no universal definition of e-skills, but in practical terms they are acquired through self-learning, education, heavy use of ICT and cooperative learning.

We will use a combination of definitions proposed by scholars and go further to suggest a new definition with a broader sense: e-skills are related to the general skills needed to use ICT and fully exploit the opportunities of the digital world.[10] They are linked to the ability to use the technologies (devices), to understand their purposes and their functionalities and to exploit their potential for learning, working, informing and enjoying leisure time. These skills are general cognitive abilities and skills, as well as behavioral skills.

E-skills are sometimes categorized into three often related levels on a sliding scale of increasing sophistication. First at the bottom are the basic skills required to participate in a modern society where social and economic services are increasingly delivered through digital media. Second are the technical skills required to effectively operate in the modern enterprise and business where the disruptive paradigm of e-commerce by Amazon, among others, and an increasingly proliferation of e-governance by government agencies have spawned a new generation of virtual service outlets to achieve faster delivery and greater and least-cost reach to the general population while eliminating the constraints of physical boundaries. Third at the top are the sophisticated technical e-skills required to develop new services and solutions, to redesign existing and older services and content and to enhance the knowledge and skills sets—as well as tools required to continually advance the boundaries of the digital society.

Several of the skill types further discussed below fall into one or a combination of these three levels. Other emerging trends, as with the application of ICT in education, often require a full spectrum of all the three types of e-skills depending on whether the application is for formal or informal education. For example, informal education may require the teaching of basic e-skills by trainers who have just similar level of skills or by more advanced trainers who go beyond the basic training to also develop the required pedagogical digital materials themselves. The various levels of e-skills are also often analyzed in combinations of behavioral patterns related to standard communities of literacy practices, as follows.

Literacy and language abilities as basic e-skills

Since these technologies induce intense reading and writing of documents and messages, most scholars agree that literacy is one of the basic foundations of e-skills. Literate people are better able to use these technologies. Despite significant technical progress, however, most of the Internet's content is still in written form, therefore excluding that part of society without reading skills. At the same time, language skills are becoming fundamental e-skills. Most Internet content is in English. Speaking and reading English gives one an advantage as it allows access to more content. Knowledge of several languages therefore permits access to more content and increases the opportunities of the Internet. Progress is being made toward content translation, however. Nonetheless, people with multiple language skills remain better favored.

Instrumental e-skills

These are linked to the ability to use devices. These skills are not related to content but rather to how to use a computer, software, applications or a smartphone. While these skills were highly important in the early

generation of PC and ICT devices and only managed to persuade a fringe of the population to use them, they are becoming increasingly foundational skills required to operate in an ever-more digital world. This means that there is limited specific learning required—rather, intuitive self-learning sometimes by trial and error has become the basic driver. People can now engage in easy self-learning by doing. In most cases digital devices need people to invest time. The economic value of this learning process (the opportunity cost of time dedicated to these activities over other uses) is the main barrier. Mobile technologies seem more appropriate for Africa, not only in infrastructure but also in the needed skills.

Content-related skills

Alone, access to the digital world and the ability to access mass information and data are insufficient for critical use of these technologies. As society migrates from predominantly a manufacturing to a service economy, the ability to collate, evaluate and analyze on a large scale volumes of information to decipher patterns and linkages and to make deductive conclusions based on available information demands a more formal skill set. Thus informational skills are needed to search for and extract information, verify its source, compare it with other similar information and have the critical posture. These skills are not easy to acquire: they need a learning process and the cognitive ability to do so. Education system needs to put critical thinking and ethics in use of these technologies as fundamental skills to help students have better informational skills. In France a recent study indicates that more than 80% of the population is unable to conduct adequate research on the Internet. This gives an idea of the massive challenges and investment needed for these skills.

Behavioral skills

Behavioral skills are linked to the nature of these technologies, but also to sociopsychological abilities. They are known as the 3Cs, 4Cs (box 11.1), 5Cs or even 8Cs. Several scholars have stated that these technologies need people to be able to collaborate, cooperate, coordinate tasks, communicate, make content contribution and so on.

This particular set of skills needs a behavioral shift. These skills are learned by intensive use of ICT and by acquiring new reflexes in the digital world. We need to insist on the fact that e-skills are linked to the way of behaving in the digital world. Training people to cooperate and collaborate in the real world does not mean that they will have the ability to transfer these skills in the digital world and vice versa. These skills are fundamental for enterprises and for social life. Building social capital needs these skills in the digital world. They are needed for social networks and for corporate network use. They need specific training. One of the ways of linking the education system to the private sector is the fact that students need to acquire these skills during their training and education. Most of the education systems in Africa ignore such skills and the need to develop them.

Content-development skills

The ability for some people to generate content and contribute to the digital society

Box 11.1 The 4Cs: creativity, critical thinking, communication and collaboration

Creativity: The tendency to generate or recognize ideas, alternatives or possibilities that may be useful in solving problems, communicating with others and entertaining ourselves and others.

Critical thinking: Among other things, to be fair and open-minded while thinking carefully about what to do or what to believe. If you are a critical thinker, you will assess the reasons for and against doing something and then make your decision based on a fair assessment.

Communication: The exchange and flow of information and ideas from one person to another.

Collaboration: Working together to achieve a common goal.

needs a specific set of skills. These skill sets belong to the top of the rungs of the ladder in the e-skill world. As indicated in the seminal work of Rogers (1995) only small proportions of innovators are able to make contributions to world knowledge. For example, the diversity of Africa needs people to develop local content in different languages for different ethnicities and communities. Every nation in Africa therefore needs a critical mass of skilled persons with the ability to develop such content.

One of the main characteristics of these technologies is the fact that users sometimes have to produce the content. The user-producer model implies the ability to generate sustainable content and traffic.[11] Some of these user-information producers are transforming their activities into real jobs (web-marketing, community manager). These jobs did not exist 15 years ago and these skills are not learned through the education system. The rapid evolution of technologies implies that most of the new jobs are now linked to the ability to use these technologies. As such, building content-development skills is a reservoir of new jobs that Africa needs to exploit to resolve its youth unemployment problems.

High level, applications-development skills

Another set of skills is even more sophisticated: skills for development of applications and e-commerce (see annex 11.1). These skills need specific training in engineering schools and high profiles for mastering ICT. Most of these skills are costly and developed by the private sector for commercial purposes. They are also linked to innovation and the ability to innovate. Africa is investing to build these skills by fostering technoparks and attracting the most advanced universities to Africa.

One of the main concerns is the wage differential that is causing a major brain drain: most of Africa's most skilled IT people are abroad working for European, North American and Asian companies. This drain is hindering Africa's ability to develop a competitive industry in the world market, despite strong political commitment. Most African countries have an ICT technopark, meaning that they are trying to concentrate a critical mass of their limited skills in this particular domain, but no country has a city that has become the next Bangalore. Lack of skills, small size of technoparks and weak higher education remain strong barriers.

Users and uses of ICT

Bridging the divide thanks to the new generation of ICT—the late-adopter advantage

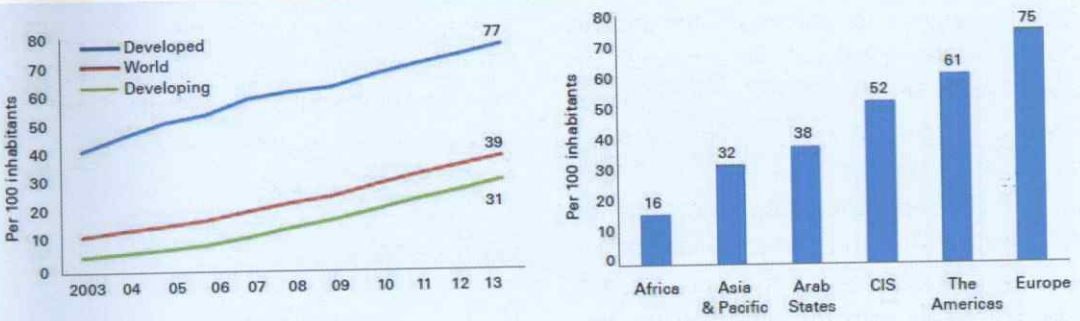
In 2013 more than 2.7 billion people were using the Internet, or 39% of the world's population. Europe and Africa were the regions with the highest and the lowest levels of household Internet penetration—77% to 7% (figure 11.1).

Between 2009 and 2013 Internet penetration in households has grown fastest in Africa, with annual growth of 27%, followed by 15% in Asia and the Pacific, the Arab States and the Commonwealth of Independent States (figure 11.2).

Mobile-broadband subscriptions have climbed from 268 million in 2007 to 2.1 billion in 2013. This reflects an average annual growth rate of 40%, making mobile broadband the most dynamic ICT market. In developing countries the number of mobile-broadband subscriptions more than doubled from 2012 to 2013 (from 472 million to 1.2 billion) and surpassed those in developed countries in 2013. Africa is the region with the highest growth rates over the past three years when mobile-broadband penetration increased from 2% in 2010 to 11% in 2013 (figure 11.3).

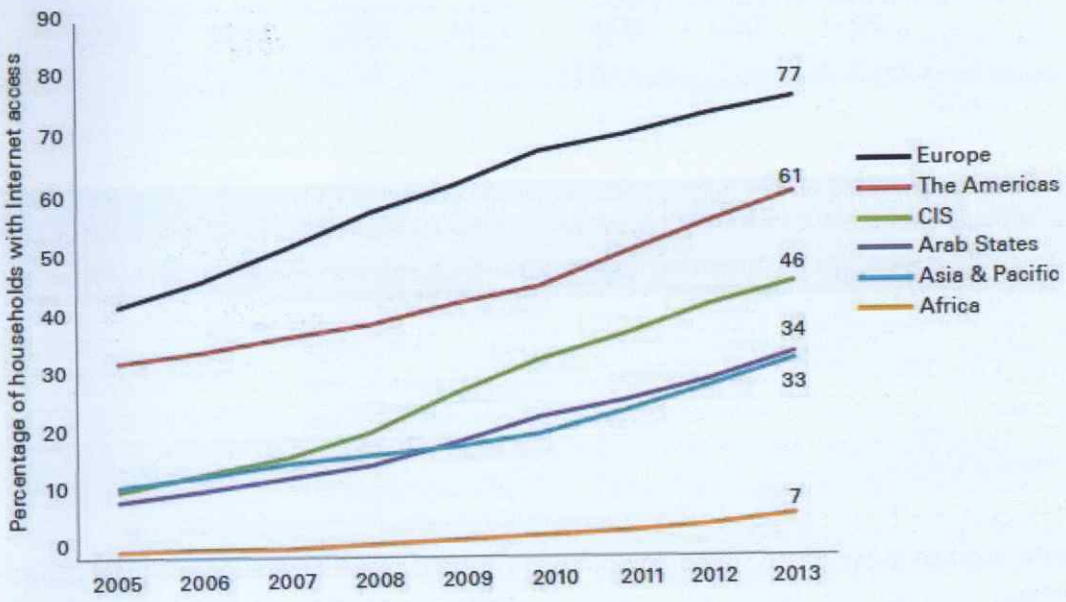
Poor performance in equipment in Africa relates mainly to old technologies (fixed phone, computers and Internet). But mobile technologies are better adapted, easier and quicker to deploy on a large scale and thus seem more appropriate to Africa—giving it the late-adopter advantage. According to Aker and Mbiti (2010), in Sub-Saharan Africa mobile phone technologies can improve access to and use of information, thereby reducing search costs, improving coordination among agents and increasing market

Figure 11.1 **Internet users by development level**



Source: ITU World Telecommunication/ICT Indicators database 2012.

Figure 11.2 **Households with Internet access**



Source: ITU World Telecommunication/ICT Indicators database 2012.

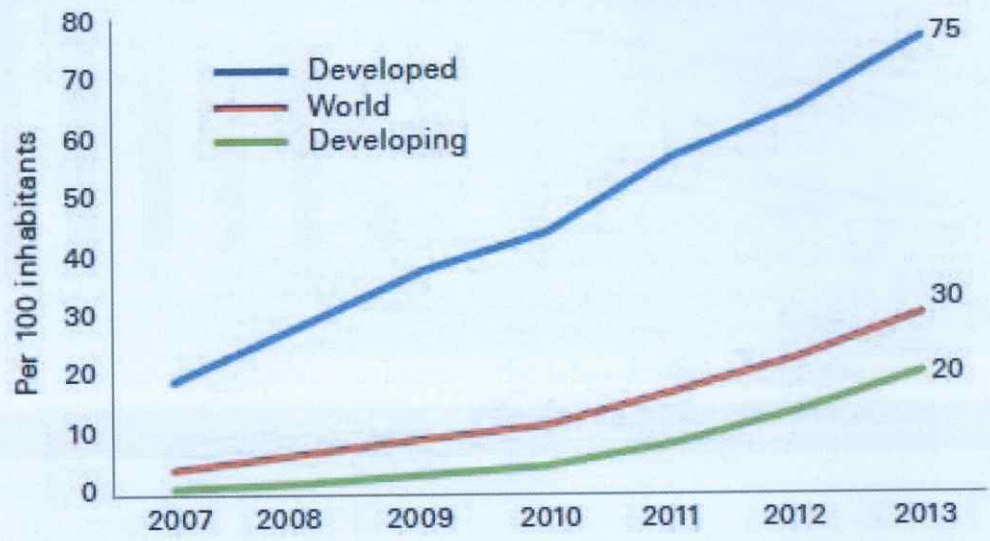
efficiency; improve corporate productive efficiency by allowing for better management of supply chains; create new jobs to address demand for mobile-related services, thereby providing income-generating opportunities in rural and urban areas; facilitate communication among social networks in response to shocks, thereby reducing households' exposure to risk; and facilitate the delivery of financial, agricultural, health and educational services.

Africa's ICT uses

The E-readiness Index shows Internet and ICT global diffusion for a set of 70 countries (including four African countries).[12] While the 2006, 2007 and 2008 editions do not contain use indicators, the 2009 version includes three indicators of use. They measure the use of the Internet by consumers, the use of online public services by citizens and the use of online public services by business.

Four African countries saw their scores drop in the 2009 version from 2008 (table 11.1). This shows that, beyond the question of access and availability of the technology, there is an issue of use and ability among citizens and businesses. Moreover, the scores are very low relative to other world regions. On use alone, performance is

Figure 11.3 **Active mobile-broadband subscriptions**



Source: ITU World Telecommunication/ICT Indicators database 2012.

Table 11.1 **Performance of African countries on Internet and ICT diffusion**

Country	Ranking (out of 70)	2008 (global)	2009 (global)	2009 (ICT use score)
South Africa	41	5.95	5.68	5.93
Egypt	57	4.81	4.33	3.05
Nigeria	61	4.25	3.89	3.50
Algeria	67	3.61	3.46	2.33

Source: EIU 2009.

below average (5 out of 10), except in South Africa.

The survey results of the Research ICT Africa (2007/2008) on 17 African countries shows that many respondents who do not use the Internet identified their lack of computer knowledge as a reason.[13] In 9 of the 17 countries, lack of skills was the most commonly cited reason for non-use.

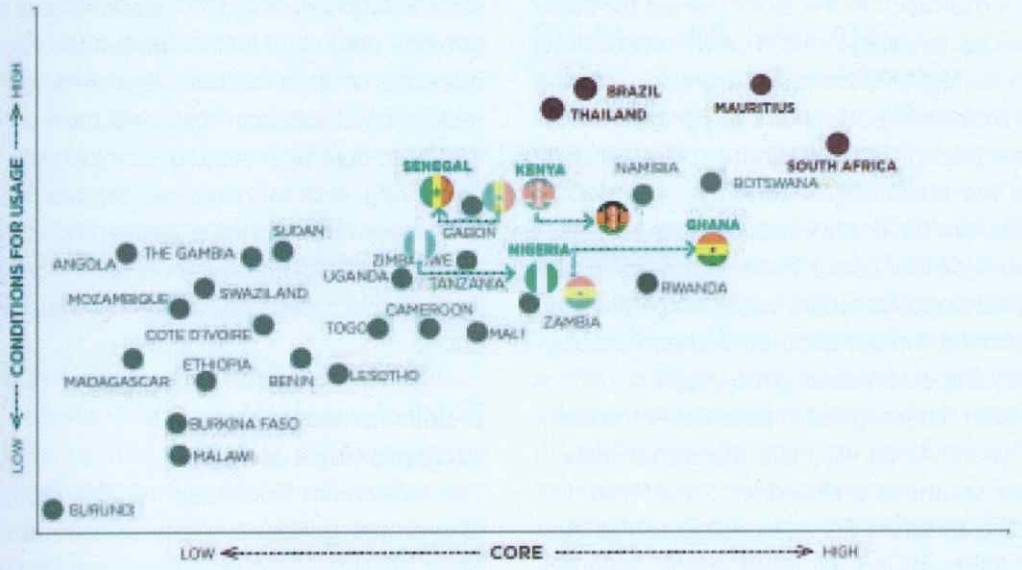
There is a strong relationship between core (equipment) and use factors, suggesting that countries that perform well on one dimension also tend to perform well on the other (figure 11.4). Importantly, the pattern also suggests that, in the absence of a minimum amount of investment in core infrastructure, there is a clear ceiling to progress on use conditions. None of the countries achieved strong use conditions without a commensurate investment in core conditions. For policymakers this suggests that poor performance on core conditions, measured by indicators on physical infrastructure and general business environment, cannot be leapfrogged. No vibrant Internet economies—or the positive development impacts that come with them—have been built atop poor business environments (box 11.2).

Economic impacts of e-skills

E-skills development is increasingly considered to be a factor in economic growth rather than a consequence of it.[14] Three characteristics of ICT explain this view:

- ICT is omnipresent in most business sectors.
- ICT improves continuously and therefore reduces costs for users.
- ICT contributes to innovation and to development of new products and processes.

Figure 11.4 ICT core (equipment) and use



Source: Dalberg 2013.

Box 11.2 Connect Africa Strategy, 2007

Building e-skills in Africa has the aim of deepening the strategy defined at the Connect Africa Summit of 2007 in Kigali. The fourth goal of this strategy states that African countries must support the development of a critical mass of ICT skills required by the knowledge economy, notably by establishing a network of ICT centers of excellence in each subregion and ICT capacity building and training centers in each country, with the aim of achieving a broad network of interlinked physical and virtual centers, while ensuring coordination between academia and industry by 2015.

The strategy's fifth goal states that African countries must adopt a national e-strategy, including a cyber-security framework, and deploy at least one flagship e-government service as well as e-education, e-commerce and e-health services using accessible technologies in each country by 2012, with the aim of making multiple e-government and other e-services widely available by 2015. The project seeks to understand how these e-services will be used in the near future by studying actual patterns of use and the needed skills for efficient use.

Source: AfDB 2013.

Both ICT development (increased infrastructure and access) and ICT for development (adoption of ICT applications) have contributed to advancing the process of development—facilitating the delivery of services, such as education, health, better governance (on the parts of both the leadership and the governed), enterprise and business development.[15] Some European Union officials claim that new ICTs constitute "time portals" that will bring modernity to the people of the developing world.[16] Mobile phones are also thought to help promote democracy through delivery of voter education,[17] and to reduce corruption.[18] Others argue that these technologies enable economic "catch-up" through technological leapfrogging.[19]

Building e-skills in Africa has several socioeconomic impacts. Instead of listing them all, we discuss four main issues related to human capital formation.

Building e-skills improves youth employability

Today, most organizations require their employees to have a minimum level of e-skills. Economies in Africa, especially their private

sectors, will have to be ready to deal with this, particularly as African countries are facing a mismatch in the labor market for these services (shortage of ICT and related skills, and surfeit of lower-quality skills). Ensuring plentiful e-skilled workers in Africa will both benefit from and contribute to the Internet and the knowledge economy more widely. Africa needs entrepreneurs able to create e-businesses. Labor market characteristics have changed in recent years, and e-skills are becoming fundamental to workers' employability, especially among the youth.

With a demographic boom over the coming years Africa will have the opportunity, if these youth are e-skilled, to benefit from ICT and to produce services linked to the sector. Although the continent is right now facing youth employment problems, ICT may become a key source of growth and fount of democracy if youth has not only access to ICT but also the necessary e-skills. Rapid training can also stimulate creativity among African youth, whether formal or informal.

Africa needs more ICT practitioners partly because Africa imports e-services at a high cost. According to the Organisation for Economic Co-operation and Development, advanced ICT users have many of the same skills of highly qualified ICT workers and may get jobs not just in their fields but also in ICT because of their e-skills. By fostering the e-skills of its citizens Africa will have a new means to fight high youth unemployment.

Having e-skills increases the probability of employment in Africa (table 11.2). "Agricultural contract workers in South Africa are, for example, often required to have a mobile phone."[20]

E-skills for women's socioeconomic inclusion

The Millennium Declaration (2000) resolved to promote gender equality and empowerment of women as effective ways to combat poverty, hunger and disease, stimulate development that is truly sustainable and ensure that the benefit of new technologies, especially ICT, are available to all. The Agreed Conclusions in 2003 of the 47th session of the UN Commission on the Status of Women (on the participation and access of women to the media and ICT, and their impact on and use as an instrument for advancing and

Table 11.2 **ICT and employability in Africa (%)**

Country	Using a mobile phone helps me find a job	Listening to the radio helps me find a job	Watching TV helps me find a job
Benin	51.6	13.0	6.5
Botswana	68.4	36.7	34.0
Burkina Faso	54.2	40.0	23.8
Cameroon	38.0	23.7	21.7
Côte d'Ivoire	5.2	6.7	6.3
Ethiopia	35.9	2.8	4.5
Ghana	58.3	5.1	6.0
Kenya	69.5	41.1	35.3
Mozambique	44.9	18.8	30.9
Namibia	74.7	50.0	13.2
Nigeria	37.7	6.0	6.7
Rwanda	50.7	19.5	34.3
Senegal	47.7	4.0	2.8
South Africa	55.3	35.5	27.3
Tanzania	52.3	22.5	19.5
Uganda	54.7	25.5	15.6
Zambia	38.3	22.4	27.0

Source: Schmidt and Stork 2008.

enhancing women) states that "ICT offer tools for enhancing women's full access to the benefits of information and new technologies."[21]

ICT provides tools that can provide women with access to lifelong learning, education and training (see chapter 25). Neglecting to give women access to these tools not only deprives them and their families of income but also reduces the skills pool of the nation, limits productivity and bars a country from being competitive globally.[22]

E-skills increase the health dividend

ICT provides a powerful opportunity to improve service delivery by overcoming the geographic and financial barriers that hinder service delivery in remote areas. E- and m-health in most developed countries are improving health sector efficiency and people's health. It is also crucial in fighting epidemics and disseminating general information on public health and in managing health institutions more efficiently. Finally, ICT offers new ways of delivering health services online, cutting costs and keeping dispersed health workers abreast of the latest developments (see chapter 12).

These developments may be summarized under patients and providers. Patients—African citizens—need basic e-skills to understand and use these e-health services. The Internet is a huge location for accessing medicines, drugs, health services and care. Yet people do not need a prescription to buy some drugs and medicines, which is worrying as they may harm health. And so citizens must have basic e-skills to benefit from these e-services. E-skilled citizens can also access a country's health strategy, use e-government services (such as online appointments) and discover information about sanitation in general.

Providers—African health staff—need the basic e-skills to update their knowledge and fully use the more technical aspects of ICT, once again pointing to the key issue of e-skills rather than access. As with patients, health staff and doctors may misuse the technologies if they lack e-skills. The performance of program managers, staff of health ministries and administrative personnel also depends on their e-skills.

Building e-skills helps Africa achieve economic transformation

ICT is a "general-purpose" technology—it has no specific purposes initially and is pervasive in that it can be used by any person or any sector.[23] Later, it needs to be adapted to local contexts and to meet the needs of local populations.[24] While most applications, software, hardware and other devices are produced in a few countries, their efficient use must be adapted to local populations, which requires people to have the ability to use them fully—they must be e-skilled, and integrating indigenous knowledge into innovation systems demands an e-skills strategy.

Africa needs to build its own capacity to create and manage e-services for its productive sectors, but faces huge shortages and mismatches for three linked reasons. First, higher education is poorly oriented toward these e-skills and cannot produce the required number of graduates in the near future (see chapter 17). Second, Africans who are qualified ICT specialists are leaving for better jobs in America, Asia and Europe. The brain drain is particularly worrying among ICT specialists. Third, African enterprises are unable to carry out the required vocational training, and some multinationals are curtailing investment plans because of a poorly prepared ICT workforce (box 11.3). Training such a workforce is thus a priority for most African countries.

By extension, ICT has a major role in good governance and political involvement of citizens. E-skilled people are better able to access the latest (and often better) information, to blog and to take part in social media, expressing their opinions and giving feedback to politicians. ICT was fundamental to the Arab Spring and could well enhance democracy and allow people to project their liberties more. Democracy and good governance in Africa need more e-skilled persons. Building e-skills in Africa will also allow governments to tackle the governance challenge.

Box 11.3 Statement by the CEO of ST Microelectronics, Tunisia

We are unable to develop more complex services and products nowadays in Tunisia due to the lack of a high-level e-skilled workforce. We employ Tunisian engineers for three or four years in our companies, but at the end when they have the necessary skills they quit Tunisia for Europe. Most European ICT firms offer higher salaries and better conditions. We faced this several times and we cannot develop more complex R&D services due to this situation and to the lack of e-skills. Nowadays, several ICT companies have pooled their resources and created training courses with a private institute outside the higher education system in order to have a high-level, e-skilled workforce in Tunisia. Tunisia's situation is not a special case.

Source: Author interview.

Strategies for building e-skills in Africa

A fundamental point of departure in discussing the building of e-skills through education is the recognition of the schism in classifying contemporary society into the digital generation and an older, non-digital generation. The Joint Information Systems Committee (2011) of the United Kingdom, in setting its agenda for e-skills development there, categorized its target population similarly but sometimes with a different nomenclature: the "Google generation" and the "non-Google generation."

The digital or Google generation refers to the younger generation who have acquired basic e-skills along with basic literacy skills from inception of their educational career. The non-digital or non-Google generation refers to those who found the ICT world thrust forcefully on them with greater degrees of intrusion on their daily activities.

The fundamental business skills and advanced e-skills now belong to the realms of formal education and literacy development. A wide range of curricula, pedagogical materials and delivery media have evolved with the advancement of ICT for upgrading these skills at various levels of the formal, three-stage cycle (primary, secondary and higher education). The younger Google generation find themselves with mobile phones early in life, use computers for leisure, send text messages, post pictures on Facebook, search for videos on YouTube and chat in multiple social media platforms—all modern societal norms. Thus where e-skills are not formally inculcated in their school curriculum, they tend to acquire the requisite skills through peers and by regular and constant practice. The basic e-skills required by the non-Google generation are, however, more difficult to establish.

Building e-skills through nonformal education

The fundamental challenge in establishing the curriculum for basic education lies in identifying what those skills are. Intel, however, as part of its corporate social responsibility, has achieved significant progress in this respect with its "Easy Steps" program.[25] The program defines basic e-skills by ability in understanding the fundamentals of computing; having basic word processing, spreadsheet and presentation skills, and navigating the Internet.

It proceeds from that definition to develop an intuitive website to guide users in acquiring the skills through formal community centers or, for the more discerning ones, through systematic interactive online sessions with elaborate online support. The Intel basic e-skills program has been adopted in several Asian countries including Sri Lanka and India. In India the program has been integrated into a national digital literacy scheme that parallels their equivalents in Europe. The Intel scheme, beyond the basic literacy level, includes an online curriculum for developing websites, designing business cards and engaging in online collaboration, as part of its next level of promoting business e-skills.

Building e-skills through formal education

A wide range of tools, applications and digital content are available for students and teachers, and requires the skills mentioned above. Beyond that, states should consider the following:

Ensuring total connectivity at school

The first step is to ensure that connectivity and equipment in schools and universities are progressing, enabling more frequent classroom interactions and generating e-skills among learners (box 11.4). Public policies, the market and technological changes are resolving the access problem. African countries are showing great interest in ICT for education and are bridging the equipment gap with huge public investment and initiatives. The market, through competition between firms and technology providers, has ensured a steep fall in ICT prices, enabling schools and learners to be better equipped. Finally, technology is evolving, permitting applications and less costly equipment (such as cloud computing).

Shifting toward a learner-centered model and not a teacher-centered approach

ICT use at universities enables a switch from a teacher-centric pedagogy to a learner-centric one.[26] Moving from the Socratic, face-to-face, 2,500-year-old model of education to a more interactive and active learning is the first step in building e-skills. This requires a change of student and teacher behavior and organization. In fact, teachers need to acquire new skills and learn their new roles. They require enhanced confidence, as their beliefs about technology are a major obstacle for ICT classroom use. "If teachers are not confident in their ability or competence to handle computers, this may hamper their willingness to introduce technology in their classrooms."[27] Students are autonomously exploring new technologies and are accessing digital education contents outside the classroom. Teachers need to take advantage of these new forms of learning by strengthening e-skills of students so that they absorb learning informally. These new roles for teachers must be included in their curricula, and they must have special training.

At the same time there is a need to ensure active learning where the behavior of students changes toward autonomy, problem solving and involvement. The engagement of students in active learning and problem solving through ICT is a key to pedagogically successful use of ICT and building e-skills.[28] Involving more students by using these tools and improving ICT uses is a first step toward better performance in terms of e-skills. Different learning strategies ought to be implemented to increase student autonomy and involvement in classroom interactions. A large part of the learning process becomes centered on interactions outside the classroom where the student involvement is central. These changes can be observed through the change of the student behavior relating to the time spent on the Internet for pedagogical purposes and of the enrollment in more courses related to ICT.[29]

Box 11.4 NEPAD e-Africa Commission

NEPAD is a vision and strategic framework for Africa's renewal. The NEPAD e-Africa Commission was created to promote ICT development in Africa. The Commission (with African governments) has identified ICT skills development as a key priority, and has established the NEPAD e-Schools Initiative. This aims to impart ICT skills to teachers and students in primary and secondary schools in Africa, harnessing technology to improve, enrich and expand their education and to make every learner ICT literate. Over a 10-year period the initiative seeks to develop all African schools (estimated to be in excess of 600,000) into NEPAD e-Schools. These schools will be provided with necessary infrastructure and ICT equipment, and will have teachers that are trained and with access to applications and digital content, to ensure that ICT plays a meaningful role in enhancing education and health.

It is a multicountry, multistakeholder initiative to:

- Equip more than 550,000 African schools with state-of-the-art computers and curriculum-relevant learning materials.
- Connect the schools to the Internet by 2020.
- Teach ICT skills to young Africans in primary and secondary schools.
- Provide teachers with ICT skills to enable them to use ICT as a tool to enhance teaching and learning.

Several African countries have already made this shift, or are attempting to set strategies for changing the pedagogical approach. But more action is needed to have an observable impact on building e-skills and improving learning outcomes.

Changing the organization within education systems

Organizational change within schools and universities fosters e-skills acquisition and prepares prospective workers for new practices in firms. These changes tend to improve the employability of students and increase their future wages. ICT facilitates educational collaboration between individuals and groups of people, which may take place locally or in separate geographic locations. Students may collaborate with peers in other schools, teachers may collaborate with their peers, and members of the local business community may serve as mentors to students, and so forth. According to Thijs and others (2001), there is a move from a traditional pedagogic organization to an emerging pedagogic organization (in the information society) based on an active, collaborative, creative, integrative and evaluative learning. This requires educational organization based on active learning with different activities, which are determined by learners in small groups and where pace is determined by learners individually. By contrast, in the classical way of teaching, there is little variation in activities: they are prescribed by the teacher in a whole class instruction, and pace is determined by the program.

Africa needs strong change in the organization of its education system and activities—a necessary condition for improving outcomes.

Promoting ethics in ICT use

One key result in integrating ICT in education is the fact that students acquire new e-skills and further develop their initial competencies. Understanding successful use of ICT in higher education and its implications has great practical relevance for long-term strategic pedagogical planning of technology implementation in education.[30]

Building e-skills through lifelong learning and professional training

While most African businesses lack professional training, the professional training that is offered ignores e-skills and their importance. Many scholars have found that African enterprises are bridging the divide in ICT equipment, but that effective use is still very weak—often because they lack skilled workers. Emphasizing these skills in professional training seems one of the main components of an e-skills strategy.

Meeting the e-skills demand in the marketplace

Another way is to substantially increase the number of degrees and training dedicated to ICT. There is no systematic evaluation of the required ICT skills in the African private sector but a comparison with Europe is highly informative. The European Commission has predicted that there will be 900,000 unfilled ICT vacancies in Europe by 2015, as employers struggle to find staff with the required skills. The European Union, with a strong education system and massive professional training, is lacking skills in this particular domain.

The picture is at least of the same magnitude in Africa. There is a need to train millions of skilled people in the next few years to fully exploit and contextualize these technologies. For example, billions of applications are now made by users of mobile devices worldwide. Each application has, in general, its own "context" and particular aims. Few applications are made by Africans for Africans. South Africa is leading the continent by setting a specific strategy aiming at promoting the development of these m-applications. Nigeria, Morocco and Tunisia are close behind—but most African countries still need to pick up.

Universities are the main supplier of e-skills demand in the marketplace. Universities have the responsibility not only for the qualitative aspects of e-skills needed but also to adapt and provide solutions for the increasing scarcity of ICT professionals within the market. The foreseeable lack of e-skills in a few years shows that universities and

policymakers are far from agreeing on what actions are urgent. In some countries the supply and demand disequilibrium of ICT students is expected to deepen even more dramatically as the number of ICT students continues to climb only marginally, or in some cases even drop. This contradicts the general trend for higher salaries and elite status of ICT graduates.

The different approaches of universities and industry to the graduate skills required widen the gap between what universities offer and what industry needs. Industry has pragmatic goals and expectations, looking for young employees immediately employable and functional without much additional investment in training. So, they would like to influence curricula and make them more practical and relevant. Industry would like to identify the most promising students and potential employees in advance. An appropriate preliminary selection of graduates would greatly lower industry's risk in investing in new employees—in many companies the main objective in their relationship with universities.

Attracting high e-skills profiles to African ICT technoparks and areas of innovation

As an industry with short technological cycles, the ICT industry is particularly appropriate for lifelong learning. This is essential for e-skills competence building and certification, as businesses face the need to respond to the shortening of the technology life-cycles in ICT and the accompanying obsolescence of related knowledge, skills and competencies of their employees. This opens new horizons to work based on nonformal learning. Updating professional training through a continuous educational process is not always undertaken by universities of most African countries, with some noted exceptions.

Most African countries are also building technoparks and areas of innovation dedicated to ICT applications (see chapter 14). While the agglomeration effect is very important for networks of innovators, most of these technoparks remain in an early stage. In fact, there is a need to have the best facilities in the country in these areas. These areas need to attract the best entrepreneurs in these sectors and to offer them the required incentives.

Many multinationals firms like Microsoft, Apple, Blackberry, Orange and so on are developing specific programs within these areas of innovation.

Yet developing e-skills through the education system alone will not capture the full ICT dividend. The three main messages from the literature of the last two decades that investigated firms' productivity gains after investing in and using ICT are: first, investment in ICT is not enough to make productivity gains (the "Solow Paradox"[31]); second, organizational change is complementary to ICT investment, and can improve firm efficiency and productivity; and third, investment in ICT needs to be accompanied by human capital investment (e-skills) to foster productivity.[32]

Generalizing e-skills training for Africa's workforce

Most African firms lack the resources to invest in general training in e-skills, even though workers need to know how the technology works and to explore its possibilities. This process must be generalized to all employees, not just top management (as was the approach several years ago). Most workers explore the technology by themselves outside working hours, and often by trial and error—the process is not well structured.

ICT and new organizational practices like teamwork and project management, adopted together, offer complementary impacts on firm performance.[33] To foster corporate ICT use, Africa needs to adopt such practices and foster employees' e-skills inside the firm. These organizational practices also need skills like problem solving, critical thinking and multitasking. Since much ICT is collaborative, it readily allows for such organizational change, helping make economies more efficient. E-skills have a strong effect on worker behavior. A new strand of research shows that e-skills improve performance, while ICT investments and new organizational practices may motivate workers, partly through self-improving behaviors outside the firm's time. Firms need more autonomous workers with

the ability to take the initiative and to be fully involved in their job.

Fostering social uses of ICT for an inclusive society

Acquiring e-skills is fundamental to all citizens in life. Mobile applications are now widely developed in Africa. They are affecting financial transactions (such as M-Pesa in Kenya), public health, education, labor and leisure. Ensuring equal access to these applications by all citizens needs specific programs and training for disadvantaged populations. While young people can build e-skills in their schools and workers in their workplaces, disadvantaged people may have less chance to be trained in these technologies and thus be excluded from the digital world. Social inclusion programs therefore need to address this challenge and to set specific programs for disadvantaged populations.

Promoting e-administration and e-governance applications

The more people use these technologies the more they can explore their potential and master their use. Since these e-skills are transferable, acquiring them in social life leads to greater use in professional life. Promoting e-administration and e-governance applications implies that all the population will need to use these technologies. Cooperative learning and transfer of skills may occur between the components of society. Service delivery must use ICT as much as possible. Generalizing ICT use in public affairs, especially in social service delivery, will help. In turn, greater use of e-governance systems helps people acquire e-skills. The good news is that African countries are developing their e-applications in these areas (see chapter 28).

Making mobile broadband more affordable

Despite these good intentions and the need to move beyond access to skills, without such access skills are irrelevant. A regional comparison highlights that mobile-broadband services remain largely unaffordable in Africa, where the price of a computer-based plan with 1 GB of data volume averages more than 50% of monthly gross national income (GNI) per capita (table 11.3). In the Arab States and Asia and the Pacific by contrast, postpaid handset-based services are relatively affordable, accounting for 2.2% and 3.5% of monthly GNI per capita, respectively; prices in the Americas and Commonwealth of Independent States remain relatively high (5% or above of monthly GNI per capita) for all mobile-broadband services. And even mobile phone ownership is lower in Africa than other regions (table 11.4).

Promoting digital literacy for rural Africans

Urban Africans are more likely than rural Africans to use ICT and have e-skills. To reverse this digital divide and ensure social inclusion, specific training sessions and access to ICT are required in rural Africa. Governments are the catalysts that can influence the universities–ICT industry relationship, as a high number of African universities are public universities. More, governments can go far beyond being only catalysts in the education system with industry: their regulatory role should maintain and support an educational infrastructure that provides enough educated people for all social and economic

Table 11.3 Price of mobile-broadband services by region, early 2013 (% of GNI per capita)

Service	Europe	Arab States	Commonwealth of Independent States	Americas	Asia and Pacific	Africa
Prepaid handset-based (500 MB)	1.1	5.7	5.7	5.9	5.9	38.8
Postpaid handset-based (500 MB)	1.1	2.2	5.6	5.0	3.5	36.2
Prepaid computer-based (1 GB)	1.9	7.4	7.6	11.1	12.6	58.3
Postpaid computer-based (1 GB)	1.2	2.5	7.4	8.0	10.6	54.6

Source: ITU World Telecommunication/ICT Indicators database.

Table 11.4 **Mobile phone ownership (per 100 people)**

Region	2005	2006	2007	2008	2009	2010	2011	2012	2013
Africa	12.4	17.8	23.5	32.4	38.4	45.7	53.6	59.8	63.5
Arab States	26.8	38.8	52.6	63.0	76.2	87.7	96.4	101.6	105.1
Asia and Pacific	22.6	28.8	37.1	46.6	56.3	67.7	77.3	83.1	88.7
Commonwealth of Independent States	59.7	81.8	96.1	112.2	127.5	135.1	147.0	158.9	169.8
Europe	91.7	101.2	111.7	117.2	117.0	117.6	120.1	123.3	126.5
Americas	52.1	62.0	72.1	81.5	88.0	95.0	101.4	105.3	109.4

Source: ITU Statistics (www.itu.int/ict/statistics).

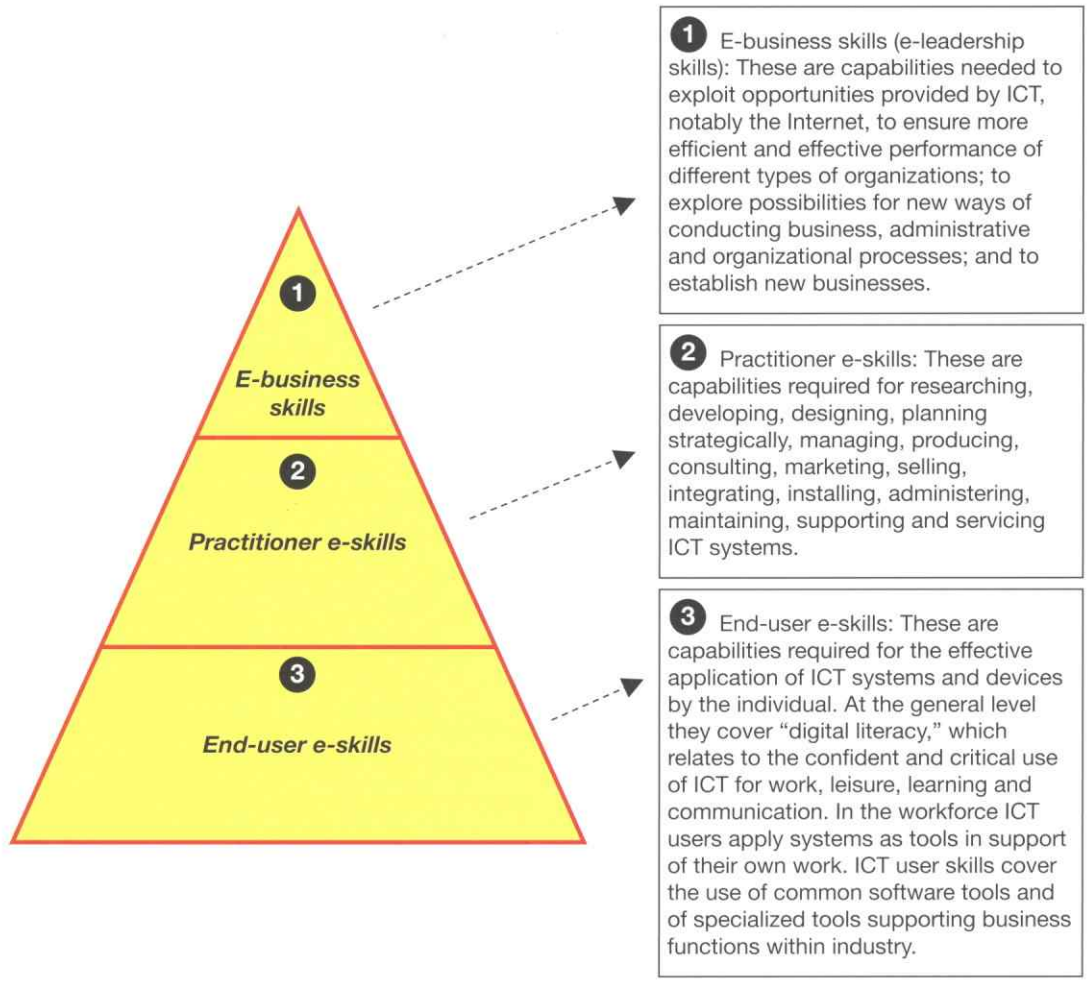
needs. Governments can indeed dramatically change university–industry relations with focused incentives.

Conclusions

Africa must build its e-skills—and soon—to foster its economic growth and social inclusion. African leaders in Cape Town committed themselves to a connected future with fast-tracked broadband penetration of 80% of African citizens by 2020. Incidentally, Africa is now ringed by huge terabytes of optical fiber broadband capacity. The next challenge is to extend these capacities inland as arteries of "last mile" broadband access—necessary to ensure sustainable growth and prosperity, especially among the poorest of the poor and often through small and medium enterprises. However, such investment also needs to build the required e-skills, which are not only technological but also the more general skills of critical thinking and teamwork.

E-skills can be built in Africa through three main strategies: changing the education model (targeting teachers and boosting their ICT confidence); giving general training at African firms (which requires strong finances and investment in organizational change); and improving the capacity of citizens to acquire e-skills and develop more social applications. In this way, the potential that ICT offers Africa can be captured, helping the continent move from just consuming ICT to developing it.

Annex 11.1 The three groups of ICT skills (European Union)



Notes

1. Yonazi and others 2012.
2. EIU 2009.
3. Schmidt and Stork 2008.
4. The terms e-skills, digital literacy and ICT skills are often used interchangeably.
5. Carvin 2000.
6. Larsson 2002.
7. Soby 2003.
8. Kwan 2001.
9. Danielson 2003, Park and Kim 2000.
10. Steyaert 2002; van Dijk 2005; van Deursen and van Dijk. 2010.
11. von Hippel 2005.
12. EIU 2009.
13. Schmidt and Stork 2008.
14. Tcheng and others 2007.
15. Okpaku 2006, p. 153.
16. Graham 2011.
17. Aker, Collier and Vicente 2011.
18. Bailard 2009.
19. Okpaku 2006.
20. Schmidt and Stork 2008.
21. www.un.org/womenwatch/daw/csw/47sess.htm.
22. Dlodlo 2009.
23. Bresnahan and Trajtenberg 1995; Helpman 1998.
24. Antonelli 2003.
25. www.intel.com/content/www/us/en/education/intel-easy-steps.html.
26. Ben Youssef, Ben Youssef and Omrani 2013; Keengwe, Onchwari and Onchwari 2009; Saulnier and others 2008.
27. Mooij and Smets 2001.
28. Barak, Lipson and Lerman 2006.
29. Ben Youssef, Dahmani and Omrani 2013; Ebner and others 2010; Sivapalan and Cregan 2005.
30. Jonassen and others 2005; Nicol and MacLeod 2005.

31. Solow 1987.
32. Ben Youssef, Hadhri and M'henni 2011; Hollenstein 2004.
33. Askenazy and Caroli 2010; Bresnahan, Brynjolfsson and Hitt 2002; Brynjolfsson and Hitt 2003; Garicano 2010; Garicano and Hubbard 2009; Ichniowski, Shaw and Prennushi 1997; Melville, Kraemer and Gurbaxani 2004.

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PART II

Innovative Business Models for Building Human Capital

CHAPTER 12

Investing in Africa's health

Laurence Lannes, Feng Zhao, Caroline Jehu-Appiah, Mona Sharan and Nejmudin Bilal

Africa faces three main challenges in health: ensuring good health during climate change and increased urbanization, improving availability and quality of key inputs and safeguarding sustainable, efficient and equitable health financing—in addition to achieving the Millennium Development Goals (MDGs).

Climate change and urbanization have huge effects on health system development. Weak health systems and institutions—including poor financing systems and inadequate human resources for health—hamper the capacity to respond quickly to emerging challenges. Insufficient domestic spending (partly due to high external aid levels) and inefficiencies in resource spending have constrained sustainable health financing.

This chapter proposes four areas for investment in health to address these challenges. First is investing in the post-2015 agenda, including equity considerations and climate change. Second is promoting health as a productive sector to improve competitiveness and employment opportunities. Third is building social infrastructure to improve service delivery and address risk protection, inclusion and social cohesion. Fourth is investing in skills development and technology to build the human capital needed for healthy populations and to improve the quality of Africa's human capital.

Overview of Africa's health challenges

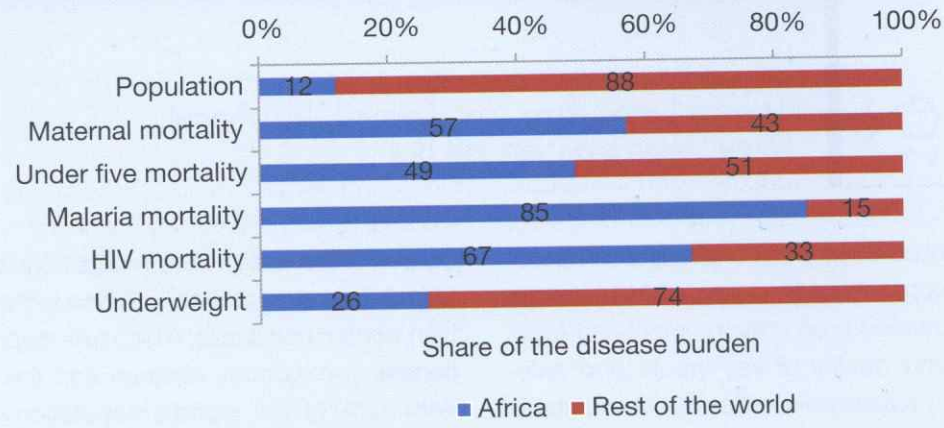
Reaching the MDGs

As 2015 approaches, Africa's progress toward the MDGs has generally been positive, though mixed across indicators and countries. But the overall pace of progress is insufficient to achieve the MDGs on time.

Burden of diseases. A key impediment to sustained, inclusive growth in Africa is the very high burden of disease, which falls disproportionately on women, children and the poor. With 12% of the world's population, Sub-Saharan Africa accounts for 57% of maternal deaths, 49% of under-five child mortality and 67% of HIV/AIDS cases (figure 12.1).[1] The high burden of disease has a direct economic impact. Where malaria or HIV/AIDS is endemic, labor productivity and investment remain low. The World Health Organization (WHO) calculates that the average tuberculosis patient loses three to four months of work and up to 30% of yearly household earnings; households lose about 15 years' income if a member dies of tuberculosis.[2] Malaria causes substantial economic losses and can lower GDP as much as 1.3% in countries with high transmission levels. Over the long term these aggregated annual losses have resulted in substantial differences in GDP between countries with and without malaria, particularly in Africa.[3]

Child mortality. Sub-Saharan Africa witnessed unprecedented declines in child mortality over the past two decades. The average child mortality rate decreased from 174 per 1,000 in 1990 to 121 in 2010 and the rate of decline has increased from 1.9% a year over 1990–2000 to 2.5% over 2000–2010.[4] There is an accelerated decline in child mortality in 34 countries of the region; the rate of decline increased during the MDG period from 2000 compared with the previous decade. East and Southern Africa have achieved larger gains than Central and West Africa. Angola, Ethiopia, Eritrea, Liberia, Madagascar, Malawi, Niger and Rwanda have experienced steep declines from 1990 to 2010.

Figure 12.1 **Africa bears a disproportionally high disease burden compared with its share of the world's population, 2009**



Source: Adapted from Kinney, Lawn and Kerber (2009).

Preventive care interventions have resulted in major gains in child survival, but curative interventions have low coverage. Some of the biggest gains in child survival in Sub-Saharan Africa have been attained by increasing childhood immunization coverage and decreasing malaria-related mortality. But medical treatment for childhood illnesses remains less than optimal in most countries. Treatment rates for acute respiratory infections and diarrhea (both major causes of infant mortality) are very low and show little to no improvement over time.

More broad-based strategies are needed for strengthening health systems to improve access to treatment for childhood illnesses and to expand community-based interventions for caring for sick newborns—the next frontiers in improving child survival.

Maternal mortality. Sub-Saharan Africa has the world's highest burden of maternal mortality, and progress in reducing it has been slow. The maternal mortality ratio in Sub-Saharan Africa (500 deaths per 100,000 live births) far exceeds the global average (210). From 1990 to 2010 the maternal mortality ratio in Sub-Saharan Africa declined 41%, less than in North Africa (66%), South Asia (64%) and East Asia (69%)—and the same as in Latin America and the Caribbean (41%). Increasingly larger numbers of women in Africa are giving birth in health facilities and are using skilled attendants instead of traditional birth attendants for delivery care. The level of antenatal care and skilled delivery care utilization in many African countries surpasses those observed in other developing regions such as South Asia.

Although Sub-Saharan Africa has increased use of maternal health care, maternal mortality has not declined correspondingly. This discrepancy suggests deficiencies in quality of care. Access to maternal health services remains a challenge in many countries. Lack of access to these services tends to be especially acute in rural areas and urban slum communities. Cost of services, geographic access and cultural barriers are major constraints that prevent women from seeking care.

Reproductive health. Family planning has been neglected, though evidence shows strong correlations between contraceptive use and lower child and maternal mortality. Sub-Saharan Africa has the world's highest fertility rate and a correspondingly high unmet need for family planning. Family planning use, increasing in several parts of Africa, contributes to reducing maternal mortality. Family planning improves maternal health and survival by reducing the number of births women have and averting high-risk births, for example, among younger women. Contraceptive use averted 92,752 maternal deaths

in Africa alone, accounting for nearly a third of the total maternal deaths and an additional 59,000 maternal deaths that could be averted in Sub-Saharan Africa if the unmet need for contraception were met.[5] Malawi, Madagascar, Namibia, Tanzania and Zambia, currently increasing rates of family planning use, are expected to further reduce maternal mortality over time. The average number of births per woman in the region has declined only modestly, from six in 1990 to five in 2010.[6]

Communicable diseases. Progress on reducing disease prevalence has been more encouraging, but challenges remain. HIV incidence in Africa steadily declined over 1990–2009, from 0.57% to 0.40%, but Sub-Saharan Africa remains the most heavily affected region, accounting for 69% of new HIV infections, 68% of people living with HIV (including more than 90% of children living with HIV) and 72% of AIDS deaths.[7] Since HIV prevention interventions and highly active antiretroviral treatment have lowered mortality rates, more people now live with HIV, but they require lifetime access to treatment. HIV programs thus have to prioritize treatment for people living with HIV, and reaching at-risk populations and newly infected individuals remains a formidable challenge. Despite success in scaling up access to treatment to more than half the people eligible for highly active antiretroviral treatment in Sub-Saharan Africa by 2011, countries such as Uganda are beginning to witness a rise in new HIV infections. Moreover, with more than 80% of people living with HIV in Sub-Saharan Africa coinfected with tuberculosis, the emergence of multidrug- and extremely drug-resistant strains poses new challenges for overburdened and underresourced health systems.

The acceleration of malaria prevention strategies such as insecticide-treated nets has reduced malaria incidence and mortality. Further expansion of such successful programs will be necessary to sustain improvements.

Noncommunicable diseases. New health challenges are emerging in Africa. Despite the unfinished MDG agenda and the continuing burden of infectious diseases, malnutrition and maternal mortality and morbidity, new challenges are emerging as a result of rapid urbanization, the demographic transition and climate change. Noncommunicable diseases (NCDs) kill more people than do infectious diseases in low- and middle-income countries. According to the WHO, NCDs were responsible for 63% of deaths (36 million) worldwide in 2008—and nearly 80% of them (29 million) were in low- and middle-income countries, dispelling the notion that such conditions are mainly a problem of affluent societies. Without action, NCDs will be responsible for 52 million deaths a year by 2030. Worldwide, deaths due to communicable diseases occur disproportionately among people in the poorest quintile (60%), compared with people in the richest (9%), while the opposite is true for deaths due to NCDs (31% among people in the poorest quintile and 84% among people in the richest).[8]

Africa still sees more premature deaths due to infectious diseases than deaths due to NCDs, but the prevalence of NCDs is rising rapidly. Although in Africa the people in the richest quintile are the most affected, it is likely that the burden of premature death and disability from NCDs will increasingly fall on the people in the poorest quintile.[9]

Inequalities in health outcomes. Inequality in health outcomes by socioeconomic quintile is prevalent and widening in some countries. Poverty tends to be a major barrier to women's use of health services in Sub-Saharan Africa. Inequality in maternal health services tends to be high, with women in the poorest quintile least likely to receive care during pregnancy and childbirth. In Sub-Saharan Africa only 30% of women in the poorest quintile receive professional medical care during delivery, compared with 85% of women in the richest quintile, and the under-five mortality rate of the poorest quintile averages 1.65 times that of the richest quintile.[10]

Inequality in health is also patent for communicable diseases. A greater emphasis is needed on reaching the poorest to reduce inequity in health.

Ensuring good health in the context of climate change and increased urbanization

The changing environmental landscape in Africa presents a major threat to inclusive and green growth, poverty reduction and health. Africa is particularly vulnerable to the effects of climate change and urbanization on health and nutrition. African countries will need to adapt and mitigate the risks related to climate change to ensure that improvements in health outcomes and nutrition status are not jeopardized. Sustainable policies in household energy, electricity, agriculture, nutrition, transport, water and sanitation, and infrastructure could have a large positive impact on the burden of disease.

Climate change

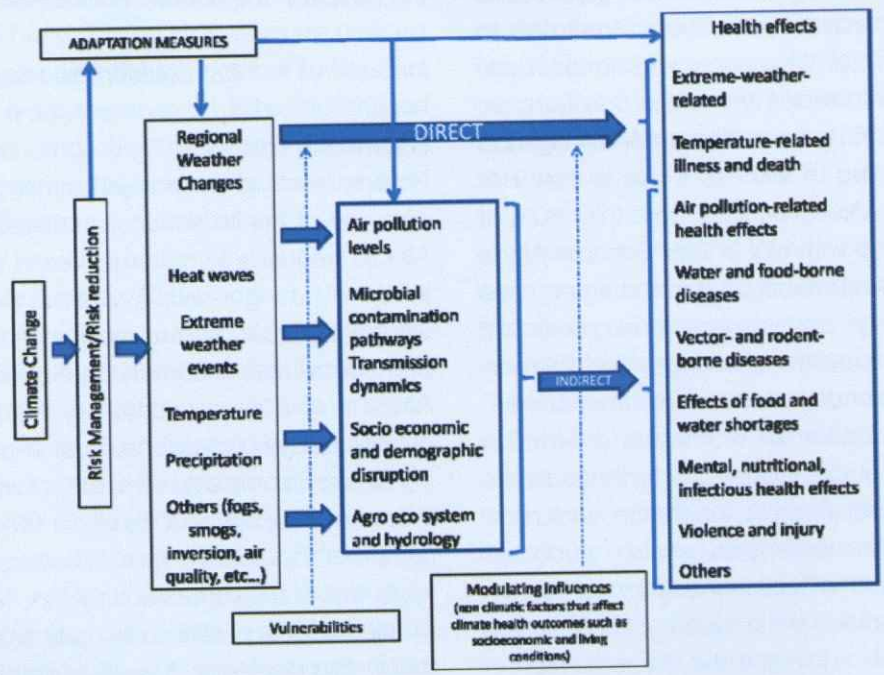
Climate change and variability are projected to increase threats to human health, safety and survival through impacts on food yields, increased water-, food- and vector-borne diseases, conflict and displacement (see chapter 4).[11] Both direct and indirect effects are expected (figure 12.2). Many of the major killers in Africa are climate sensitive: malaria, meningitis, dengue, cholera, diarrheal diseases and other infections carried by vectors.

Climate change could increase the population at risk of malaria in Africa by 170 million by 2030[12] and the global population at risk of dengue by 2 billion by the 2080s.[13] Some of the major epidemics in Africa, notably meningitis and cholera, occur seasonally and are often associated with high morbidity and mortality. For example, between 2004 and 2009, 93% of reported cholera deaths globally were in Africa.[14]

Human health is a central concern in climate change, and climate change should not be considered simply an environmental or development issue. Addressing climate change should be viewed as much as an effort to improve human health and well-being as an effort to protect the natural environment or economic development. An effective and globally equitable approach to climate change mitigation and adaptation is essential to advance global health.

More sustainable policies are needed on household energy, electricity generation, agriculture and nutrition, transport, and the infrastructure that could substantially reduce

Figure 12.2 Health and climate change



Source: Adapted from Patz and others (2000).

major burdens of disease. Support for health adaptation, through sectors such as agriculture and water, is essential to protect populations in the short to medium term, while mitigation is essential to safeguard the services that ecosystems provide to support global health over the long term.

Urbanization

According to UN-HABITAT, African urban populations will more than triple over the next 40 years. Between 1990 and 2010 Sub-Saharan Africa experienced the fastest annual urban growth rate in the world (3.9%), a pattern set to continue. At least 33 African cities have a population of more than 1 million. In Sub-Saharan Africa 71.8% of urban dwellers live in slums, the highest proportion in the world.[15] Rapid unplanned urbanization brings health challenges and is often associated with poverty, environmental degradation and population demands that outstrip service delivery capacity (see chapter 3).

Urban health hazards and associated health risks include substandard housing, crowding, air pollution, insufficient or contaminated drinking water, inadequate sanitation and solid waste disposal services, vector-borne diseases, industrial waste, increased motor vehicle traffic and stresses from poverty and unemployment. A study conducted in the slums of Nairobi revealed not only high under-five mortality rates, but also increasing overall mortality rates.[16] Under-five mortality (151 deaths per 1,000 live births) was 35% higher in the slums than in rural areas of Kenya and 2.5 higher than the average for Nairobi. Vaccination coverage was 25% lower and incidence of common childhood diseases two to three times higher in slums than in rural areas. Urban outdoor pollution in Africa is responsible for an estimated 49,000 premature deaths annually.[17]

Over the coming decades the effects of climate change and urbanization will interact and increase disease burdens.[18] In planning public health interventions in Africa, one must consider the dynamic relationship between climate change and urbanization and their impact on vulnerable populations.[19] Addressing urban health risks and concerns requires more effective partnering across sectors, including the environment, housing, energy, transportation and urban planning. Promoting good urban planning and governance, exchange of best-practice models and stakeholder partnerships will be critical in dealing with the health risks of urbanization.

Improving availability and quality of key inputs

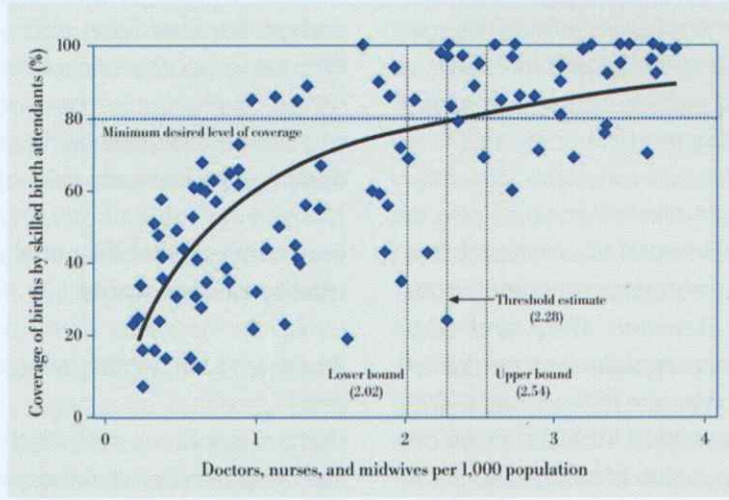
Addressing the human resources for health crisis

Human resources for health are central to health system performance and a key determinant of people's health, as an essential component of building responsive and efficient health systems. Health workers undertake, plan, resource, mediate and implement most health system functions. They have a central role in diagnosing and analyzing the population's health priorities and in choosing health policies and national treatment protocols. The majority of health system financing goes to pay for health workers, who make or influence most other spending decisions (through prescriptions, referrals and equipment purchase).[20] The evidence demonstrates the importance of skilled, motivated and supported health workers to improve health outcomes and to affect the wider socioeconomic development agenda (figure 12.3).

Africa is disproportionately affected by an acute shortage in numbers, as well as maldistribution and ineffective management of its health workforce, especially compared with the magnitude of its people's needs. Of the 57 countries with critical shortages identified by the WHO, 40 are in Africa.[21] Africa has nearly 25% of the world's disease burden but only 3% of the world's health workers and less than 5% of the economic resources (figure 12.4).[22]

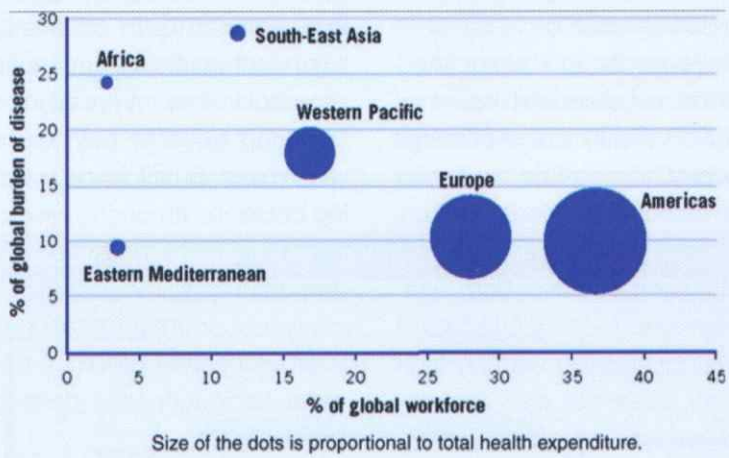
The human resources for health crisis in Africa is not restricted to the availability of health workers; it is further exacerbated by the inequitable distribution of health professionals within countries, which is biased

Figure 12.3 Population density of health care professionals required to ensure skilled attendance at birth, 2006



Source: WHO 2006b.

Figure 12.4 Distribution of health workers by level of health expenditure and burden of disease by WHO region, 2006



Source: WHO 2006b.

toward urban areas, and by migration to well-off countries. Motivating and managing health workers is critical to improving performance and retention. Evidence shows that the shortage in human resources for health is more of a rural crisis. More than half the world's people live in rural areas, but only 38% of nurses and 25% of doctors work in them.[23]

In addition, the quality of health service delivery remains very low in most African countries. In Uganda absenteeism is 35% among medical personnel in primary health care clinics. The poor quality of care is also due to the existing know–do gap, according to which health workers do not behave professionally in the absence of extrinsic incentives. Evidence from Tanzania shows that only 20% of doctors behave professionally.[24]

The Agenda for Action, established in 2008 at the first Global Health Workforce Alliance Forum and reiterated in 2011, provides a strategic foundation for donor investment in six areas: leadership to build coherent national and global leadership for health workforce solutions; evidence and joint learning; education to scale up education and

training of health workers; retention, performance and distribution; migration to manage the pressures of the international health workforce market and investments to secure additional; and more productive investment in the health workforce.[25]

Improving availability of quality pharmaceuticals

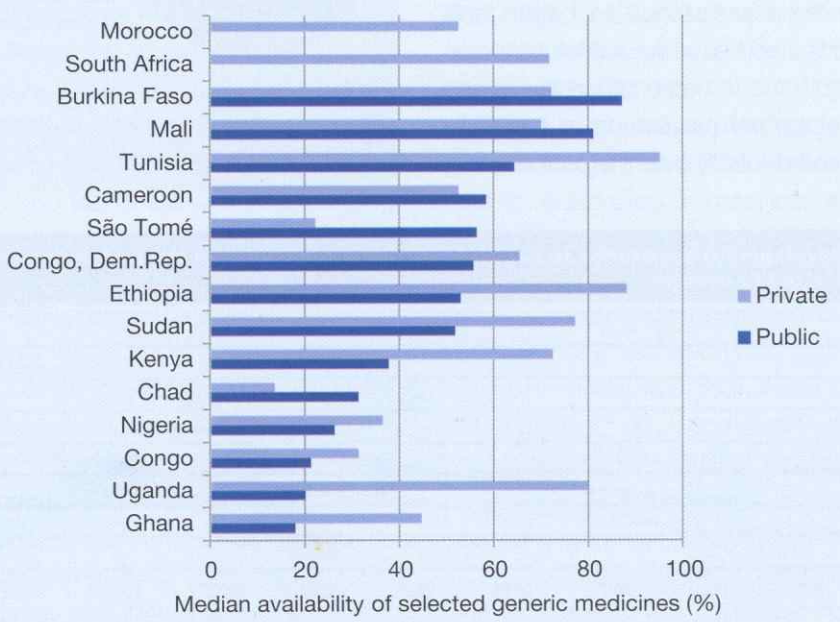
Africa bears the greatest burden of disease in the world but in most cases depends on externally developed and procured drugs, vaccines, medical devices and diagnostics to support the health of its people, importing roughly 70% of its medicines and 95% of active pharmaceutical ingredients.[26] The economic impact from the continent's disease burden is tremendous, resulting in an estimated loss of USD200 billion each year. A key element driving poor health status, with the consequent disastrous impact on economic development, is the lack of health products needed to address the most prevalent African diseases. For example, two-thirds of deaths in children under 15 are attributed to diseases for which effective treatment exists. The availability of essential medicines is currently way below 40% in the public sector in Sub-Saharan Africa.[27] The quality of pharmaceutical products is another serious concern, as there is a growing problem of counterfeit drugs and substandard medicines and medical devices.

The availability of affordable and quality drugs is an issue in most African countries, particularly in public facilities. Availability of selected essential medicines was consistently better in the private sector than in public health facilities between 2001 and 2007 (figure 12.5). In Sub-Saharan Africa availability in private facilities was 59% in the private sector compared with 38% in the public sector. In North Africa availability in private facilities was 75% compared with 39% in public health facilities.

Ensuring sustainable, efficient and equitable health financing

By 2015 it is projected that Sub-Saharan Africa will have 7 of the world's 10 fastest-growing economies.[28] This rapid economic growth has boosted the amount of resources allocated to health infrastructure and to survival-enhancing social services. Yet issues of governance and income inequality have hampered efforts to improve health outcomes. Income inequality, as measured by

Figure 12.5 Private provision of drugs is higher than private in many countries



Source: WHO Indicator and Measurement Registry (latest year available).

the Gini coefficient, remains high, and 6 of the 10 most unequal countries worldwide in 2010 were in Sub-Saharan Africa.[29] Poverty has declined by 9% over the past 20 years but that is too slow for the continent to meet the MDG goal of halving poverty by 2015. The reality is that 47% of Africa's population (excluding North Africa) still subsists on USD1.25 or less a day—adjusted for purchasing power parity (PPP).[30] Health financing and outcomes reflect these inequalities. Fast economic growth allows countries to invest more domestic resources in health and thus ensure more sustainable and equitable health financing and better outcomes for the poor.

A shifting aid landscape

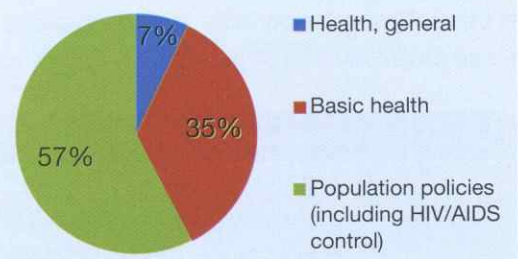
The aid landscape is changing, as aid to developing countries declines. Until 2011 aid had steadily increased for more than a decade, and net aid rose 63% between 2000 and 2010. But 2011 saw the first year of decline (3%), and tight budgets in Organisation for Economic Co-operation and Development countries will continue to put pressure on aid in the coming years. Bilateral aid to Sub-Saharan Africa was USD28 billion in 2011, down 0.9% in real terms from 2010, but total aid to Africa increased 0.9% to USD31.4 billion because donors provided more aid to North Africa after the region's revolutions.[31]

Development assistance to health has also started to decline, while wasteful, inequitable expenditures threaten progress. Gross official development assistance to health in Africa rose substantially over the past decade but began to decline in 2009 (figure 12.6). The increase in assistance hid large inequalities in spending: most was focused on infectious diseases, while crucial health areas—such as NCDs, some tropical diseases, reproductive health and the impact of climate change—received little. Limited funding was allocated to improving the functioning, efficiency and equity of the health system as a whole or to social protection (figure 12.7).

The need for increased domestic spending and value for money

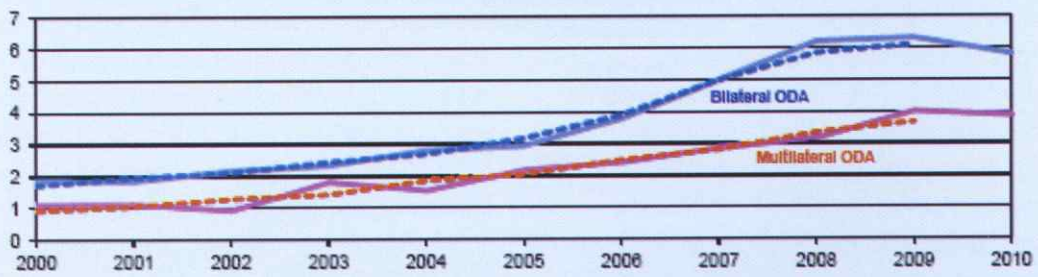
Domestic spending on health has been limited due in part to a high level of external resources flowing to the sector. Although global experience shows a strong correlation between GDP growth and increased domestic health expenditures, ministries of finance have substituted external resources for domestic public health expenditures, with

Figure 12.7 Development assistance to health in Africa by subsector is distorted by HIV/AIDS control programs



Note: Data refer to commitments for 2010.
Source: OECD–DAC 2012.

Figure 12.6 Development assistance to health for Africa increased over the last decade but has started to decline



Note: Data are in billions of USD in 2009 prices and exchange rates, and refer to a three-year moving average of commitments.
Source: OECD–DAC 2012.

out-of-pocket spending increasingly filling the expenditure gap. Globally, for every USD1 of development assistance to health, governments redirect USD0.56 on average to other spending priorities.[32]

Despite increases in development assistance to health over the past decade, domestic public allocations for health have remained stable and far below the 15% of total public spending advocated in the Abuja Declaration. AfDB President Kaberuka notes, "More aid could have contributed to less ownership and less accountability from recipient governments."[33] Although continentwide disaggregated expenditure data are not readily available, it is reasonable to assume that domestic spending has been directed away from such key priority areas as HIV/AIDS, tuberculosis and malaria, which received substantial development assistance over the past decade, leaving these priority areas vulnerable to future downturns in development assistance. Indeed, in most African countries the domestic budget is captured almost entirely by human resources expenditures, leaving all other expenditures to the private sector (mainly households) and to external assistance.

In donor countries budget constraints have lately resulted in declining development assistance for health, putting at risk even the well-funded programs (HIV, tuberculosis and malaria) around the world. Any backtracking from the achievements made in halting and reducing these diseases will have catastrophic socioeconomic consequences for Africa. In response, there are encouraging developments in some countries. Nigeria launched a Save One Million Lives Program in November 2012, committing USD500 million of government resources to increase access to and utilization of quality cost-effective basic health services. Zambia's government has made a commitment to increase funding for antiretroviral treatment from USD11 million in 2012 to USD35 million in 2013 (7% of full program cost). Kenya and Tanzania have pledged to establish trust funds to fight HIV/AIDS in partnership with private sector and civil society leaders.

In addition to increased domestic resources, better value for the money spent by government is critical to ensuring sustainable health financing in the future. Countries achieve very different results with comparable levels of social spending.[34] For instance, the proportion of births attended by a skilled attendant varies fourfold between countries at the same level of health expenditure per capita. There are also large inefficiencies in the way resources are being used: the WHO estimates that globally 20–40% of health expenditures are wasted.[35] Inadequate resource allocation, with funds not allocated to high-impact interventions, affect both public and private expenditures. Improving value for money in health in Africa implies running a number of strategies, ensuring for example that resources are allocated to proven cost-effective and high-impact interventions; that expenditures are tracked effectively and transfers of resources across layers of systems become efficient; that equity and efficiency in input market are taken as key principles underpinning financing and provision of services and acquisition of health system inputs; and that strong governance is the bedrock of ensuring value for money through a functional accountability system and making the community's voice count.

Reducing out-of-pocket expenditures on health to address inequalities and financial barriers to health care

High out-of-pocket expenditures on health generate large inequalities and financial barriers to health care. In most countries out-of-pocket expenditures account for a substantial share of total health expenditures, putting poorer households at risk of catastrophic expenditures. An estimated 60% of total health expenditure in Sub-Saharan Africa is out of pocket.[36] Private expenditure on health (most of which is out of pocket) exceeds public resources (external assistance and domestic funding) in many African countries, including Morocco (66%), Namibia (58%) and Guinea (89%).[37] This financing model is highly inequitable because when public resources (external assistance, government budget and

public health insurance mechanisms) do not provide adequate financial protection to individuals, the poorest households—which cannot afford private health insurance or out-of-pocket spending—incur catastrophic health expenditures (financed by informal borrowing). Ghana and Rwanda, which have developed health insurance mechanisms nationally, have lower levels of out-of-pocket spending than most of the countries in the region.

Table 12.1 provides a framework for investing in the health sector to strengthen health systems and achieve better health outcomes. It shows that, in addition to increased resources to the sector, approaches to improve the efficiency and effectiveness of current and new resources are required. A number of them can be adopted to optimize the use of resources and maximize the impact of resources invested in the sector, whether from governments, households or development partners.

Strengthening voice and accountability mechanisms

Public money is not always effective due to poor governance and accountability in service delivery. In Sub-Saharan Africa large amounts of funding have been dedicated to infrastructure inputs (such as hospital buildings) and much less to quality inputs (such as human resources for health training) or to more cost-efficient models of service delivery. Inefficiencies result from a lack of evidence-based policies and strategies, lack of focus on results, inappropriate procurement and management of equipment and commodities, and inappropriate staff mix coupled with a lack of performance incentives and inadequate hospital investments. Too often public funds—up to 95% in some countries—do not reach the frontline.[38] So a question arises of what governments and their citizens are paying for. More accountability in service delivery is essential and the evidence is compelling: the use of scorecards in primary health care facilities in Uganda led to a decrease in waiting time for care and a reduction of absenteeism among doctors and nurses. Improvements were also observed in the management of clinics and health status, as 33% fewer children under 5 died.[39]

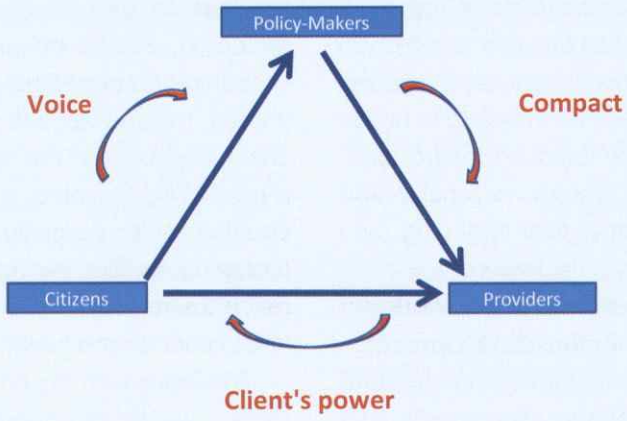
The accountability triangle can be used to highlight potential weaknesses and strengths in governance that can have an impact on distributional outcomes and service delivery (figure 12.8).[40] Key links in the triangle are voice (how citizens relate to politicians and policymakers at the national, state, and local levels), client power (how citizens as clients of service delivery relate to providers within a given sector) and compact (how politicians

Table 12.1 Funding framework

	Domestic revenue	Households, individuals and employers	ODA
Level of health spending	More domestic investments for health More equitable investments in health	Reduced level of catastrophic out-of-pocket expenditure	More ODA spending for health in the short to medium term, reducing in the long term Fulfillment of existing commitments
Where to invest resources (effectiveness)	Investing in strengthening health systems Increased investment in primary and community care	Out-of-pocket spending directed at effective and proven care	Policy alignment with national plans Fulfillment of ODA flows according to agreed disbursement schedules
Approaches to investing (efficiency)	Investing in institutional capacity to improve absorption Results-based funding Decentralization (fiscal and services) Reduce wastage and strengthen control systems	Establishment of risk pooling/health insurance mechanisms Out-of-pocket spending directed through risk pooling and health insurance mechanisms	Harmonization and alignment of funding flows and monitoring processes
Mechanisms for channeling funds	National mechanisms Empowering local governments where appropriate	Prepayment/health insurance mechanisms Public–private partnerships	Move toward a global funding platform

ODA is official development assistance.
Source: Adapted from HHA (2011).

Figure 12.8 **Accountability triangle**



Source: World Bank 2004.

and policymakers relate to public and private providers).[41] These key links must be taken into account when defining health policies and when delivering health care services (see chapters 28 and 29).

Investing in health beyond 2015 to address the sector's challenges

In the changing Africa a new agenda for health has emerged with a focus on governance and value for money, developing and modernizing health systems (building on improved connectivity), mainstreaming gender, building human and material resources and catalyzing private sector growth and job creation.

The post-2015 development agenda

Much remains to be done in most African countries to reach the MDG targets even after 2015, particularly for the poor. Public health financing is skewed toward richer quintiles, and the poor contribute more than the share of national income that they take home. In parallel, new challenges have appeared and Africa needs to set its new agenda for health and human development in general. For instance, Africa faces challenges of mainstreaming adaptation to climate risk into development, adding costs to ongoing development interventions.

In many of the global consultations on the post-2015 agenda, health has been a central element of sustainable development. It is a contributor to development, and an end in itself and an integral part of human well-being. The agenda emphasizes the need for creating and maintaining good health and well-being rather than preventing and treating disease. The thematic consultation also outlines that the post-2015 health agenda should include specific health-related targets as part of other development sector goals; take a holistic, life-course approach to people's health with an emphasis on health promotion and disease prevention; accelerate progress where MDG targets have not been achieved and set more ambitious targets for the period to come; and address the growing burden of NCDs, mental illness and other emerging health challenges.

African consultations on the post-2015 development agenda identified four broad development outcomes: Africa needs structural economic transformation and inclusive green growth; innovation and technology transfer is the foundation for accelerating growth and development; human capital development should be at the heart of Africa's priorities; and financing and partnerships should evolve to reflect current realities. The human development theme stresses making investments in health a priority beyond 2015.

The Global Health 2035 framework provides a bold plan to cut infections and child and maternal deaths; curb NCDs and injuries; and achieve pro-poor universal health. Prompted by the twentieth anniversary of the 1993 *World Development Report,* The Lancet Commission on Investing in Health

was launched in December 2012. Chaired by Lawrence Summers, and co-chaired by Dean Jamison (lead author of the 1993 report), the Commission brought together 25 leading economists and global health experts to re-examine the case for investing in health and to propose an ambitious forward looking health investment framework for low- and middle-income countries (box 12.1).

Promote health as a productive sector and boost private sector development

Health is a productive industrial sector, and Africa needs to promote investments that can foster economic growth and job creation. Areas such as the pharmaceutical sector, medical tourism and hospitals have large potential to generate value and offer opportunities for employment, particularly for youth (box 12.2).

A new vision is needed for Africa that promotes the health sector as a labor-intensive industry that can provide an estimated 2 million–3 million skilled jobs for young Africans and contribute to economic growth in Africa. For instance, as the pharmaceutical industry develops and demand for modern drugs increases, there will be opportunities in research and development, manufacturing, sales and distribution.

Thinking must move beyond the public provision and financing of health care services to include private provision and financing. Public–private partnerships (in financing and provision) can improve performance, expand access to care and reduce costs, especially in the hospital sector and in e-health. Agribusiness entrepreneurship can improve nutrition security. Aligning profitability and good nutrition through value chain analysis will reveal possibilities for achieving social, environmental and health goals.

Synergies with the private sector can also bring a wealth of opportunities to stimulate job creation and growth. Indeed, the private health sector in Sub-Saharan Africa is surprisingly large and constitutes an important, diverse component of the region's health care systems. It covers all elements along the health value chain, including education, provision, financing, manufacturing, distribution and retail (figure 12.9). In 2005 some 60% of the USD16.7 billion in total health expenditure was financed by private parties, and private providers captured about half that.[42]

Build social infrastructure

Africa needs a focus on building social infrastructure, including hospitals and social insurance (see chapters 23 and 24). Such

Box 12.1 The Convergence Agenda

Global Health 2035 outlines a path for today's low- and lower middle-income countries to achieve similar rates of dramatic progress, reaching levels of mortality seen today in the 4C countries and averting about 10 million deaths in 2035. The 2035 convergence goals are summarized as "16-8-4"—reducing under-5 mortality to 16 per 1,000 live births, reducing annual AIDS deaths to 8 per 100,000 population and reducing annual tuberculosis deaths to 4 per 100,000 population.

The report lays out a detailed investment framework for national governments to achieve the "16-8-4" convergence goals by aggressively scaling up new and existing tools to tackle HIV/AIDS, tuberculosis, malaria, neglected tropical diseases and maternal and child health conditions—and strengthening their health systems using a "diagonal approach"—that is, building systems that specifically improve these countries' ability to tackle the highest burden health challenges.

The Commission estimates that the average incremental cost of convergence for 34 low-income countries will be about USD23 billion annually over 2016–2025, rising to around USD27 billion annually over 2026–2035. The incremental cost in lower middle-income countries will be about USD38 billion annually over 2016–2025, rising to around USD53 billion annually over 2026–2035. The expected economic growth of middle-income countries will easily allow these countries to finance convergence entirely from domestic sources. While low-income countries will require some external assistance, they should be able to finance most of the incremental cost of achieving convergence themselves.

Source: Jamison and others 2013.

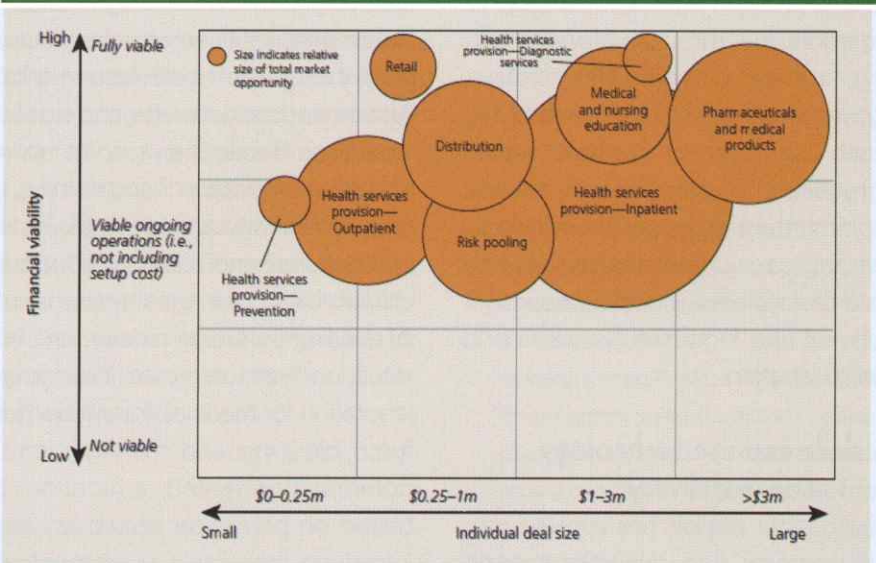
Box 12.2 International trade in health services—export prospects in North Africa

International trade in health services has been expanding rapidly since the late 1990s. Its share in the world market for tourism services rose from 1.2% in 1997 to 1.5% in 2010. In the Mediterranean region, strategies to promote these exports are run by private stakeholders (Morocco, Lebanon, Egypt, Tunisia and Turkey) and governments (Jordan and Tunisia). Although there is great complementarity between demand from Europe and supply from the south Mediterranean, trade flows are generally south-south. This principle of neighborliness is also observed in the other regions of the world.

In the medium term the international competitiveness of the health sector provides opportunities to consolidate the tourism sector and diversify the range of tourism services toward well-being services that attract a growing segment of European demand. Even so, most of European health care demand remains beyond the reach of practitioners in North Africa and the Middle East, but it has not been proven that the institutional barrier represented by the current nonportability of health insurance is the main cause of the limited north-south trade in the region. Indeed, there are other major constraints on the international travel of patients that stem mainly from the specificity of health sector transaction costs.

Source: AfDB 2013b.

Figure 12.9 Investment opportunities in private health care in Sub-Saharan Africa



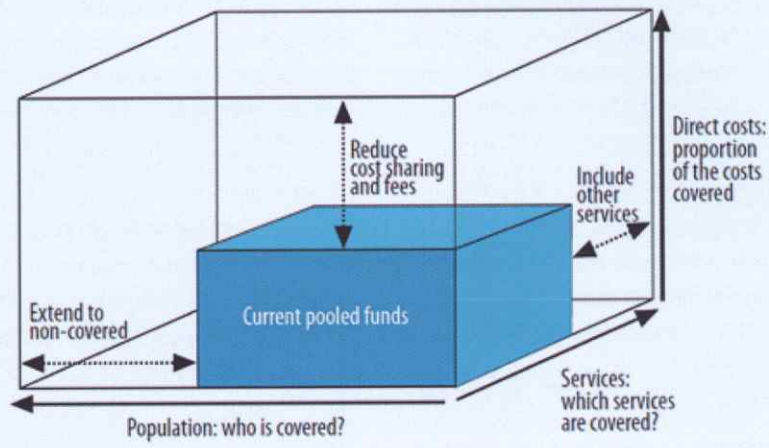
Source: IFC 2007.

investments have been overlooked by donors, but are critical to ensure sustainable and equitable progress in Africa. Weak management has been identified as one of the main causes of poor hospital performance in Africa. Strategies to improve hospital management performance include public–private partnerships (as in Lesotho), hospital reforms for more autonomy, innovative payment mechanisms, strengthening of hospital information systems and use of information and communications technology (ICT).

Further, countries need support in developing equitable and sustainable health financing systems, including evidence-based planning and budgeting and results-based financing. To address the financing gap due to the drop in development assistance to health, innovative partnerships to mobilize and leverage resources are an option.

Given the complexity of implementing health financing reforms, few African countries have made major progress in implementing financial and social protection mechanisms, particularly for the poor. But it is of crucial importance as health expenditure can generate catastrophic expenditures and poor health status can hinder development. Countries should thus invest in financing systems to enhance access to health care and provide

Figure 12.10 **Three dimensions to consider when moving toward universal health coverage**



Source: WHO 2013.

financial risk protection against catastrophic health expenditures through prepayment, risk pooling, strategic provision and purchasing, and government subsidies (figure 12.10). Using health insurance to increase health coverage requires not only political will and political commitment grounded in evidence, but also strong capacity to design, develop and operate the systems, including appropriate institutional and legal setups, skills and efficient administration.

Develop skills and use technology for efficient service delivery

Africa's health labor market has evolved rapidly into a complex and dynamic market. Health workforce production, deployment, financing, productivity, migration and mobility within and between countries have recently been the focus of health labor market analysis. Africa needs to leverage and advance health workforce development; scale up investment in medical education[43] and training, infrastructure, technology and systems; institutionalize international and regional coordination and collaboration; promote medical faculty capacity building, including recruitment, training and retention; institutionalize interministerial collaboration for medical education, health workforce planning and management; promote community-oriented education programs based on principles of primary health care; introduce innovative placement and retention policies to fill gaps and provide millions

Box 12.3 **Mobile Technology for Community Health in Ghana—AfDB eHealth award winner**

Maternal health care in Ghana has improved over the past two decades, though slowly. In 2011 antenatal coverage was 96.7%, while skilled attendance at delivery was just 68.4%. Despite the high antenatal coverage, treatment is incomplete. Most women do not make the minimum four recommended antenatal visits. Reducing maternal and neonatal mortality requires reaching women with the information needed for a safe pregnancy and delivery—dispelling the traditional beliefs that encourage women to deliver at home and to withhold skilled care from their newborn babies during the critical 48 hours after birth.

To narrow the gap in service use to reduce maternal and neonatal deaths, pregnant and postpartum women must have the right information. Mobile Technology for Community Health is using mobile phone technology to provide a creative, evidence-based approach to improving maternal and infant health. It has two interrelated mobile phone applications that focus on improving the health of pregnant women and infants in poor rural areas. "Mobile Midwife" sends targeted, time-specific voice messages containing health information to pregnant women and new parents in their local language. "Nurse Application" helps community health nurses electronically record the care given to patients and identify clients—both mothers and infants—due for critical care.

of jobs; and promote performance incentives to improve the quality of health care and the availability of health staff.

Spurred by technological innovations, a rapid ICT revolution is taking place in Africa, especially in mobile technology, cloud computing, biotechnology and e-governance. Africa should build on the ICT revolution to improve service delivery and access to care. Technology can remove geographic and financial barriers to health services and provide better quality, timely and cheaper services to populations, thus improving health status and productivity. In particular, e- and m-health can improve access to health information by providing systematically reliable and accurate data at all levels. These innovations can also empower the health workforce and reduce the human resources for health shortage in Africa by providing training to health staff, thus increasing the number of trained personnel and improving the quality of their training, at a limited cost. Innovations can be used to convey health education to the public for improved public health. They can also contribute to more accessible and better health services as they can remove bottlenecks in the delivery of health services, whether health services or medicines (box 12.3).

Notes

1. Kinney, Lawn and Kerber 2009.
2. Kim and others 2003.
3. WHO 2012.
4. WHO and others 2010.
5. Ahmed and others 2012.
6. World Bank 2011.
7. UN 2011.
8. Gwatkin 2012.
9. WHO 2011a.
10. Suzuki, Sharan and Bos 2012.
11. McMichael 2011.
12. Hay and others 2006
13. Hales and others 2002.
14. World Health Organization Global Health Atlas (http://apps.who.int/globalatlas/); World Health Organization Multi-Disease Surveillance Centre (www.who.int/csr/disease/meningococcal/epidemiological/en/index.html).
15. UN-HABITAT 2006.
16. APHRC 2002.
17. UN-HABITAT 2008.
18. Confalonieri and others 2007.
19. Ramin 2009.
20. Anand and Barnighausen 2011
21. WHO 2006b.
22. O'Brien and Gostin 2011.
23. WHO 2006a.
24. Leonard and Masatu 2010.
25. DeLuca and Soucet 2013.
26. UNIDO, 2012.
27. Research for Development Institute 2008.
28. *The Economist* 2011.
29. AfDB 2013a.
30. WHO 2011b.
31. OECD 2012.
32. Institute of Health Metrics and Evaluation 2012.
33. Kaberuka 2011.
34. Kaberuka 2011.
35. WHO 2010a.
36. IFC 2007.
37. WHO 2010b.
38. AfDB 2011.
39. Björkman and Svensson 2010.
40. World Bank 2004.
41. Coudouel and Paternostro 2006.
42. IFC 2007.
43. Obesity is rising in Africa. There is therefore a need for an urgent need for action, including building capacity in nutrition. Curricula for health sciences should be adapted to reflect this new reality.

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CHAPTER 13

Investing in science, technology and innovation

Hatem Mhenni, Adel Ben Youssef, Nawsheen Elaheebocus, Corbin Michel Guedegbe and Crispus Kiamba

Promoting science and technology is high on the agenda of development agencies operating in Africa. In 2006 the AU Summit in Khartoum endorsed the Consolidated Plan of Action (CPA), the guiding document for AU and NEPAD activities in science and technology in Africa. Its objectives are to harness and apply science, technology and innovation (STI) in order to eradicate poverty, achieve sustainable development and ensure that Africa contributes to the global pool of scientific knowledge and technological innovation. The CPA identifies three pillars for science and technology: capacity building—building up human skills in science and technology to solve African problems; knowledge production—generation of scientific and technical knowledge of African problems and how to solve them; and technological innovation—introducing products, processes and services in Africa. The programs in the CPA belong to four clusters: biosciences and environment, natural sciences and engineering, health, and improving policies for research, development and technology transfer.

The CPA programs are implemented at national, regional and continental levels by such stakeholders as regional economic communities (RECs), AU Member States, national institutions and the private sector. International, continental and national development partner institutions, including civil society, have supported CPA goals by aligning their programs with it and providing financial support and technical assistance.

The CPA called for a review every five years to determine how it has effectively promoted continental priorities, regional integration and intra-Africa cooperation and spurred socioeconomic transformation and human and institutional development. That has been done, and different AU organs are this year considering a new Science, Technology and Innovation Strategy for Africa. The new strategy envisions a robust STI foundation for an integrated, prosperous and peaceful Africa; it is expected to accelerate Africa's transition to innovation-led and knowledge-based economies for sustainable growth and development. It calls for three strategic thrusts: building an infrastructure base for innovation-led development, enhancing technical competences and stimulating entrepreneurship.

To realize this new vision, the strategy argues for creating an enabling environment by embedding STI in all sectors, especially education, food security and nutrition, entrepreneurship, industry, infrastructure and regional integration policies.

The capacity of countries to compete in the global market depends on their ability to innovate and apply technology to industries and productive sectors. A country's ability to innovate is often based on adopting new technologies from abroad or on the results of local research and development. Both require investing in STI.

STI is an integrated concept. It entails a process of knowledge creation through products and services so as to effect deep changes in social and economic conditions. Science is the creation of knowledge. Technology is the use of science to develop products and services. Innovation refers to the products, processes and services that arise from technology. Capacity to apply current technologies and to assimilate, adapt and expand on new technologies is essential to a country's competitiveness and productivity.

Countries that have succeeded in propelling development and growth have

invested in building skills and have created knowledge that meets society's demands. For example, satisfaction of demand for access to clean water and safe food, for basic energy services and for protection from pandemics like malaria and HIV foster stability and sustain growth. STI policy thus requires dialogue among scientists, policy and decisionmakers and the private sector. This dialogue helps transform society through advances in science and through sustainable use of natural resources. It also encourages researchers to contribute to the national, regional and global knowledge pool to inform policymaking. This interaction can be reinforced by greater contact between science and decisionmaking processes by both institutions and individuals. This ensures that STI serves society and promotes inclusive growth and development.

The knowledge economy, productivity and growth

Innovation is essential for productivity and economic growth (box 13.1). Applying technological advances leads to more effective use of productive resources and transformation of new ideas into economic solutions (products, processes and services) and lays the foundation for sustainable competitive advantage for firms. Innovation, research and development (R&D) and rising income per capita are highly likely to mutually reinforce each other. Recent research in emerging countries has shown this clearly for Brazil,[1] Argentina,[2] China,[3] Malaysia[4] and six Latin American countries.[5] African countries rarely feature in these studies.

Progress in STI is a major determinant of readiness for the knowledge economy, which is generally defined as production and services based on knowledge-intensive activities

Box 13.1 Defining innovation

Innovation is the means by which individuals and groups apply their creative, adaptive capacities and their social, organizational and institutional knowledge to generating and applying new scientific and technical knowledge. A broadly inclusive term, it may encompass the work of both formal science and technology (S&T) enterprises and the informal, grassroots ideas and inventions of people not associated with official institutions.[1]

An innovation system is broadly defined as the set of agents involved in an innovation process, their actions and interactions and the socioeconomic institutions that condition their practices and behaviors.[2]

Research and development (R&D), sometimes also called research and experimental development, refers to creative work undertaken systematically to increase the stock of knowledge (including that of humankind, culture and society) and the use of this knowledge to devise new applications. To measure R&D, most studies refer to the *Frascati Manual*.[3]

The *Frascati Manual* is considered a cornerstone of Organisation for Economic Co-operation and Development (OECD) efforts to increase the understanding of the role played by S&T in analyzing national systems of innovation. By providing internationally accepted definitions of R&D and classifications for its component activities, the manual contributes to intergovernmental discussions on best practices for S&T policies. The manual is based on experience gained from collecting R&D statistics in OECD member countries, based on the collective work of national experts in NESTI (the Working Party of National Experts on Science and Technology Indicators). NESTI, supported by a secretariat, has over the last 40 years elaborated on the concept of S&T indicators and drafted a series of methodological manuals known as the "Frascati Family," among them manuals on R&D (the *Frascati Manual*), innovation (the *Oslo Manual*),[4] human resources (the *Canberra Manual*),[5] technological balance of payments and patents as S&T indicators.

The *Frascati Manual* is also published in electronic format on the OECD website so that the manual can be updated frequently as newer material becomes available. The electronic version is complemented by material related to R&D surveys.

The sixth edition of the latest manual was prepared by teams of experts drawn from the NESTI Group.

Notes

1. ICSU-ISTS-TWAS 2012.
2. Freeman 1987.
3. OECD 2002.
4. OECD 2005.
5. OECD 1995.

that help accelerate the pace of technical and scientific advance. A key element is thus greater reliance on intellectual capabilities than on physical inputs or natural resources. The Knowledge Assessment Methodology (applied by the World Bank)[6] is a proxy for how well a country is prepared to compete in the knowledge economy. It applies 148 structural and qualitative variables to 146 countries to assess performance in four knowledge economy pillars:

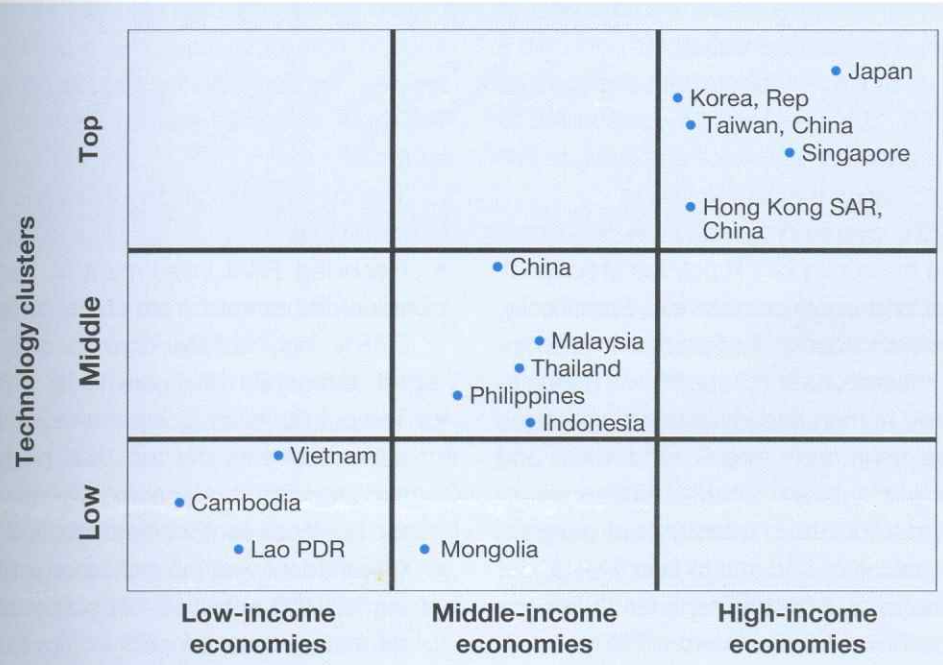
- *Economic and institutional regime.* This must provide incentives for efficient use of current and new knowledge and for entrepreneurship to flourish.
- *Education and skills.* The country's people need education and skills that enable them to create and share and to use their education and skills well.
- *ICT infrastructure.* This is needed to facilitate processing and dissemination of information.
- *Innovation system.* Firms, research centers, universities, think tanks and other organizations must be capable of tapping the growing stock of global knowledge, assimilating and adapting it to local needs and using it to create new technology.

All high-income countries have a history of consistent investment in higher education and technology. They have invested in human capital, picked a niche to grow their economies and encouraged industrialization, well-functioning service industries and good governance. There is a close positive correlation between high-income countries and top technology clusters. In East Asia the three income groups (low, middle and high) roughly correspond to three technological clusters identified in 2004–2009 based on a country's skill base and the high-tech intensity of its products and exports (figure 13.1).

Similarly, the European commission funded an assessment of the innovation performance of the countries in the European Innovation Scoreboard and grouped them as follows:[7]

- *Innovation leaders.* Denmark, Finland, Germany, Israel, Japan, Sweden, Switzerland, the United Kingdom and the United States. Sweden is the most innovative country, largely due to strong innovation inputs, although it is less efficient than some other countries in transforming these into innovation outputs.

Figure 13.1 Income groups and technology clusters in East Asia



Source: World Bank 2012b.

- *Innovation followers.* Austria, Belgium, Canada, France, Iceland, Ireland, Luxembourg and the Netherlands.
- *Moderate innovators.* Australia, Cyprus, Czech Republic, Estonia, Italy, Norway, Slovenia and Spain.
- *Catching-up countries.* Bulgaria, Croatia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania and the Slovak Republic. Turkey currently performs below the other countries.

Africa's STI Landscape

To monitor scientific and technological developments, formulate and review the implementation of policies and strategies and, more importantly, guide the continent's march toward achieving its target of 1% of GDP invested in R&D, in 2007 African ministers established the African Science, Technology and Innovation Indicators (ASTII) Initiative. Africa's history of measuring and monitoring STI information had been available mostly through estimates based on indirect measurements of technology-related use, trade and investment, education and the S&T data of international organizations collected from individual countries and aggregated in international databases. But data from many African countries are absent from these databases. The lack of a robust common set of STI indicators has also limited the continent's ability to make evidence-based decisions about STI. That was why Africa resolved to build its capacity to collect and analyze STI data by creating the ASTII Initiative.

ASTII's overarching objective is to help improve the quality of STI policies at national, regional and continental levels. Specifically, ASTII seeks to identify and promote the adoption of internationally comparable STI indicators, build human and institutional capacities for developing and using STI indicators and conducting surveys, enable African countries to participate in international program for STI indicators and inform countries about the state of STI on the continent.[8] For the first time Africa set out internationally recognized mechanisms and guidelines to assess R&D and innovation programs and monitor implementation of the decision to invest 1% of GDP in R&D.

The first phase of the ASTII pilot survey covered business enterprises, governments, higher education and private nonprofit organizations. A common measurement framework was adopted and the core indicators of interest were identified as:

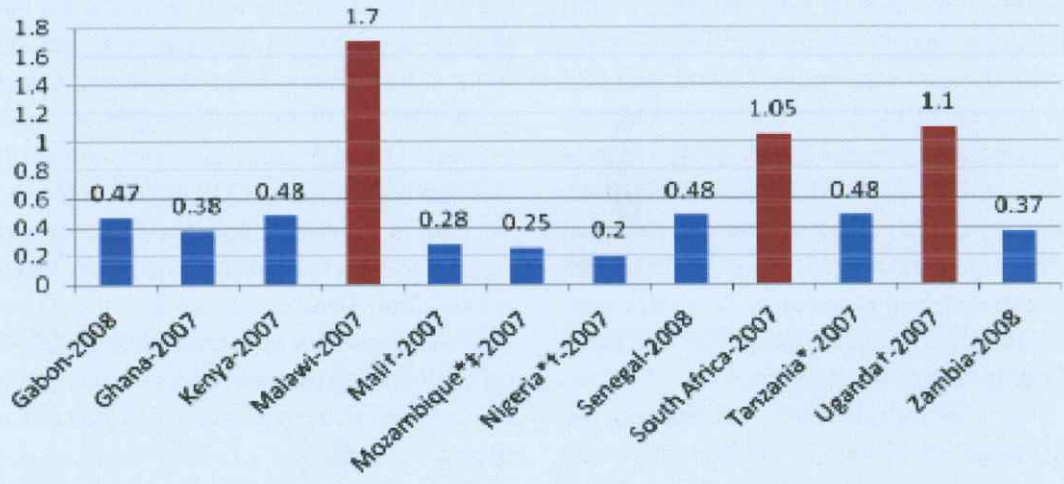
- Gross domestic expenditure on R&D (GERD) by source of funds and sector of performance.
- R&D personnel (headcount and full-time equivalent) by gender, sector of performance, formal qualification and occupation and researchers by gender and field of study and research.

The first ASTII survey of 2005–2007 was conducted in 2008 in 19 African countries to assess their R&D investments and personnel. Countries were chosen based on their expression of interest. Of these, 13 produced R&D survey data. The survey assessed R&D investment by business enterprises, government, higher education and private nonprofit organizations. R&D investment was defined as spending on services, consumables, infrastructure and personnel (such as wages), needed to undertake the R&D activities performed by public and private institutions. But many country surveys were simply piloted, and many did not cover all sectors. Thus in some countries the business sector was not surveyed—a serious omission.[9] The data should therefore be interpreted cautiously.

The survey results on R&D expenditure indicated that:

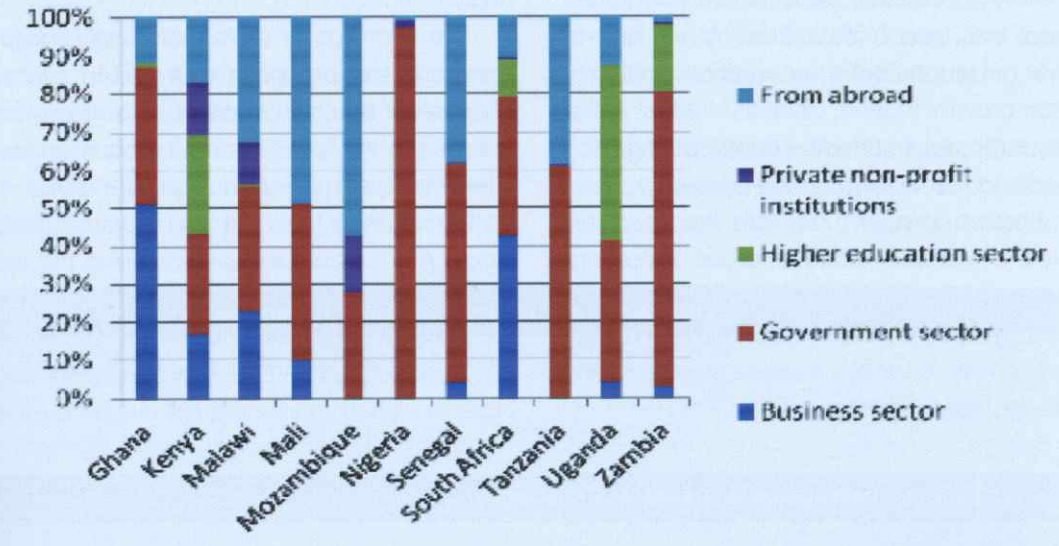
- Reported R&D investment in surveyed countries ranged from 0.2% of GDP to 0.48%; only Malawi, Uganda and South Africa reached 1% (figure 13.2).
- The public sector (government and higher education) was the top R&D performer, except in South Africa and Malawi, where the business sector was dominant.
- Government was the main source of funding for R&D activities, especially if higher education was lumped in (figure 13.3). Kenya and Uganda, and to some extent Zambia, were the only countries where

Figure 13.2 **Gross domestic spending on R&D (% of GDP)**



Source: NEPAD 2013.

Figure 13.3 **GERD by source of funding (%)**



Source: NEPAD 2010.

higher education accounted for a considerable share of R&D funding.

- R&D activities were financed largely by international donors and other foreign sources. Mozambique was the most dependent on foreign donors, with more than 50% of its R&D financed from abroad, followed by Mali (49.0%), Tanzania (38.4%), Senegal (38.3%) and Malawi (33.1%). This support is important to understand, since it should be expected to decrease over time, though international support is crucial at a capacity-building stage. Nigeria and Zambia had very low dependence on foreign funding, only about 1%.
- The business sector accounted for a considerable share of R&D funding in some countries (Ghana 50.9%, South Africa 42.7% and Malawi 22.8%), but in most countries its share of funding was less than 10%. The Ghanaian business sector stood out because it heavily funded R&D compared with other funding sources.

Of surveyed countries, South Africa had by far the highest number of human resources available for R&D activities, with a researcher density of 825 per million inhabitants. Senegal was not far behind with 635 per million. At the other end were Mozambique (researcher density of 24.4), Uganda (25.4), and Ghana (27.1). It was not clear why there were such huge differences between countries. One possible reason could be that the definition of a researcher varied by country. The ASTII has recognized that this issue warrants further investigation.

Few African countries are meeting the R&D target of 1% of GDP; only South Africa is even close.[10] In absolute terms, countries allocating the highest amount of funds to R&D (GERD) are South Africa, Morocco, Egypt and Tunisia. Most countries are far from international targets for R&D spending as a percent of GDP (figure 13.4). Most African countries invest less than 0.5% in R&D, but a leap to 1% is not a hope but a necessary condition to foster growth. Indeed, since the 1980s, Africa has purposed an effective contribution of science and technology in development.

The sources of funds are not so diversified in Africa. Public sources represent between 70% and 90% of the GERD while in the developed countries business and particularly private business sources provide nearly 80% in Japan and Korea.

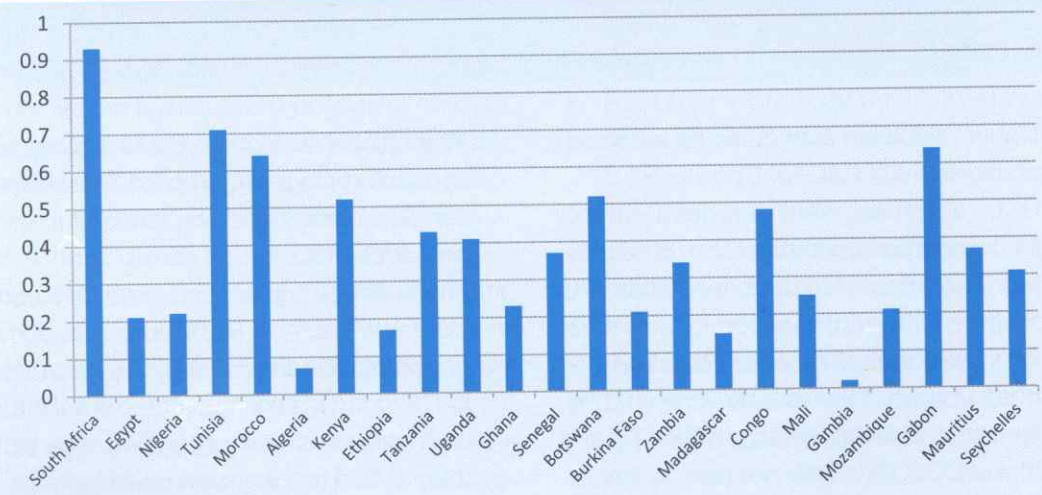
There is a strong correlation between GERD and GDP for R&D funding, suggesting that when a country reaches a certain level of development, it is easier to allocate more to R&D. But in Africa this relationship is quite weak; to increase the target of GERD in relation to GDP by 0.1% would take about USD9.60 of additional GDP (figure 13.5).

This is relatively high for most African countries since the majority has a very feeble level of GDP. The most dynamic of them have reached a relatively acceptable level of GERD on GDP but the rest will have serious difficulties in the short term to ameliorate their actual score.

Moreover, nearly half of African countries did not publish any data on R&D funding and those that have cannot guarantee that the validity of the data meets international standards; only South Africa's data definitely do so.

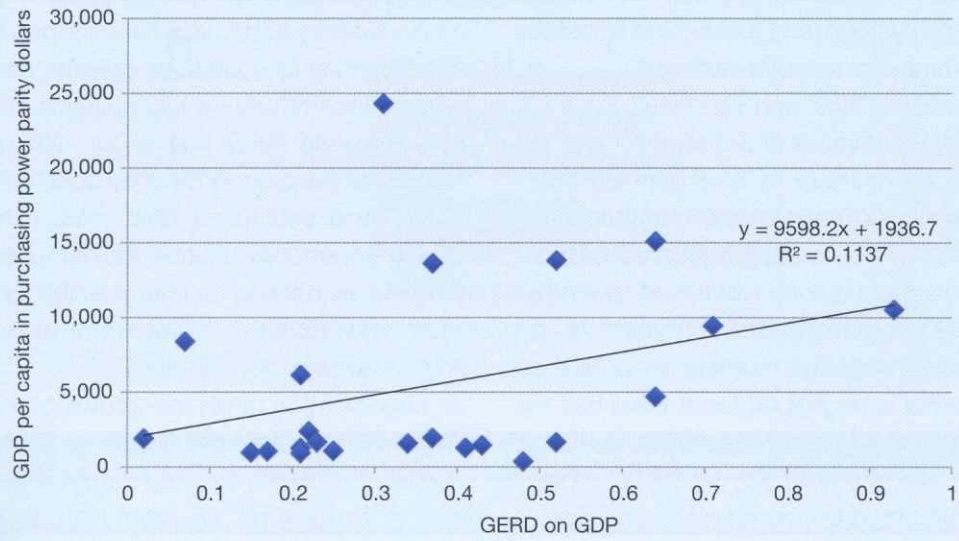
The shortage of skills has been a major constraint on progress with STI in Africa. The lack of a critical mass of high-level skills is linked to the fact that most African universities have not reached high standards of performance in teaching and research (only South Africa has universities among the top 500 worldwide). The best records in Africa for publications quoted between 1996 and 2012 were South Africa, Egypt, Tunisia and Nigeria. These four countries are producing

Figure 13.4 **African R&D spending (GERD as a % of GDP)**



Source: Authors based on World Development Indicators database.

Figure 13.5 Relationship between level of development and R&D spending in Africa



Source: Authors based on World Development Indicators database.

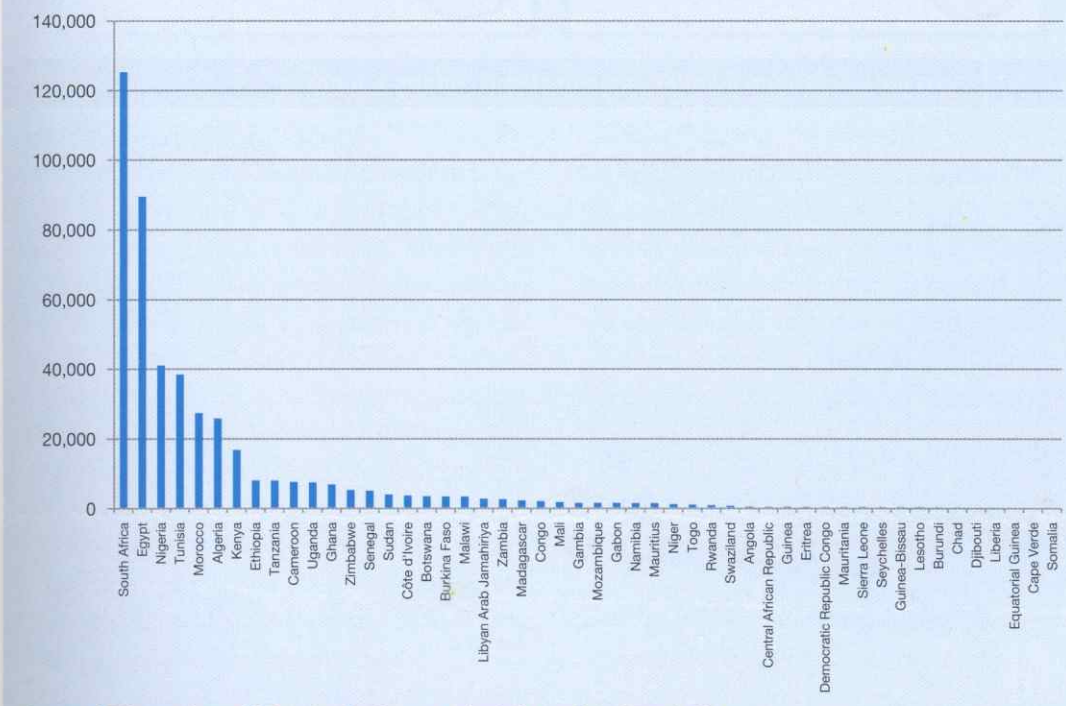
two-thirds of all the continent's scientific publications (figure 13.6).

South Africa is leading in terms of absolute number of publications, and Tunisia is first in number of publications per capita. In the last 10 years Tunisia has also seen its publications per year increase fastest.

But when comparing African totals with those in the United States, Japan, and even China, no African country is among the top 20.[11]

Fragile countries like Somalia, Eritrea, Liberia, Chad and Djibouti and small countries like Equatorial Guinea, Rwanda, Mauritius

Figure 13.6 African production of scientific publications, 1996–2012



Source: SCImago Journal & Country Rank: www.scimagojr.com/countryrank.php.

and Cape Verde are lagging. But the potential to increase their production is very high since they are putting in place their higher education systems and making the first steps toward creating research centers.

There is a high and positive correlation between the number of publications and the *h*-index, the number of leading researchers with many publications and many citations (figure 13.7).[12] To increase the number of leading researchers by one unit would take more than 473 publications. Since in many African countries the annual number of published documents is negligible, for at least half the countries, 473 is a very high target. In Kenya, for example, the scientific production is very concentrated in the hands of a few internationally recognized researchers and the other 90% are producing at less than the average rate.

Clearly, progress in scientific research in Africa has been very slow. The slow development of STI has delayed the emergence of African countries as knowledge economies. Africa lags behind in all knowledge assessment methodology indicators considered (figure 13.8).

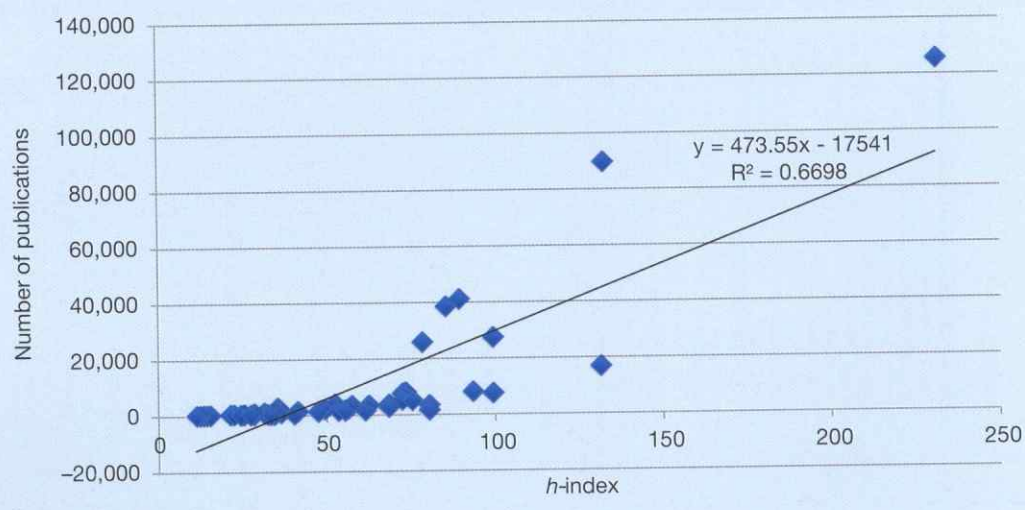
Yet there are opportunities to create an environment for building up STI in Africa. Increased economic growth, better governance and plentiful natural resources are attracting foreign investment. Africa's continued economic rise will largely depend on its capacity to harness its untapped natural resources, its youthful population and—of prime concern here—a technological revolution. Because Africa has about 12% of the world's oil reserves, 40% of its gold and vast arable land and forest resources, it has a unique opportunity to seize the demographic dividend by offering its fast-growing youthful labor force comprehensive, innovative skills and knowledge development.

Urbanization and the growing middle class will play a major role in growth. The number of middle-class households is forecast to increase by 50% from 2010 to 2020. By 2030 the top 18 African cities will have a combined spending power of USD1.3 trillion. This enormous, largely untapped domestic market will attract considerable domestic and foreign investment.[13]

How does STI contribute to Africa's transformation?

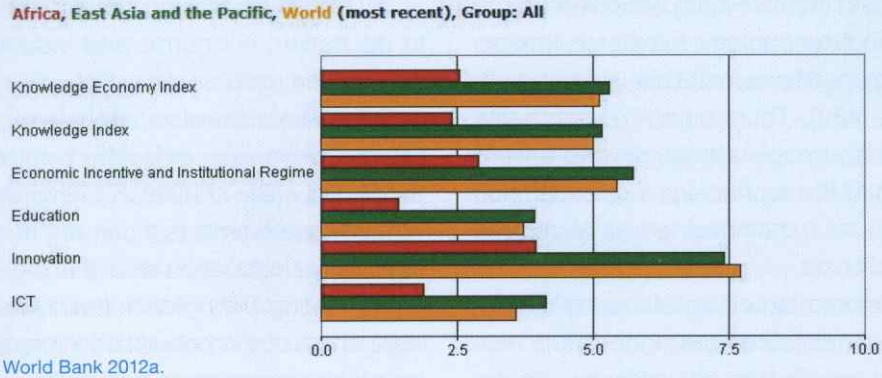
Africa needs a framework for STI based on the continent's own characteristics and current international opportunities. Figure 13.9 illustrates the proposed conceptual framework with four interrelated phases.

Figure 13.7 Correlation between number of publications and the *h*-index



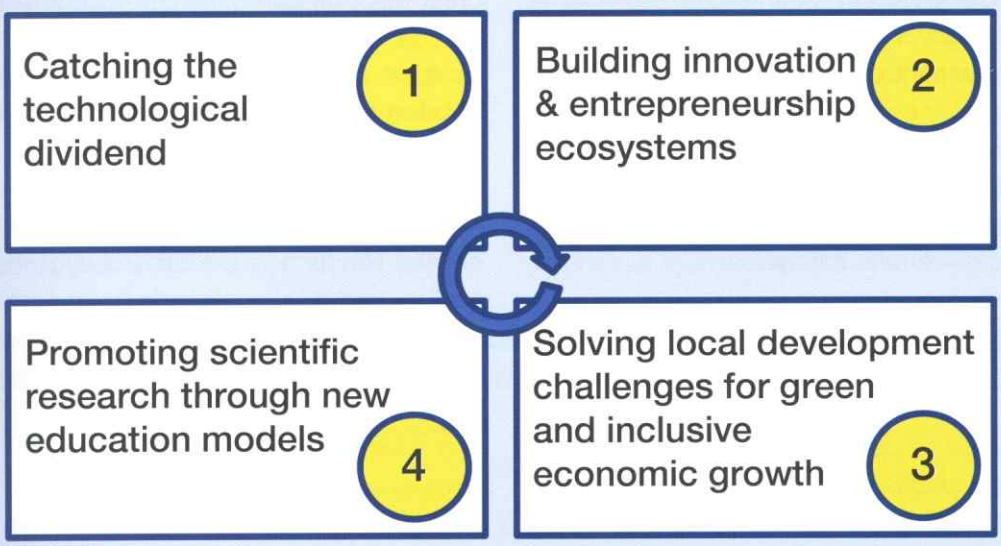
Source: Authors based on World Development Indicators database.

Figure 13.8 Knowledge Assessment Methodology Index and Pillars, Africa and East Asia and Pacific



Source: World Bank 2012a.

Figure 13.9 Conceptual framework: Building on STI for Africa's transformation



Source: Authors.

Catching the technological dividend

African countries are in a unique position—they have the youngest population as technology is booming. With telephones African countries did not have to invest in landlines, they just caught the next innovation in telephony and invested directly in mobile technologies. They should do the same with other technologies, not investing in desktop computers and expensive storage systems but in mobile devices and cloud computing. Africans are just beginning to see the potential of mobile technologies (phones and tablets) for improving social indicators, transparency and governance.

The potential of general-purpose and open-source technologies—information and communications technology (ICT), biotechnologies, renewable energy and medicines, among others—offers an important opportunity for Africa to benefit from spillovers of world R&D and innovation. This technology dividend is sure to improve the capacity of the continent to absorb more advanced technologies. Building up absorptive capacity through dedicated institutions and human capital is a precondition for benefiting from the dividend (see chapter 11).

Technology transfer can help Africa deal with its socioeconomic problems. Technology transfer is the process by which a technology in advanced economies is acquired by a developing country where the conditions

for using it are in place. Africa can draw on a wide range of technologies to boost its economy and improve living conditions for its peoples. But technology transfer is impossible when conditions for its use are not available (table 13.1). Thus, before governments attempt such transfers they need to ensure not only that the technology exists but also that is can be transferred, so as to reduce efforts and costs.

Open innovation offers Africa the opportunity to join international innovation networks and benefit from the spillover effects. Closed and open innovation are the two poles of the innovation continuum. Successful closed innovation requires control and ownership of the intellectual property; a company should control the creation and management of ideas. Open innovation, in contrast, assumes that firms use external and internal ideas and paths to the market as they look to advance their technology. African countries should thus tap into the potential of open innovation.

Building innovation and entrepreneurship ecosystems

Building a governance system for STI is fundamental to foster science production, technology adoption and the culture of innovation. Most African countries are trying to construct STI capacity by building innovation ecosystems, technoparks (science parks), science and technology observatories and dedicated institutions to govern STI. All these need to be part of a national system of innovation. Many African countries are also drafting new STI policies. These systems and policies need to be reinforced to establish an environment conducive to the gradual evolution of these countries to knowledge economies (see chapter 14).

STI policies that are strategically linked to education, economic and industrial policies can be used as drivers of youth employability. They can also improve access to knowledge-based innovation, thus raising productivity (see chapter 17). Providing youth with adequate skills is an urgent item on the agenda for education and training systems implementing STI policies, mainly because a large share of the population in many African countries survives on informal labor, and particularly for untrained youth, it is hard to find stable, formal employment (see chapter 19). The prevalence of the informal sector creates great risk that can generate economic and political instability, as has been seen in some Northern African countries, showing the risks of failing to address youth concerns, particularly among those calling for change.

Centers of excellence and technoparks are essential to benefit from agglomeration effects. The term "economies of agglomeration" is used in urban economics to describe the benefits that firms obtain when locating near each other ("agglomerating"). This concept relates to the idea of economies of scale and network effects. Simply put, as more firms in related industries cluster together, costs of production can fall steeply as firms can draw on multiple competing suppliers, specialize more and achieve greater division of labor. Egypt, Morocco, Nigeria, Rwanda, South Africa and Tunisia have built centers of excellence and technoparks that are fostering new technology-based firms and linking higher education and innovation to the private sector. By enabling agglomeration of a critical mass of scientists and researchers

Table 13.1 **A scarcity-induced innovation framework**

	Problems for which advanced economies have found solutions	Problems for which advanced economies have not yet found solutions
Problems for which solutions suitable for developing countries exist	The vast majority of solutions acquired through technology transfer	Solutions to problems mainly posed in developing countries and developed locally
Problems for which solutions suitable for developing countries do not exist	"Canonical" solutions exist, but for different scarcity reasons they are unsuitable for developing countries	No solutions yet: typically health issues like vaccines against cholera or AIDS

Source: Srinivas and Sutz 2008.

necessary for R&D, centers of excellence and the involvement of industry, technoparks are key elements for effective innovation ecosystems.

Solving local development challenges for green and inclusive economic growth

Due to the scarcity of R&D investment, Africa needs to target priority domains in which to invest. The priority areas identified by the African Development Bank, the African Union Commission, United Nations Educational, Scientific and Cultural Organization and the United Nations Economic Commission for Africa are water, energy, health, agriculture, biodiversity, education and ICT. These priorities are the core of the Pan African University (box 13.2).

Water. One goal is to provide safe water at affordable cost to everyone. Africa's water and sanitation infrastructure deficit is a serious obstacle to the continent's growth prospects and socioeconomic development. It partly accounts for the continent's lack of competitiveness. In 2010 only 66% of Africans had access to safe water and only 40% to improved sanitation.[14] Weak human capacity, inefficiencies in services delivery and poor transparency and accountability are factors in the deficit. Research is needed to identify alternative technologies that could be scaled up to ensure sustainable provision of water in rural areas (see chapter 10).

Energy. Clean energy is vital. Access to energy can affect socioeconomic parameters like income, education, health and life expectancy (see chapter 8). Energy can act as a multiplier of the Millennium Development Goals because it can stimulate economic growth to generate employment, boost educational opportunities and improve general health. To achieve energy access for all, Africa must maximize clean energy options and emphasize energy efficiency. Technology should be enhanced through R&D to identify and scale up alternative energy options and realize the potential of hydropower and solar energy.

Box 13.2 The Pan African University: Regional STI pole of excellence

The thematic areas constituting the Pan African University (PAU) Institutes and the geographical distribution are basic sciences, technology and innovation in East Africa; earth and life sciences (including health and agriculture) in West Africa; governance, humanities and social sciences in Central Africa; water and energy sciences (including climate change) in North Africa; and space sciences in Southern Africa. The Bank in July 2013 approved a USD45 million grant to support the establishment of the PAU governance structure and the first three PAU Institutes in the following countries:

- Kenya: PAU Institute for Science, Technology and Innovation (PAU-STI), hosted by the Jomo Kenyatta University of Agriculture and Technology.
- Cameroon: PAU Institute of Governance, Humanities and Social Sciences (PAU-GHSS), hosted by the University of Yaoundé II.
- Nigeria: PAU Institute of Life and Earth Sciences (PAU-LES) hosted by the University of Ibadan.

For North Africa, Algeria is hosting the PAU Institute for Water and Energy Sciences. The selection of the host country in the Southern African region (space sciences) is in progress.

The project will help provide Africa with the skills it needs to add value to its natural resources and enhance its competitiveness and sustainable growth. Through its postgraduate programs in science, technology, engineering and mathematics, as well as the innovation and governance programs offered in its thematic networks of institutions, the PAU will help bring together a critical mass of talent in priority areas for Africa, while enhancing regional cooperation and integration in training and research in higher education and ensuring gender diversity for social inclusion.

The PAU will thus help address the challenges facing African countries in their efforts to establish knowledge economies, including the scarcity of scientists and engineers in key fields, the minimal contribution to scientific knowledge and the migration of well-qualified students to high-profile institutions abroad. By offering postgraduate training (Master's and PhD degrees), the PAU aims to create centers of excellence in science, technology, engineering and mathematics and boost the innovative capacity of Africans to adapt to the changing needs of the global economy. Further, by supporting intra-African mobility of highly skilled people, the PAU will strengthen regional integration and addressing the brain drain.

Health. The very high burden of disease must be alleviated. This burden falls disproportionately on women, children and the poor. It is also a serious impediment to sustained and inclusive growth. For example, where malaria or HIV/AIDS is endemic, labor productivity and investment are suppressed. Similarly, the sickness and death of a mother can leave an intergenerational burden through child malnutrition or loss of livelihood or education. Early childhood malnutrition especially has long-term irreversible effects on learning, adult health and productivity (see chapter 22). Technology should be harnessed to help reverse these patterns through ICT to improve service delivery and access to care (such as e-health solutions, e-learning and health worker training)—and innovative solutions to address nutrition challenges (such as value chain analysis to reveal possibilities for achieving social, environmental and health goals and development of food industries to tackle micronutrient deficiencies).

Agriculture. Research, technology and innovation can contribute a great deal to reducing rural poverty in Africa, where agriculture is the primary source of livelihoods. Although African economies, closely linked to natural resources, rely heavily on agriculture, largely rainfed, agricultural development has long been considered of secondary importance. It is important to rethink agricultural policies and practices, particularly how science and innovation can address development and sustainability challenges, given that Africa will be particularly vulnerable to climate change and the variability linked to biodiversity loss, food insecurity, water scarcity and more frequent droughts (see chapter 9). Technology and innovation have demonstrated that they can improve sustainable agriculture and yields—another reason for enhancing STI in Africa.

Promoting science through a New Education Model for Africa

Africa must strengthen its ability to innovate under scarcity conditions (see table 13.1). In Africa innovation must deal with shortages, weaknesses and the inadequacy of several types of inputs, but it does have access to inputs from industrialized countries.[15] Still, this constraint has some advantages because it helps make products cheaper and offers more demand-based products and services, as seen in India and South Africa (generic drugs), Brazil (machinery for cereal processing) and China (information technologies). If Africa's innovation is to target resource-scarce users, it needs a new model of innovation in higher education. African entrepreneurs and students need to acquire the skills set to innovate in scarcity conditions, such as problem-solving capacity, self-esteem and creativity.

A country's education and training system influences its capacity to find innovative solutions to societal problems and needs. The system should foster technical and cognitive skills that promote new ways of thinking, a productive workforce and entrepreneurship (see chapter 17). It should cultivate a sense of social responsibility and social inclusiveness and enable citizens to make informed decisions. STI thrives on the expansion of higher education, and its benefits to society are twofold. First, it facilitates production and efficient use of scientific research that can be reinvested for structural improvements in education systems in areas such as technical and vocational education and training. And second, it can be invested in society as a means of building human capital.

Policy implications

Thus the key questions for policymakers are:

- What are the appropriate policy instruments?
- What role is there for universities (and perhaps African university partnerships with top-tier international universities)?
- What is the role of Africa-based think tanks?
- What can be done to stimulate entrepreneurial action?

We explore these questions through a critical evaluation of the nature of policies appropriate to innovation-based development.

Using STI to build skills

STI can help Africa produce more value-added products and diversify its economies. Greater STI capacity can help make Africa more competitive by fostering productivity and changing economic specialization (box 13.3). For several decades most African countries have produced goods and services based on their endowments—usually labor-intensive natural resources. One of the main constraints on moving their economies up the value chain is the lack of STI capacity. Improving it is the only way to challenge competitors. Indeed Africa is already adopting new technologies to produce more sophisticated goods and services: "The continent is acquiring industrial technology at a very fast pace. For instance, imports of capital goods have increased nearly three times and royalties and licensing fee payments have increased almost six times between 2000 and 2008."[16]

By mastering new technologies African countries can integrate better with the rest of the global economy and produce at least parts of complex goods. For example, Airbus has recently invested in Morocco and Tunisia, where hundreds of local engineers are working in high-tech units to produce components of Airbus aircraft. Ethiopia is also now part of Boeing's production chain.

Problem-oriented projects are a good way to build initial capacity, and indeed may do more than that if the project is sufficiently embedded, uses local input to identify problems and concludes by creating a concrete product that can be efficiently distributed. Key is understanding how to embed project approaches within broader systems of innovation networks and deepen knowledge of local capacities, needs and markets.

Diaspora networks and knowledge can be useful. A successful diaspora network has three elements: members who are talented and demonstrate strong intrinsic motivation; members who are implementing projects in their country of residence; efficiency, continuity and development based on concrete activities with measurable outcomes. But the African diaspora is not well-mobilized, especially in STI. Although most of the world's prestigious universities have benefited from African talents and skills, the continent has seen few returns.

Several initiatives could reverse this situation by building virtual platforms and networks involving the diaspora. For example "virtual innovation centers" could be launched

Box 13.3 The First Africa Forum on Science, Technology and Innovation

A high-level ministerial conference on STI, hosted by the Kenyan Ministry of Higher Education, Science and Technology, took place in Nairobi on April 1–3, 2012. Sponsors were the Bank, United Nations Educational, Scientific and Cultural Organization, African Union Commission, Unite Nations Economic Commission for Africa and Association for the Development of Education in Africa. A ministerial declaration signed by 30 African Ministers of Science and Technology formed the basis of the Nairobi Declaration, which has the following broad objectives:

- Develop STI policies, strategies and programs for youth employment, human capital development and inclusive growth in Africa.
- Promote, nurture and harness Africa's creative minds and entrepreneurial talents.
- Enhance the links between STEM education and labor markets in Africa by strengthening those between knowledge generation and enterprise development, linking governments, academia and small and medium enterprises and supporting rural development and the informal economy.
- Build up scientific research in Africa by increasing investment in collaborative research, supporting institutional and human capacity building in R&D and strengthening higher education and research institutions.
- Harness STI for sustainable development by ensuring that R&D is used to solve societal problems, such as those related to water, health, ICT, energy and agriculture.
- Facilitate knowledge production and transfer between countries by strengthening regional networks and South–South and North–South cooperation and developing financial instruments.

Source: www.adeanet.org/STIforum/en/content/about-1st-africa-sti-forum.

by extending the initial vision for the United Nations Economic Commission for Africa to the diaspora. Members of the diaspora may also help finance local R&D.

Knowledge can be produced and diffused in the production sector. Institutions of higher education need an active policy on scientific publication. Although Africa accounts for 13.4% of the world's population, it has been producing only 1.1% of world scientific knowledge.[17] Of 4 million scientific papers released annually, African scientists contribute only 1.8%. Only 3 African universities are among the top 500 in the world. African countries average 35 scientists and engineers per million inhabitants compared with 168 in Brazil, 2,457 in Europe and 4,103 in the United States. African scientific publications should be encouraged by the launch of African journals on scientific subjects and by encouraging publication through setting rewards in the higher education system or appraising university teachers based on their publications. Promoting the New Education Model for Africa in Africa over the next five years must include policies promoting international publication. There is also a need to diffuse and share scientific knowledge from African universities for the benefit of industry and the economy.

Using STI for efficient and inclusive service delivery

There is a clear need for national STI policies and reforms. To maximize returns from STI, dedicated national institutions and organizations must be set up and faculty capacity built. Take Kenya. The government has established a Kenya National Technology Acquisition Office, National Innovation Agency, National Commission for Science, Technology and Innovation and National Research Foundation. These are very similar to those of South Africa, which leads the continent on STI. African countries will benefit fully from STI only if they build such dedicated organizations.

Relationships between government research organizations and potential users of their innovations are absent or unsatisfactory. Academic research tends to be oriented toward the interests of the international scientific community. The substantial literature on the problems of indigenous technological transfer in India suggests that inadequate coordination between different sectors of that society is in part responsible for India's failure to build on its potential for technological innovation.

Centers of excellence in science and technology boost the innovative capacity of Africans to adapt to the changing needs of the global economy. African countries must create these institutions, ensure that they are sustainable and share their experiences.

STI can help alleviate poverty. Instead of seeing STI as held back by a shortsighted concern with immediate measures to alleviate poverty, it is necessary to focus on what STI changes could help alleviate poverty. One basic change is to organize STI more systematically so that poverty alleviation and STI initiatives are compatible. The factors that shape innovation, and its integration into what is both a social and an economic value chain, will vary by sector and reflect differences in knowledge bases, networks, organizational structures and regulatory and other institutional contexts.

A sound system to protect patents and other intellectual property rights is an incentive for innovation. Fostering innovation needs to take property rights into account. Although innovators must protect their work through patents, most African countries do not do a good job of regulating property rights, undermining the value of patents and thus innovation. Africa must benefit from the accelerating world trend to measure innovation by number of patents. Efforts must be directed not only to producing patents but also to using patents effectively. M-Pesa is a good example of research and innovation being produced by Africans for Africans but patented and licensed in the United Kingdom. How can Africans take this back

The mobility of researchers and students in Africa needs to be fostered and networks need to be strengthened by building the African research space. Tertiary students from Sub-Saharan Africa are among the world's most mobile; a decade ago nearly 6% (200,000) were studying outside Africa, mainly due to the lack of high-profile institutions in science and engineering and the low proportion of students studying science compared with other parts of the world. One of the main issues for the next decade is to support and facilitate intra-African mobility of highly skilled people through STI. Solid policies will strengthen regional integration and address the brain drain (see chapter 20).

The approach should be to build on the rapidly evolving best practices of African networks of centers of excellence, including those started under NEPAD auspices.[18] The new African Development Bank–supported Pan African University and the World Bank–supported African Higher Education Centers of Excellence fall in the same category.

Using STI to build inclusive financial and social systems

Promoting biotechnologies in Africa would help Africans achieve self-efficiency in food production. Recent discoveries in biotechnologies allow Africa to enhance its returns to agriculture and select crops appropriate for each country. While acceptance by local populations is still an issue, responsible use of new biotechnologies, along with conventional plant breeding, can contribute to Africa's food security. Several African countries, like Tunisia, have biotechnology strategic plans and technoparks, though the biotechnology dividend has yet to be fully collected.

> Africa missed the green revolution, which helped Asia and Latin America achieve self-sufficiency in food production. Africa cannot afford to be excluded or to miss another major global "technological revolution." It must join the biotechnology endeavor.[19]

Because it is pro-poor and inclusive, STI can reverse "jobless growth." One of the best-known applications of new technologies is the short message system. Such technology can save lives by disseminating health information and even help prevent some epidemics. The shift in technology use is worldwide. ICT allows the poor to shortcut the problem of expensive equipment and concentrate on communicating, which is why many Africans are adopting mobile technologies and using them a great deal.

> Not only has the continent been the fastest growing market for mobile phone services, a number of mobile applications and technologies have been invented and applied on the continent. These include MPESA's "banking the unbanked" in Kenya, Dr. Math's mobile tutoring support in South Africa and the Pedigree short messaging service (SMS) platform in Ghana. These initiatives are serving millions of Africans and are driven by the continent's intellectual capital, supportive business environment and the interest of the private and public sectors in adopting and using these innovations.[20]

Such technology is important to increasing productivity, among other human benefits. To some extent it can reverse jobless growth. In fact, STI can allow Africa to explore new growth trends (especially in services) by using and customizing new technologies, as through e-business. Several European and North American firms are now delivering e-services from Africa and are offering jobs for educated youth who have mastered these technologies.

Improving STI teaching methods could benefit disadvantaged populations. To some extent STI has a bad reputation in Africa as the enemy of local traditions, habits and cultures. There is thus a need to demystify science in Africa by showing that it is not only for the gifted, by teaching it in primary schools as

part of the general education syllabus and by opening scientific laboratories and centers to the public.

STI varies greatly among African countries, from the more fragile to the more advanced economies. While some need to build their vision, strategy and reforms, others—like South Africa, Rwanda, Tunisia and Egypt—simply need to build up current operations.

Conclusions

STI can improve Africa's economic transformation by increasing the capacity to face development challenges. As STI pervades all sectors, it can, through R&D and its technological applications, enhance a country's ability to add value to its natural potential and to become more productive and competitive, thus promoting sustainable growth.

Strengthening STI's role in Africa's development requires policies and reforms conducive to attaining knowledge-economy status. They include promoting national ownership of STI and adopting strategies, including public–private partnerships, to boost the emergence of critical masses. African countries will need to allocate enough resources to STI from their own budgets to ensure that funding is predictable and sustainable.

Firms have in general been rather absent from STI policy in Africa. With a few important exceptions, firm-level innovation has not been seen as particularly important to link to S&T development in Africa.[21] Future policies for STI will need to take better account of the fact that much innovation in East Asia is still imitative and that more work like that of Adams and Clemmons (2006) on the relationship between research systems and industrial systems is needed.

Technological innovation is also a contextual process, and it should be assessed by the socioeconomic condition in which it is embedded. Without this, catch-up varieties of technology-led economic policies are unlikely to meet the needs of most people, especially in countries where innovation and poverty reside side by side.

Notes

1. Raffo, Lhuillery and Miotti 2008.
2. Arza and Lopez 2010.
3. Jefferson, Rawski and Zhang 2008.
4. Hegde and Shapira 2007.
5. Argentina, Chile, Colombia, Costa Rica, Panama and Uruguay; Crespi and Zuniga 2012.
6. Using variables that track the performance of an economy, this methodology helps illustrate how well an economy uses knowledge for its economic and social development. See www.worldbank.org/kam.
7. The European Innovation Scoreboard was created at the initiative of the European Commission, under the Lisbon Strategy, to provide a comparative assessment of the innovation performance of EU Member States. The EIS 2007 sets out innovation indicators and trend analyses for the EU27 Member States and for Croatia, Turkey, Iceland, Norway, Switzerland, Japan, the United States, Australia, Canada and Israel. The Annexes contain tables with definitions and comprehensive data sheets for every country. The EIS report and its annexes, accompanying thematic papers, interactive tables to view results and the indicators database are available at http://www.proinno-europe.eu/metrics.
8. NEPAD 2010.
9. NEPAD 2010.
10. UNESCO Institute for Statistics database 2012. http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=143&IF_Language=eng(2012).
11. Based on the SCImago Journal & Country Rank for 2011: www.scimagojr.com/countryrank.php?area=0&category=0&region=all&year=2011&order=it&min=0&min_type=it.
12. The *h*-index attempts to measure both the productivity and the impact of the published work of a scientist or scholar. The index is based on the scientist's most cited papers and the number of times they have been cited in other publications. The index can also be applied to the productivity and impact of a group of scientists, such as a department or university or country. The index was suggested by Jorge E. Hirsch, a physicist at the University of California–San Diego as a tool for determining the relative quality of the work of theoretical physicists; it is sometimes called the *Hirsch index* or *Hirsch number*.
13. "Africa Favourable Year for Crops," http://us.industrysourcing.com/articles/263046.aspx

14. UNICEF and WHO 2012.
15. Srinivas and Sutz 2008.
16. AU 2012.
17. NEPAD 2010.
18. Kiamba 2013.
19. Wambugu 1999.
20. UNECA and AUC 2012.
21. Rigas and Mhenni 2010, Koubaa, Mhenni and Ghabsi 2010.

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CHAPTER 14

Creating new centers of excellence in Africa

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Developing science, technology and innovation (STI) is high on the agenda of the African Union (AU) and its New Partnership for Africa's Development (NEPAD). The guiding document for AU/NEPAD STI activities is Africa's Science and Technology Consolidated Plan of Action, endorsed by the AU Summit in Khartoum in 2006 (box 14.1), which consolidates AU/NEPAD science and technology programs. The strategic objectives in science and technology are twofold: to enable Africa to harness and apply science, technology and related innovations to eradicate poverty and achieve sustainable development—and to ensure that Africa contributes to the global pool of scientific knowledge and technological innovations.

Technology parks are decidedly important for the emergence of innovations. Generally, these technoparks combine the intellectual resources of universities and funding from government agencies and private companies to allow technologies and research to be commercialized. But economic researchers have found it difficult to quantify their value, and their structure and the roles of those active in them remain unclear. Globally many researchers have decided to analyze the structure but have done so mainly through links on the websites of various actors.

Building STI capacity is crucial for the growth and competitiveness of African countries. Fostering STI requires them to link the private sector to universities and high schools and to provide an enabling environment for new technology firms (see chapter 13). How well countries compete in the global marketplace depends on their ability to innovate and apply technology to industry and other productive sectors. Similarly, their ability to innovate tends to be based either on adoption of new technologies from abroad or on the results of local research and development (R&D)—both of which require investment in STI.

Technoparks—often known as science and technology parks (STPs), as defined below—contribute to these goals. This chapter describes the landscape for them in Africa and presents evidence of their impact on inclusive development, job creation and growth. Investment in them fosters STI, giving Africa an opportunity to catch up with advanced economies through green and inclusive growth.

What are STPs?

Technopark models range widely, from business parks, incubators and science parks to industrial parks. This paper refers to STPs as the general form, especially in developing countries. STPs promote economic growth and foster technology-based sectors. Since 1970, developed countries like the United States, France, Japan, the United Kingdom (UK) and Italy have adopted them. In the 1990s and 2000s developing and emerging countries followed suit. Globally there are now more than 400 science parks worldwide. The main rationale for STPs is that physical proximity between new technology firms creates new value; the agglomeration effects benefit the entire economy by raising its innovation outcomes. STPs are designed to provide the technical infrastructure, logistics and administrative support a young firm needs as it struggles to gain a foothold for its products in an increasingly competitive market.[1]

Policymakers believe strongly in the efficacy of STPs, but researchers are more skeptical. The literature is not unanimous. While authors like Massey, Quintas and Wield

Box 14.1 The Science and Technology Consolidated Plan of Action

The African Ministerial Conference on Science and Technology (AMCOST) is the governance structure for setting continental priorities and policies for the application of science and technology for Africa's socioeconomic transformation. The Science and Technology Consolidated Plan of Action (CPA) constitutes the main framework. The CPA, the instrument for implementing AMCOST decisions, articulates the common objectives of African countries and their commitment to harnessing science and technology for the socioeconomic transformation of the continent and its integration into the world economy.

The CPA covers three main areas: R&D flagship programs; programs for improving policy conditions for science and technology; and implementation modalities, governance and funding mechanisms for R&D.

The CPA is based on capacity building, knowledge production and technological innovation. Capacity building refers to the creation, improvement and mobilization of human skills, physical infrastructure, financial resources and policies for science and technology to be produced and used to solve African problems. Knowledge production is concerned with generating scientific and technical knowledge about Africa's problems and identifying ways to solve the problems. Technological innovation entails the generation of products, processes and services.

The CPA organizes programs in four clusters: biosciences and environment, natural sciences and engineering, health, and improving policy conditions for R&D and technology transfer. These programs are implemented through centers of excellence. Building up existing technoparks and establishing new ones contribute to project success.

Indicators for STI identify gaps that may require government intervention or areas for donors to support capacity building. The system of indicators provides the business case for donor involvement and a means of monitoring changes.

(1992) believe there is no economic effect except the real-estate aspect, Colombo and Delmastro (2002) argue that the farther behind a country is in high-technology activities, the more science parks achieve their goals. But there is not much, if any, evidence on their role in less-developed countries. Still, since emerging countries like those in Africa lack the preconditions for technology-based growth, science parks are seen as a solution, especially for attracting technology-based industry and enterprises.[2] In Africa STPs are now recognized as a means to promote STI, scientific and engineering education and continued professional training, as well as to commercialize R&D. They can be found in Algeria, Botswana, Egypt, Kenya, Madagascar, Morocco, Namibia, Senegal, South Africa, Tunisia and probably other African countries.

Relevance of STPs

The first technopark was established in 1951 in the United States, near Stanford University. It was Frederick E. Terman's vision and life's work that created the foundation for Silicon Valley. Terman harnessed local experience of interaction between industry and university in the field of electrical engineering since the 1880s and in wireless communication since the 1910s to promote Stanford's interests. As director of its Applied Electronics Laboratory, Terman reinforced the relations between university and industry by selecting only projects that would build up Stanford's basic electronics research and enhance the university's reputation. Backed by Varian Associates, Terman transformed the initial plans for a Stanford housing and industrial site into the backbone of what today is Silicon Valley, partnering companies like Fairchild and Lockheed.[3]

STPs provide the ideal setting to enhance innovation and technological progress and thus promote a country's development and economic growth. Through technical infrastructure, logistics and financial administrative support, and specific networks, these parks could promote the marketing of innovation, creation and transfer of knowledge. In 1959 Terman's initiative became the model for Research Triangle Park in North Carolina, and parks began to emerge in Europe in the late 1960s and early 1970s to replicate U.S. success. The first technopark in France, Sophia Antipolis, near Nice, was created in 1969. The first in England, Cambridge Science Park was launched in 1972 near Cambridge University.

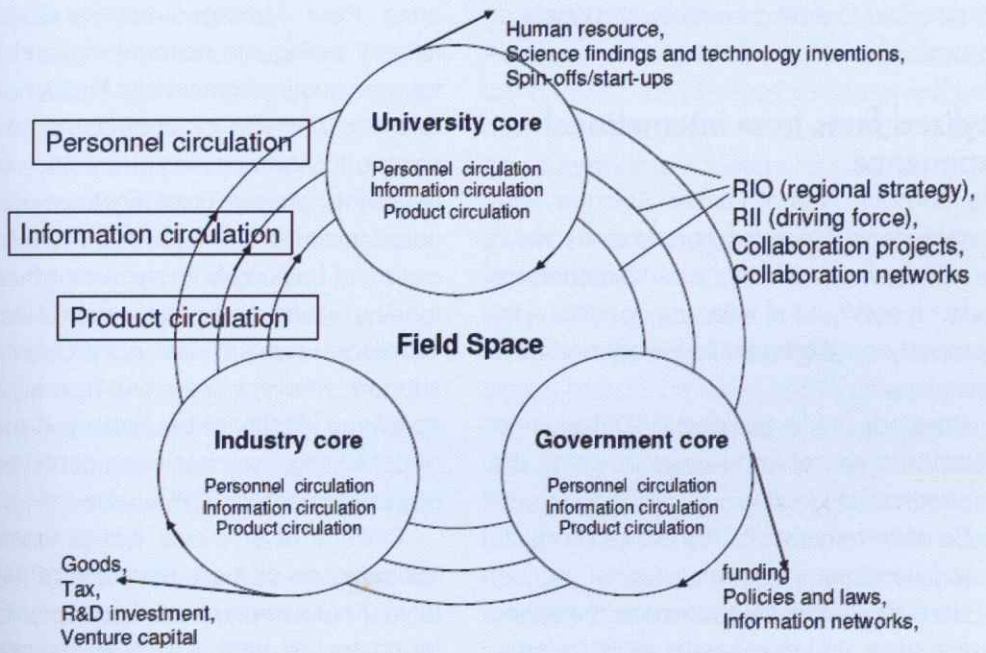
Today, emerging countries are following suit to accelerate technological catch-up and enabling local universities to compete in the global innovation marketplace.

STPs give new-technology firms the support they need to survive, especially at the infant stage. Because of market failure, these firms need strong support from the state.[4] Support can take such forms as access to critical inputs as well as financial, physical and expertise support. Further, governments have become more supportive of STPs when they realized that establishing them close to universities can boost technology transfer and job creation. One role of STPs is also to enable local academics to commercialize their research ideas.[5]

Several arguments are used to justify government intervention in STPs. Oakey (1995) considers the externality argument to be the most important justification for public intervention, because their benefits to society exceed those appropriated by the firms themselves. Castells and Hall (1994) list three motivations for setting up science parks: (re)industrialization, regional development and creation of synergies. Colombo and Delmastro (2002) add that because new-technology firms are sources of radical innovation and unconventional technical approaches, by supporting them, governments may open new industrial sectors. Emerging economies use such arguments in supporting technoparks to improve their competitiveness, establish industries with greater value added and compete in global markets. The parks are also intended to compensate emerging economies for their lack of the initial conditions necessary for technology-based competition, such as markets, interactions and skills.

The triple helix model of innovation, which brings together academia, government and business, is a basic approach to developing science parks (figure 14.1). Interactions among stakeholders transform the role of each institution. In some circumstances the university can take the role of industry, helping incubate new companies. Similarly, government can take the role of industry, helping support parks through funding and regulatory changes. Industry can take the role of the university in training and research, often at the same high level as the university.

Figure 14.1 The triple helix model



Note: R&D is research and development; RII is regional innovation initiator; RIO is regional innovation organizer.
Source: Etzkowitz 2007.

There have been several schools of thoughts regarding the role of parks in promoting new technology-based firms (NTBFs) and their impact on firm performances, with often contrasting conclusions. Some believe that STPs have generally failed to foster the establishment and growth of NTBFs or to encourage technology transfer among firms and public research organizations. They argue that "successful" STPs do nothing more than group successful firms in the same area.[6] Others contend that the parks have actually added value to the on-park firms and to the area where they are located. They measure added value, for instance, in increased growth in turnovers and number of employees, greater resource diversification, and lower mortality rates.[7] In particular, some science parks seem to be able to positively affect the innovative activities of tenant firms in terms of R&D spending and intensity, number of patent applications, number of copyrights and publications, number of new products and services launched and so on.[8]

But the empirical evidence for supporting STPs is not clear-cut; the question of how effective they are remains. Still, studies have tried to evaluate their performance since the 1990s, and based on their findings it is possible to draw several stylized facts or lessons.

Stylized facts from international experience

The 10-point Cabral Dahab Science Park Management Paradigm has been influential in the management of science parks around the world.[9] It sets out the following conditions for a property development to be considered a science park:

- Have access to qualified R&D personnel in the areas of knowledge in which the park has its identity.
- Be able to market its high-value products and services.
- Have the capability to provide marketing expertise and managerial skills to firms, particularly small and medium enterprises that lack such resources.
- Be inserted in a society that protects product and process secrets through patents, security or other means.
- Be able to select or reject which firms enter the park. The firm's business plan is expected to be congruent with the science park's identity.
- Have a clear identity, quite often expressed symbolically, as the park's name choice, its logo or the management discourse.
- Have management with established or recognized expertise in financial matters and with long-term economic development plans.
- Have the backing of powerful, dynamic and stable economic actors, such as funding agencies, political institutions or local universities.
- Have among its managers an active person of vision, with decisionmaking power and a high and visible profile, who actors in society perceive as embodying the interface among academia and industry, long-term plans and good management.
- Include a prominent percentage of consultancy firms as well as technical service firms, such as laboratories and quality control firms.

Eight years later, the Cabral-Dahab Science Park Management Paradigm was refined, taking into account research results from a variety of countries. Additional points refer to the type of market the park has access to and access to qualified research personnel, not just proximity to research-oriented institutions. Moreover, it had become clear that backing from dynamic government funding agencies may be a requirement only if the local university does not provide enough support. Finally, there arose new arguments about the identity of the park. The presence of consulting firms has been confirmed as a crucial element for STP survival.

Dozens of empirical works emerged to illustrate one or more elements of the paradigm. For example dynamic universities were found to be central to STP performance. Zucker, Darby and Brewer (1998) found a positive interaction between universities and

the Technopark of North California in biotechnology. Earlier Westhead and Storey (1995) had found that the probability for a firm to survive is higher if the firm has a link to a university and argued that the role of science parks in the UK may be critical to the survival of small, high-tech firms.

Multinationals have had a special role. For Sophia Antipolis, Ben Youssef and Quéré (1999) pointed out the role played by multinationals as a catalyst and noted that most of the founders of new-technology firms had been employed at big companies and their subcontractors.

Fostering interaction between small firms inside a technopark is essential for its success. Bakouros, Mardas and Varsakelis (2002) found that, at three science parks in Greece, there had been informal interactions between industry and local universities but synergies between firms within the parks were scarce. They concluded that technoparks launched in Greece in the mid-1990s were not successful because of the small size of Greek firms, the fact that they had been in operation only a few years and park admissions policies were not so clear. For Hong Kong-based incubators, Chan and Lau (2005) found no evidence of benefits from networking, and argued that networking may be more applicable to Western contexts.

STPs need to consider facilities for the international staff of multinationals, especially cultural facilities. Eto (2005) raised the question of why Japanese policies for technoparks outside big cities (Tokyo, Kyoto and Osaka) were unsuccessful, arguing that cultural factors were the main explanation.

A local labor market with high-skilled and qualified workers is also a prerequisite for STP success. These findings rely strongly on Antonelli and Colombelli (2013), who also emphasized the importance of cultural facilities for technopark success; here, big cities are more attractive.

STPs need to be linked to international value chains and production. Radosevic and Myrzakhmet (2009, 645) showed that in world markets Kazakh technoparks were unsuccessful, noting that, as in many other developing countries, "Kazakh technoparks seem to be successful in terms of facilitating business incubation, but much less so in terms of innovation promotion and diversification of the economy." Firms within technoparks were oriented largely toward the local market and operated in traditional sectors.

Sanni, Egbetokun and Siyanbola (2009) presented a quite new model for starting and managing STPs. They identified three critical groups of actors (determinants, reactors and executors) and set out four submodels of the trajectories of these groups. They considered the "determinant" group to be most important to STP establishment and management. A critical evaluation of the submodels found that the one in which government, industry and university/research institutes are all jointly involved in deciding on policy direction is the most appropriate for a developing country. The authors then concluded that economies in transition should see STPs as having a distinct organizational structure as a result of myriad collaborations and partnerships.

There is noticeable absence of comparative studies of what happens in emerging economies. The collaborative culture differs from country to country. Western cultures (Western European, North American and Australian) are characterized as individualistic; some non-Western cultures (Asian, South American and African) are characterized as collectivist.[10] Differences between cultures may influence how firms operating in a specific country interact with one another.

African technoparks: The landscape

Only 15 science parks in six African countries are affiliated with the International Association of Science Parks (IASP) (see annexes 14.1 and 14.2). South Africa and Tunisia lead, with four parks each (boxes 14.2 and 14.3). Several countries have set up or expanded the structure of their science parks in the last decade. Tunisia's strategic plan, for example, foresees 10 science parks in the next decade.

Most STPs specialize in information and communications technology (ICT), as can be seen in Algeria, Mauritius, Morocco, Rwanda,

Box 14.2 Technoparks in South Africa

As in many emerging countries, South Africa made efforts in the 1980s and 1990s to establish technoparks, some linked to universities and others independent. These projects either failed to attract the type of occupants intended or degenerated into normal business parks offering only real-estate services to residents. With hindsight, it is clear that park management did not understand the elements critical to nurturing an STP with associated value-addition activities. It was within this context that Gauteng Province launched a project to stimulate knowledge-intensive business growth based on a science park model. Given the previous history of such ventures, reference only to international role models and long distances to developed countries with deep STP experience, identifying key success factors on which to base this new activity was critical.

For The Innovation Hub (TIH), in parallel with development of the main site, activities were started in pilot mode, with business incubation a priority. This offered opportunities to understand some of the dynamics of the interrelationships of the components of the triple helix: government, business and academia/research. Significantly, the context of a resource-based economy, based mainly on imported technology, the need to transition from an isolated economy to rapid globalization and emphasis on knowledge-based business required adaptations. The early phase of TIH emphasized the important role of neutral or independent agencies such as STPs in contributing or facilitating close interfaces between the role players. Thus it was realized, as is now common practice, that STPs have a role beyond their physical boundaries that must be catered to in the development strategy. This role has evolved to the point where TIH could initiate a pilot program based on the Finnish Centers of Expertise model—where business and research consortia define key development projects, and an extended community (INNOV8) provides a forum for knowledge-based businesses, with opportunity for regular interaction between R&D institutions and government , and acts as a "voice" for smaller emerging companies. Since one of the major gaps is a shortage of business-ready high-tech skills, the CoachLab program provides a win-win engagement with business and universities that has led to other interactions. All these activities heavily emphasize engaging previously disadvantaged entrepreneurs and graduates to improve their competitiveness.

Source: www.warwicksciencepark.co.uk/wp-content/uploads/2011/03/SuccessFactorsforScienceParks.pdf.

Senegal, South Africa and Tunisia. There are three reasons for this. First, ICT is general purpose and has to be adapted to local context, which is why each country has a park for adapting ICT to its own use. Second, demand for new applications and services is growing quickly, and thus demand for new firms. Third, multinationals seeking to be closer to local demand set up plants in each park.

Most of the other STPs are dedicated to biotechnology and energy technology. The potential of biotechnologies for agriculture is vital for Africa's sustainable growth, but most countries do not have the critical mass of researchers or the tools and machinery required. The focus on energy, especially renewable, in some STPs reflects the need for energy efficiency and sustainable consumption, which is why some governments support these parks.

Yet most of Africa's STPs are more real-estate operations than technological hubs or high-tech incubators. They need firm efforts to upgrade them to international standards. Lack of resources, paucity of links to international networks of knowledge and loose interactions between actors lead to poor performance.

Another issue is that the number of STPs is probably too high for small developing countries. Some countries are building them without ensuring that all the preconditions are in place, such as local labor, experienced managers from the diaspora in leading multinationals and well-known universities in certain sectors. The process of selecting locations and areas of concentration for STPs is also questionable. In some cases, a location is chosen based on political considerations rather than knowledge of the sector.

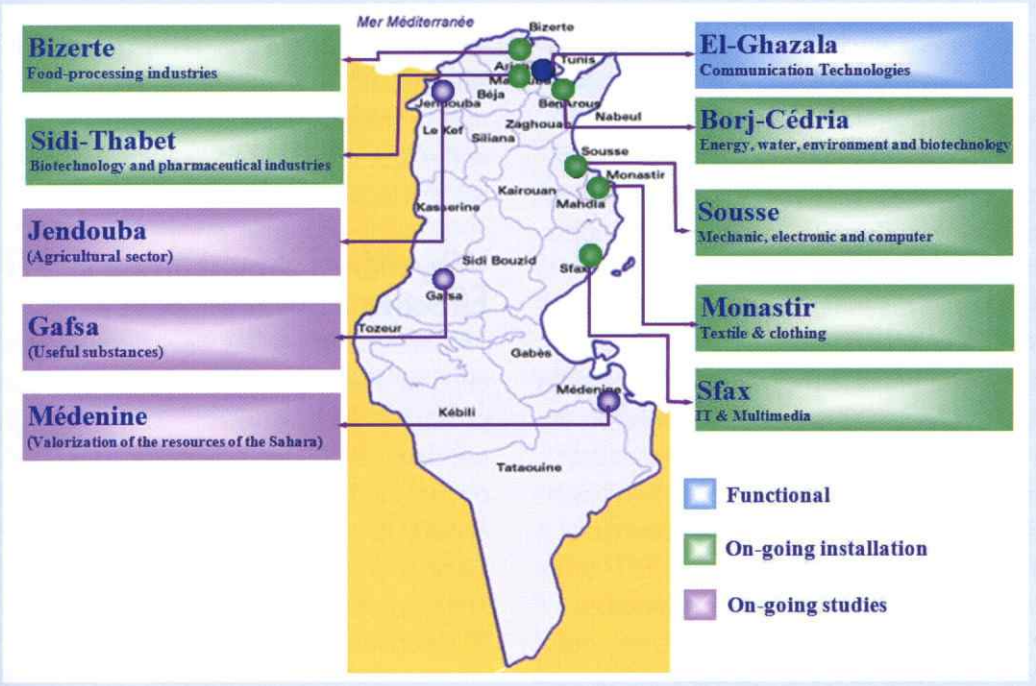
Creating STPs from virtually nothing is not always successful. Africa needs to take into account the new models that are emerging, such as replacing the concept of technoparks with competence centers or competitive clusters. The first model, designed around academic centers of excellence, produce the most significant results in terms

Box 14.3 Tunisia's technopark program

Tunisia began investing in technoparks in the late 1990s. The objective is to create jobs and foster innovation dynamics by integrating research, production and human capital around a single product or sector in a region. By commercializing research, technoparks could be important in incubating innovations.

In 2012 Tunisia had one operational technopark (El Ghazala) specializing in ICT and it is setting up six more. Three others are being studied, with a goal of 10 by 2016 (see map).

Map of 10 technoparks, 2016



Source: Ministry of Higher Education and Scientific Research (www.mes.tn).

Established in 1997, El Ghazala housed nearly 90 companies by 2011 (more than triple that in 2003) and employed about 2,000 staff; 60% of their production is exported, mainly to Europe but increasingly to Africa. (Morocco and Algeria set up similar technoparks about five years later.) TELNET, a major Tunisian success story, was a start-up that became an industrial conglomerate.

Several factors explain the relative success of El Ghazala. First, with considerable help from the diaspora, it attracted multinationals early, among them Microsoft, ST Microelectronics, Ericsson and Alcatel Lucent. Second, cooperation between firms is high. They exchange information and share training. The technopark offers services to local firms and coordinates their activities.

Third, it works closely with the government to attract foreign direct investment, and the work of resident firms is based on real expertise and new-technology potential rather than political considerations. Fourth, the technopark hosts two higher education institutions and seven research laboratories and units, which work closely with other universities and research centers in Tunis. These exchanges guarantee that the local labor market satisfies the needs of these firms. Cooperation between firms and higher education is high. Finally, Tunis is a major city that offers many cultural facilities that attract workers in multinationals.

One concern for firms in the El Ghazala, however, is the brain drain. Even when these firms offer high salaries, large European companies poach their staff with still better salary and benefit packages, making it hard for them to move up the ICT value chain.

Source: Ben Youssef and others 2013.

of publications and patents and have more interconnections with industrial partners. The second model supports the efforts of the most successful industrial clusters in a country by providing research centers, technical resource centers, higher education institutions, and incubators. These new models avoid the costs of developing large empty spaces and exploit the country's academic and industrial potential.

Some African STPs have failed to attract high-profile entrepreneurs and managers. Project managers, at least in the initial phase, were selected for academic rather than entrepreneurial skills and ability to mobilize networks of competencies and skilled people. And some have serious shortages of skills and human resources shortages. There are not yet enough high-quality researchers available in some disciplines, which prevents progress on projects related to research on, for example, tropical or epidemic diseases or very sharp technologies like nano- or biotechnologies. With limited ability and absence of a critical mass of skills, creating an STP does not represent an efficient use of resources.

The government's role must be reconsidered. For STPs to be successful, the private sector should be in the driver's seat and government should act as an enabler, providing an ecosystem conducive to innovation. In Tunisia the government acted as facilitator, especially in promoting adaptation and diffusion of new technologies. Even where firms were created in government incubators (such as, electronics in Taiwan, China, and salmon farming in Chile), they were privatized as soon as they became commercially viable. The government then turned its attention to coordination and regulation. Instead of fostering conglomerates, Taiwan's government developed clusters of new firms each time an industry transitioned to independent technological development.

While Africa seems to generalize STPs to many areas and products, international experience suggests that some preconditions are necessary. For instance, production should be broken down into interdependent segments, the product must be easily transportable and the STP should be located where there is a concentrated population of skilled entrepreneurs operating in a favorable investment climate.

Because regional integration is too weak, African STPs do not attract talent from the whole region. Setting up STPs requires a regional design where countries specialize in particular areas and attract regional talent—no single African country can create world-class STPs alone. For example, Sophia Antipolis attracts workers of more than 100 nationalities, especially workers skilled in telecoms, from all European countries and from North Africa.

Why Africa should invest in STPs: Effective innovation policy

African countries are developing STPs to expand the market for knowledge-based products and services. They have great potential to create knowledge-based economies, and ICT connectivity is now good enough to allow firms to produce services linked to the international value chain. So it is not surprising that ICT is the main theme for STPs on the continent.

Elsewhere policymakers and regional actions set up science parks to increase inventions and innovations, which become visible in terms of higher numbers of patents or new products and services. As yet this does not seem to be so in Africa.

Actually, Africa is far behind most of the world on patents. The total number granted for African countries (excluding South Africa) rose from 6 in 1995 to 16 in 2008, but although there was a peak in 2004 of 27 patents, there was a steep decrease after that. During that period only 28 of the 54 African countries had at least one patent granted by the U.S. Patent and Trademark Office (USPTO). Nearly two-thirds of African countries had less than five patents and half of them had just one or two patents during the period. Of the 28 that had patents during the period, 19 had none in 2008.

These figures show that the share of patents granted to innovators in African countries is insignificant—only about 1% of all U.S.

patents granted in 1977–2008. More worrying is that the trend is still down: before 1995 the share was about 1.24% but in 2007 and 2008 it was only 0.75%. By creating an environment conducive to linking STI and industry so as to make a larger contribution to value chains, STPs should enhance Africa's readiness to register patents.

Africa's R&D strengths and weaknesses are highlighted in a study on the state of science and technology in the AU for 2005–10 by the African Observatory of Science, Technology and Innovation.[11] The number of publications in scientific journals AU scientists were generating was assessed for all the 54 AU member countries. The results are generally positive, with dramatic growth in both total scientific production and publication quality. The scientific production of the AU grew 22% faster than the global average for 2005–2010. Several African regional economic communities saw even faster growth: indexed production of the Arab Maghreb Union grew by 60%, that of the Community of Sahel-Saharan States by 50%, and those of the Common Market for Eastern and Southern Africa and of the Economic Community of West African States by 47% each. By country, production in Algeria grew fastest (74%) over the period.

Scientists in South Africa and Egypt had the highest number of scientific papers published during the period—an indication of the scientific and technological activity there—followed by Nigeria, Tunisia and Algeria. But Tunisia becomes the top performer and Seychelles the second in scientific production per million inhabitants.[12] The analysis also shows that South Africa hosts the largest number of leading scientists, consistent with its top role in African science, followed by Tunisia, Egypt, Kenya, Algeria, Nigeria and Cameroon. These seven countries host 90% of the most active scientists in the AU.

To summarize all these statistical indicators, it is possible to identify at least three groups of African countries by scientific and technological capability. The first group comprises leading countries: South Africa, Tunisia, Egypt, Algeria, Kenya and maybe Nigeria. The second group—perhaps most important because it is contains most AU countries—comprises pursuers with good capacity but also with some shortcomings: among them, Senegal, Cameroon, Zambia, Namibia, Botswana and Seychelles. And the third comprises countries with limited scientific and technological capabilities, such as Niger, Chad, Mauritania and Somalia.

Perhaps not surprisingly, there is perfect correspondence between the scientific and technical capabilities as grouped and the number and status of STPs in those countries. South Africa and Tunisia are a perfect example of the correlation.

In reality, this macro analysis should be supplemented by another that is more detailed and would be based on a survey of the managers of African STPs to test the validity of the Cabral-Dahab hypotheses. Only then will the status of these STPs be clearer and the assessment of their performance more thorough.

STPs will strengthen the links between universities as knowledge providers and firms as employers of youth. Young people are major providers of excellent scientific quality results. Dozens if not hundreds of doctoral dissertations are defended each year but the results are largely unknown to the productive sectors. Technoparks, through geographic proximity, allow for better use of these results and therefore a more fluid relationship between universities and employers. Yet additional tools are also required, such as technology transfer offices and incubators for new projects, as well as financing for project start-up phases.

Policy implications

STPs can help African countries transform their economies by producing more value-added goods and services. Innovation is at the heart of the global economy. Technoparks, science parks and incubators can help Africa not only create new products but also offer new jobs. They will help Africa move up in the value chain. The continent must catalyze its skills in small areas to benefit from agglomeration and spillover effects.

Using diaspora networks and knowledge. Building STPs can strengthen the link and the incentives for the diaspora to be involved in the economy. The African diaspora has not been well mobilized, especially for STI. Although most prestigious universities worldwide receive African talent, little is returned to Africa.

Attracting multinationals and FDI. Technoparks offer facilities for world-class firms to move in, as El Ghazala did in Tunisia. They act as a catalyst for economic transformation.

Reinforcing higher education and R&D. African countries have launched joint initiatives within regional economic communities to strengthen higher education and R&D as a means of regional integration. The Pan African University initiated by the African Union Commission and the Pôle d'Excellence Technologique et Universitaires being designed in Central Africa are just two examples (see chapter 18). Technoparks should be major components of these initiatives to enhance linkages among training, research and industry and promote the mobility of students, researchers and firms while enhancing economies of scale and regional cooperation.

Governance is a problem in launching technoparks. Their governance must be efficient and transparent so as to improve their value for money. They should be governed by independent institutions mandated to attract innovative firms, improve STI and ensure jobs and value-added by resident firms.

Technoparks specializing in key technologies are places where pro-poor technologies can be developed, which will promote inclusive growth. STI is in fact central to inclusive growth. Technoparks create jobs open to all strands of society, rich and poor. Technological firms can also extend their business and create jobs that benefit marginalized people. Finally, some technologies have deep impact on living conditions that can be very positive, especially in matter of clean water and energy (see chapters 8 and 10).

Specialized biotechnology technoparks can help Africa achieve self-sufficiency in food production and processing. Biotechnology offers a range of solutions in health and nutrition (see chapter 15). Recent discoveries can heighten returns from agriculture. Tunisia and several other African countries have technoparks and strategic plans dedicated to exploiting the potential of biotechnology. That dividend will be crucial in the next few decades, because Africa's demographics require more efficient agricultural technology.

Conclusions

Most studies of science parks are concerned with developed economies rather than those emerging African economies. These empirical studies, which are relatively scarce, are still highly relevant. In developed economies, science parks are often more easily and closely better connected to the rest of the system of innovation. This is not always true of emerging economies;[13] because they often lack a well-developed, connected system of innovation, firms located in science parks in emerging economies have to put more effort into interactions with partners in the same science park. Interactions with partners nearby bring benefits but also potential disadvantages, such as lock-in effects.[14]

Africa's transformation requires heavy investment in STI, with special attention to building innovation capacity. Technoparks try to concentrate the means to this end in physical space to foster spillover effects, agglomeration impacts and knowledge transfer. But the secret to building the next Silicon Valley is still unknown. Africa has technoparks mainly in ICT, biotechnologies and energy, but after more than a decade of operation they need to be evaluated on how effective they are and what they contribute to the economy. Africa's economic borders need to be reshaped to attract talent to these technoparks. And national STP policies need to be strengthened and regional initiatives reinforced.

Annex 14.1 IASP members among African science parks

Country	Name	Remarks
Botswana	Measurement Technology Park (Pty)	Affiliate member www.mtpbotswana.com/
	Botswana Innovation Hub	Affiliate member www.bih.co.bw/
Kenya	Egerton University	Associate member www.egerton.ac.ke/
Namibia	Namibia Business Innovation Centre	Full member www.polytechnic.edu.na/
Nigeria	Abuja Technology Village Free Zone Company	Affiliate member www.atvfz.com.ng/bs/
	University of Port Harcourt Technology Park	Affiliate member No website
South Africa	Innovation Hub	Full member www.theinnovationhub.com/
	Vaal University of Technology: VUT Southern Gauteng Science Park	Affiliate Member www.vut.ac.za/new/
	eMonti Science and Technology Park	Affiliate member www.elidzstp.co.za/
	Nelson Mandela Metropolitan University	Associate member www.nmmu.ac.za/Home
	North-West University	Associate member www.nmmu.ac.za/Home
Tunisia	El Ghazala Pole of Communication Technologies	Full member www.elgazalacom.nat.tn/
	Sfax Technopark Management Company	Full member www.sfax-icttechnopark.tn/
	Biotechpole Sidi Thabet	Affiliate member www.biotechpole.rnu.tn/fr/default.aspx
	Pôle de Compétitivité Monastir/El Fejja (Manouba)	Affiliate member www.mfcpole.com.tn/Fr/Accueil

Annex 14.2 Non-IASP members among African science parks

Country	Name	Field	Year of creation	Remarks
Algeria	CyberPark Sidi Abdallah	ICT	2003	www.anpt.dz/
Botswana	Gaborone Diamond Technology Park	Diamond	2009	www.diamondtechnologypark.com/
Côte d'Ivoire	Parc Technologique Mahatma Ghandi	ICT	2013	No website
Egypt	The Smart Village	ICT	2003	www.smart-villages.com/
Mauritius	Ebène CyberCity	ICT	2001	www.e-cybercity.mu/
	Rose Belle Business Park	ICT	2005	No website
Madagascar	Technopole of Toamisina	Not defined	Not defined	www.univ-toamasina.mg/index.php?page=techno
Morocco	Casablanca Technopark	ICT	2001	www.technopark.ma/
	Oujda Technopark	CleanTech	2008	No website
	Rabat Technopolis	Knowledge industries	2008	www.technopolis.ma/
South Africa	Technopark Stellenbosch	Multi-sectors		www.technopark.co.za/
Tunisia	Technopark Borj Cédria	Renewable energy, biotechnology, new materials	2003	www.ecopark.rnrt.tn/
	Technopark of Sousse	Mechanics, electronics	2003	www.technopole-sousse.rnrt.tn/
	Technopark of Bizerta	Agro food	2003	www.pole-competitivite-bizerte.com.tn/
Zimbabwe	National University of Science and Technology Technopark	Multi-sectors		www.nust.ac.zw/

Notes

1. Guy 1996.
2. Bakouros, Mardas and Varsakelis 2002.
3. Williams, 1998.
4. Colombo and Delmastro 2002.
5. Storey and Tether 1998.
6. Bigliardi and others 2006.
7. Albahari, Pérez-Canto and Landoni 2010.
8. Albahari and others 2013.
9. Cabral 1998a,b; Cabral and Dahab 1998.
10. Green, Deschamps and Páez 2005.
11. AOSTI 2013.
12. AOSTI 2013.
13. Lorentzen 2009.
14. Knoben and Oerlemans 2006.

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CHAPTER 15

Skills and technology for pharmaceuticals

Laurence Lannes and Claire Baldin

The World Health Organization (WHO) estimates that a third of the world's population lacks access to the most basic medicines, while in the poorest parts of Africa and Asia this figure climbs to half.[1] According to WHO, prompt diagnosis and treatment with appropriate medicines could save some 4 million lives a year in Africa and South-East Asia.[2] Huge disparities prevail on access to treatment: 15% of the world's population consumes 91% of the world's drugs by value,[3] while every three seconds, a child dies of a poverty-related disease, many of which are curable.[4]

Over the last 10 years, African governments have consistently strengthened their political, economic, financial and health care intentions to establish and expand the pharmaceutical sector. This trend was consistent with an accelerating economic growth, implying an epidemiological transition and a fast growing urbanization that have a deep impact on health and pharmaceutical sectors.

Africa's health systems are facing a "triple" burden of diseases, where traditional infectious diseases still represent the largest burden of disease in most African countries. The "epidemiological transition," in conjunction with rising incomes and urbanization, makes chronic noncommunicable diseases (NCDs) such as hypertension, cardiovascular diseases, cancers and diabetes increasingly prevalent: it is estimated that by 2030 NCDs will account for 46% of all deaths in Africa. This then is compounded by the world's fastest growing mortality, morbidity and long-term disability rates from trauma, accidents (such as traffic accidents) and violence (public and private), resulting in fast increasing health care needs and demands.

Urbanization is growing fast in Africa. The mass migration of rural people in Africa is causing several diseases (see chapter 3). Urbanization patterns in Africa have a deep impact on market and medicine utilization growth patterns. Per capita consumption in urban settings in Africa is approximately 70% higher than in rural settings, and about a third of GDP growth in Africa is driven by cities.

Local production of pharmaceutical products is developing in Africa. There are nowadays more than 300 firms operating on the continent with a number of successful stories especially in Northern and Southern Africa.[5] However, most African firms are operating at a less complex and sophisticated level than in other emerging markets. They are benefiting from the outsourcing of western and southern Asian companies that are moving upward in the sophisticated scale. Most of these companies are producing at the stage of granulation, compression, coating, mixing, blending and packaging.[6] Poor skills and low absorptive capacity in research and development (R&D) limits the capabilities of African firms and prevent them for competing in the international markets.

This chapter analyzes how Africa can build skills for its pharmaceutical industry and how it can capitalize on the new technologies in order to address its health challenges and compete in the international markets. The first section provides an overview of the pharmaceutical sector in Africa. The second section highlights the skills needed for pharmaceutical innovation. And the third section discusses the innovation and R&D policies needed for Africa.

Overview of Africa's pharmaceutical industry

Despite the huge growth potential for Africa's pharmaceutical industry, the continent

presents multiple markets that are highly heterogeneous in pharmaceutical growth, language and trading blocs (figure 15.1).

As Africa imports four-fifths of its medicines, and (with Asia and the Middle East) accounts for only 12% of global pharmaceutical sales of €600 billion a year, the main challenge for the continent is to develop its own industry.

Three types of pharmaceutical industry have a successful track record on the continent, defined as sustainable revenue-generating businesses: innovative multinational companies, Indian and Chinese pharmaceutical companies, and local manufacturers in North Africa (Egypt, Tunisia and Morocco) and South Africa (which dominates Sub-Saharan Africa—figure 15.2). West Africa had 100 medicine factories in 2010; in East Africa, Kenya, Ethiopia and Tanzania are the main sources.

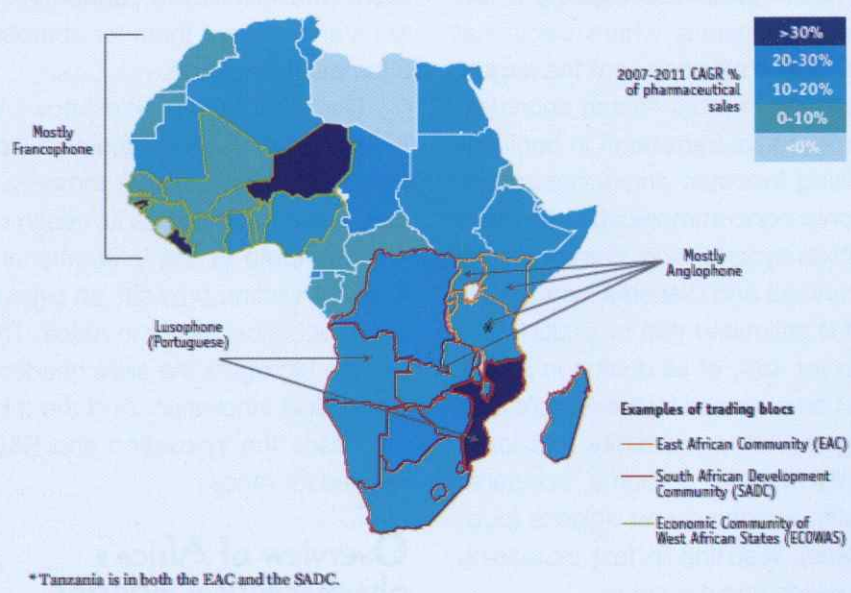
Morocco meets 70–80% of its needs in pharmaceuticals, with 30 manufacturing laboratories regulated by the Ministry of Health. Tunisia's local production impressively meets half domestic consumption (up from only 7.5% in 1987) and the country develops and manufactures generic drugs as per WHO standards. Elsewhere though the picture is dire: for instance, Central Africa imports 99% of its drugs.

To develop strong and sustainable pharmaceutical industries on the continent, African governments need to establish health and industrial policies to boost local production and lower the currently high price of drugs. Key requirements to boost the sector locally include:

- Building investors' confidence by using government procurement to leverage local manufacture and exploring the means to boost exports (to least developed countries, for example) and through a reasonable approach to medicine pricing.
- Expanding domestic capacity in manufacturing key drugs via technology transfers, investment incentives, preferences in government tenders, offtake guarantees and the like.
- Looking beyond simple manufacturing: establishing alliances in R&D, promoting clinical R&D and preparing foundations for the upcoming revolution in pharmaceutical technologies and treatment (biologics, individual therapies).

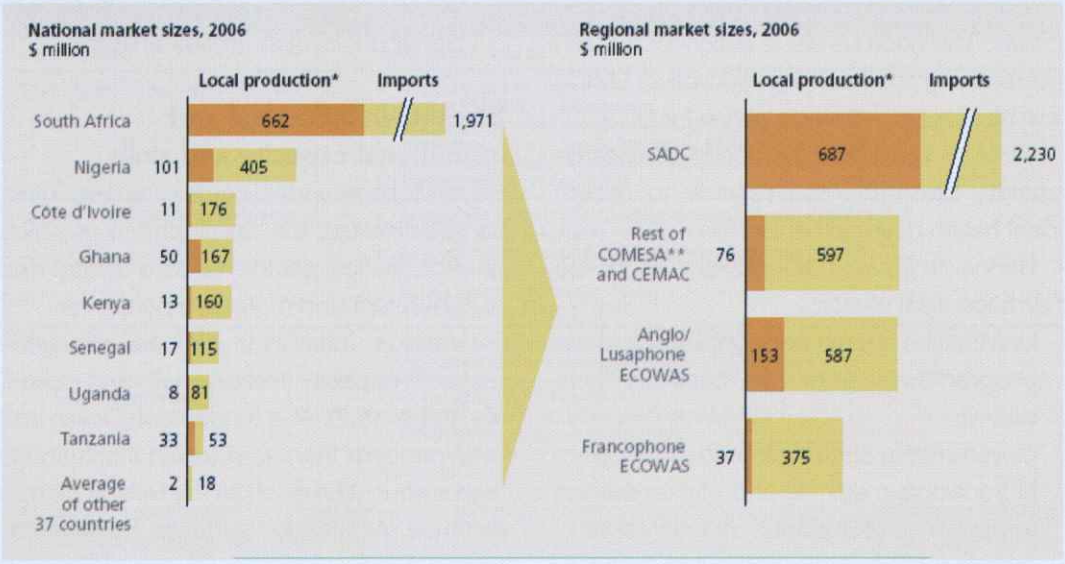
In addition, a focus on updating and upgrading indigenous skills and knowledge, which fit tightly into the drug framework, is needed (figure 15.3).

Figure 15.1 Pharmaceutical growth, language and trading blocs



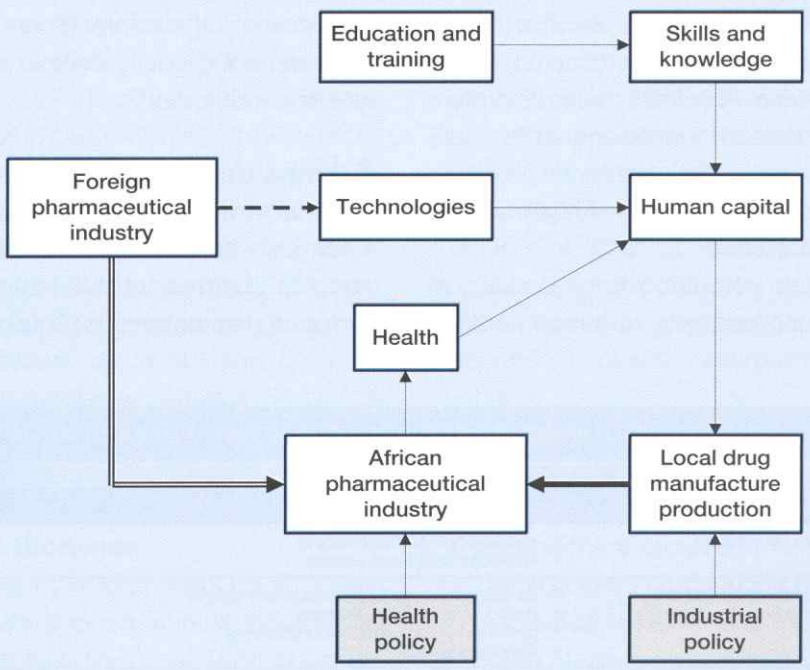
Source: IMS Health Market Prognosis (September 2012), excluding Gabon, Cameroon and the Republic of Congo, which use the 2007–11 CAGR of pharmaceutical import data from the UN Comtrade database.

Figure 15.2 Dominance of South Africa's pharmaceutical sector in Sub-Saharan Africa



Source: World Bank 2008.

Figure 15.3 Conceptual framework



Source: Authors.

Skills needed for pharmaceutical innovation

The skills needed in local production of medicine go well beyond public health, to R&D, intellectual property, trade, fiscal and tariff policies, medicine regulations, stock-keeping, finance, raw-material supply, manufacturing and marketing. Capacity to produce must not be considered independently of the need to strengthen national innovation capacity. Indeed, according to Lansang and Dennis (2007): "The need for health research capacity strengthening is widely recognized as a major unmet need, particularly in low- and middle-income countries (LMICs). [. . .] It's critical for

LMICs to achieve and sustain the minimum knowledge-based mass needed for creativity, credibility and innovation in health and development. The vigorous call to action for building and retaining the health workforce in LMICs must also include strategic action for RCS."

Table 15.1 presents the needs of research capacity strengthening relative to recent global health developments.

Hence, to develop adequate skills for the pharmaceutical sector:

- Universities should harmonize their study programs to generate capacity (see below).
- Governments should strengthen capacity in traditional medicine and phytomedicine through medicinal plants—primarily skills of the national regulatory authorities, and taxonomy, quality control and microbiology.
- States should strengthen R&D capacity: implement a favorable environment for research and build human and institutional resources to establish a critical mass of scientific staff in research institutions in Africa. Africa has to use its current skills in research institutions while seeking to network and collaborate, such as encouraging the creation of regional centers of excellence.
- Authorities should improve skills in intellectual property management to overcome difficulties in negotiating patent terms and other agreements. These skills will allow Africans to secure medicines of higher quality and greater efficacy.[7]

Strengthen individual and institutional capacity and skills

Beyond these wider, contextual and institutional attributes, the development of Africa's pharmaceutical sector needs a critical mass of competent and motivated personnel.

Various initiatives aim to strengthen research capacity (institutionally and individually) (table 15.2). At a fundamental level, initiatives concern themselves with institutions of higher education (such as the Nelson Mandela Institute). At a technical level, initiatives aim for teaching scientists technical or research methods of common diseases in Africa (such as the African Programme for Onchocerciasis Control or the Malaria Research and Training Centre). These strengthen research capacity in diseases; others strengthen technical or management capacity likely to apply to multiple research systems.

Address deficiencies in pharmaceutical research capacity

Africa also faces a lack of resources dedicated to pharmaceutical research, production and distribution. In 2008 a study on

Table 15.1 Research capacity strengthening needs relative to recent global health developments

Changing environment	Examples of needs
Global health policy environment	• Health policy and systems research • Knowledge management systems
Emphasis on development of tools and interventions for high-burden diseases	• Surveillance and information management systems • Product discovery and development • Clinical and field trial design and methodology • Economic analyses
Emerging public health problems and recent research developments	• Surveillance and global alert systems • Research training on priority health problems identified by countries/regions • Equity research • Health policy and systems research • Interdisciplinary research
Brain drain, globalization	• Centers of excellence and virtual centers of excellence • Research financing and incentive systems • Knowledge of regulatory issues and intellectual property rights
Others (cross-cutting)	• Leadership and management, such as priority setting, strategic planning, partnership development, community involvement, monitoring and evaluation • ICT, such as equipment, access and know-how • Research ethics • Research synthesis • Knowledge translation

Source: Lansang and Dennis 2007.

Table 15.2 Examples of initiatives building R&D capacity in Africa

Skills required and capacity	Examples
Higher education	Nelson Mandela Institute
Discovery and development of new medicines	• African Network for Drugs and Diagnostics Innovation (ANDI) • Panel of AU/NEPAD on biotechnology • Global Institute for BioExploration–Africa (GIBEX-Africa) • International Centre for Genetic Engineering and Biotechnology (ICGEB) • Natural Product Research Network of Eastern and Central Africa (NAPRECA) • Tropical Diseases Research (TDR)
Capacity in clinical trials (including ethics commissions)	• African Poverty Related Infection Oriented Research Initiative (APRIORI) • Council on Health Research for Development (COHRED) • Europe and Developing Countries Clinical Trials Partnership (EDCTP) • Initiative to Strengthen Health Research Capacity in Africa (ISHReCA) • Malaria Clinical Trials Alliance (MCTA) • Tropical Diseases Research (TDR)
Knowledge management	• Health Research Systems Analysis (HRSA) in WHO • International Clinical Trials Registry Platform (ICTRP) in WHO
Diseases-oriented initiatives	• African AIDS Vaccine Program (AAVP) • African Programme for Onchocerciasis Control (APOC) • African Malaria Network Trust (AMANET) • South African Malaria Initiative (SAMI) • Tropical Diseases Research (TDR) • Malaria Research and Training Centre in Mali

Source: NEPAD and COHRED 2009.

sanitary products concluded that the main shortcomings in human resources capacity in pharmaceutical innovation were among pre-clinical pharmacology, safety and the treatment of raw materials, and good manufacturing practices.[8] The study also underlined shortcomings in capacity in quality assurance systems for clinical trials and in regulations for medicines.

A number of initiatives already exist in Africa to build R&D capacity on the continent. They aim to develop or strengthen higher education, discovery and development of new medicines, capacity in clinical trials, knowledge management or diseases-oriented initiatives.

Local skills shortages

In an analysis by Naudé and Luiz (2013) on South Africa's pharmaceutical industry, all respondents saw the local skills shortage within pharmaceutical manufacturing as a problem. The skills that appeared in shortest supply were pharmacists. A third of the respondents emphasized that South African pharmacists at university level are primarily trained to become community pharmacists and thus poorly equipped to work in a pharmaceutical production environment.

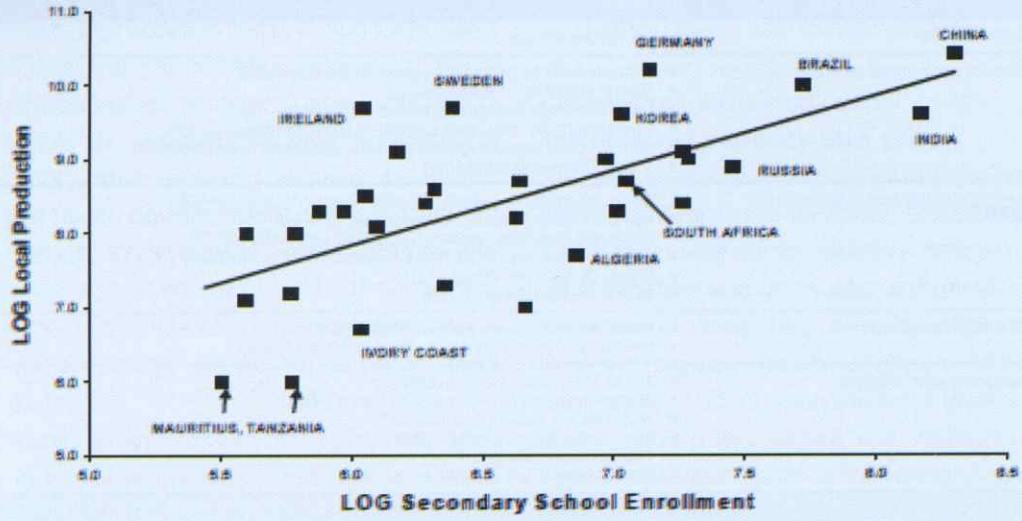
The largest local manufacturer noted that its in-house skills had lagged behind its manufacturing ability and that this had been corrected by bringing in skilled people from Europe and India to act as trainers within local facilities. The second-largest commented that it had been necessary to import skills to facilitate local in-house skills transfer. Another respondent noted that the industry should give pharmacists the opportunity to gain industrial experience and to increase the skills of other technical people in facilities to reduce dependence on pharmacists at all levels of pharmaceutical production. Respondents raised numerous other issues, such as:

- High costs of employing professional skills versus India.
- The reduced number of people entering the pharmacy profession.
- The important contribution that the pharmaceutical industry makes to skills within South Africa.
- The generally high cost of skilled and semi-skilled labor within the industry.

The role of schooling in developing the pharmaceutical industry

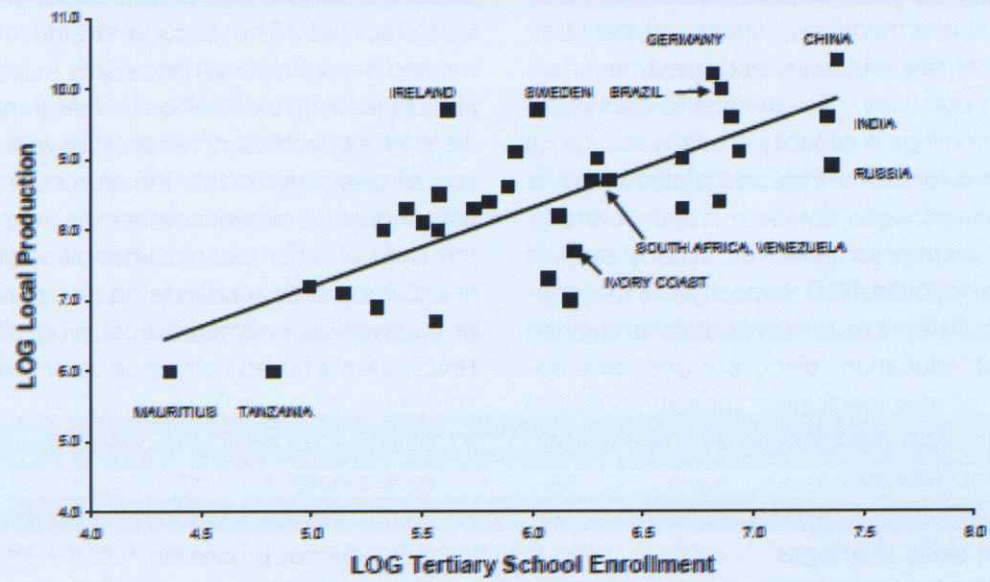
A study by Kaplan and Laing (2005) shows how school enrollment can affect local production in pharmaceutical sector. The trend is toward increasing value of local production as the number of secondary and tertiary

Figure 15.4 **Local production and secondary school enrollment**



Source: Kaplan and Laing 2005.

Figure 15.5 **Local production and tertiary school enrollment**



Source: Kaplan and Laing 2005.

enrollments increase (figures 15.4 and 15.5). Although the data say nothing about the quality of education, and we cannot infer any causality between numbers of students and magnitude of local production, it is certainly true that the available "pool" of skilled workers is important to support a viable pharmaceutical industry.

The study also shows that it is not the total population but the quality of human resources—the number of skilled workers, which, in turn, is based upon the ability of the educational and vocational system to supply industry with these workers—that is key (see figures 15.4 and 15.5). It is plausible to assume that tertiary education supplies the talent pool for bench scientists and engineers, while secondary education is the basis for supplying technical and maintenance expertise.

The potential for job creation

The human resource factor is critical to develop and sustain a pharmaceutical industry, which requires PhD level skills for many jobs, plus enough technical staff to run process development and process stream functions, equipment maintenance and drug regulatory capabilities. It appears that the populations of very few developing countries have the skills needed for these endeavors.

Globally, the pharmaceutical manufacturing industry requires a unique and specific set of skills, especially when one considers the range of skills required in the production, registration and marketing of medicines. Maloney and Segal (2007) assert that the government's focus on primary health care has resulted in a diminished focus on tertiary health care as is evident in the decreased government funding of tertiary education in universities.

There is limited evidence to date on the impact of local production on job creation. According to Kaplan and Laing (2005), there is little evidence of this for South Africa. Major labor shortages in its pharmaceutical sector are found in very high-level jobs most in demand—that is, qualified management- and technical-level specialists such as chemists and pharmacists (particularly those with regulatory experience), laboratory analysts and clinical research specialists.[9]

Innovation and R&D: A challenge for Africa

In 2002 Africa spent only 0.3% of its GDP for R&D, versus a global average of 1.7%; Africa had only 1.2% of the world's researchers.[10] The Organisation for Economic Co-operation and Development considers that R&D is a "creative work realized in a systematic way to increase the quantity of awareness including on the people, the society and the knowledge, and the use of these awareness will serve to design a new applications."[11] R&D activities cover three fields: fundamental research, applied research and experimental development. The aim of R&D is to discover and to generate new knowledge and new products—and to find solutions for problems. The essential capacity for R&D is important for innovation and discovery of new products, common reverse engineering of inverse products and development of new systems.

Africa's shortage of researchers is aggravated by the brain drain toward developed countries: more than a third of African researchers live in developed countries.[12] Multiple documents have stressed the need to promote the R&D, including:

- The Health Strategy in Africa 2007–2015.
- The World Strategy and Agenda on Intellectual Property Rights, Innovation and Public Health (AIPRIPH) (WHA61.21 of May 2008), a document of WHO.
- The Abuja Declaration of March 2006.
- The Accra Declaration on Research in Health of June 2006.
- The Algerian Declaration on Research for Health in the African region of June 2008.
- The Strategic and business plan for the African Network for Drugs and Diagnostics Innovation (ANDI) in 2009.

According to ANDI, there are three main challenges hampering R&D on the continent: very few products are being researched or in clinical trials for the continent's most prevalent diseases (such as malaria and schistosomiasis); there is little collaboration between biomedical R&D centers across Africa; and there is insufficient investment in African R&D, with overall annual R&D spending of just 0.3% of total African GDP.[13]

As a response, different countries have adopted research into national strategies and invested major resources to strengthen R&D. Government institutions and medical research institutes have run programs of medicinal discovery, while some educational establishments have developed drug-research programs and clinical tests centers for bioequivalence testing.

Still, local pharmaceutical bodies have not participated in initiatives into R&D. Some enterprises have developed R&D programs, but most have only small development departments working on engineering or medicinal marketing. Very few innovative enterprises in Africa undertake original

research: they subcontract some of it to institutions on the continent, and devote considerable resources to clinical trials.

These weaknesses underline that Africa's pharmaceutical industry must devote more resources to original, fundamental research into medicines, and must recognize the importance of R&D for its future viability. It needs to create new formulas, systems of delivery, combined products and pediatric formulas—sectors in which African producers lag behind their counterparts in other developing countries.

In short, African policymakers must make R&D more important, greatly improving the region's skills in medical and related fields. It has a long way to go: less than 1% of the thousands of chemical entities developed in the last 30 years focus on the diseases that plague Africa.[14]

Conclusions

In this chapter, we have outlined the needs in skills and capacities to develop Africa's pharmaceutical industry. Improved skills, capacities and knowledge will contribute to promote innovation in Africa's pharmaceutical sector and, as a result, to better address health needs of African populations. To do so, joint efforts and synergies must be developed among governments, regulatory authorities, public and private research institutions, education and training institutions as well as health care providers.

Notes

1. WHO 2004.
2. DFID 2003.
3. WHO 2003.
4. Sen 1999.
5. AfDB 2014.
6. Few exceptions are operating at a more complex level (Sanofi in Algeria, Sanofi Pasteur with Biovac in South Africa, Cipla in Uganda, Cadila Cipla in Uganda, Cadila with Almeta in Ethiopia, Ranbaxy in South Africa and so on). At the same time, GSK, J&J, Sandoz and others increasingly engage at manufacturing levels in Nigeria, Morocco, South Africa, Tunisia, Algeria, Ghana, Egypt and Tanzania.
7. Lansang and Dennis 2007.
8. NEPAD and COHRED 2009.
9. LABAT AFRICA/CMCS 2001.
10. Westholm, Tchatchoua and Tindemans 2004.
11. OECD 2002.
12. CUA and ONUDI 2012.
13. ANDI 2009.
14. Chirac 2006.

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CHAPTER 16

Making national education systems work

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Education is central to Africa's development, partly because of explosive growth in the continent's workforce. Recent International Labour Organization projections estimate that the African labor force will comprise 500 million people by 2020—a 25% increase over 2012 (compare with a 9% average increase worldwide). How will those people become capable job seekers, with suitable skills? The answer lies in better African education systems.

This chapter points out the main challenges of African education, underscores lessons from the past and sets out a vision for education in the coming years. It presents three recommendations for improving education systems:

- *Promote competitiveness and cultivate employment opportunities for the young.* Education should focus on skills development, community service and private sector outreach.
- *Require value for money.* Good governance in education requires flexible management. It also requires accountability through dynamic mechanisms, including community participation.
- *Embody inclusion and support social cohesion.* Build on community commitment, participation and ownership to ensure that education systems help disadvantaged children and groups while advancing accountability.

With a skills-led strategy for growth and competitiveness, unemployed youths will be able to upgrade their skills for available jobs (mainly in agriculture and the informal sector). In addition, such a strategy will promote entrepreneurship, especially through vocational training and tertiary education. With incubation initiatives and financing sources, graduates will become potential employers—not just job seekers. Further, specific investments can improve student learning outcomes and make education providers accountable. Finally, all these efforts should go hand in hand with securing access to education for vulnerable and disadvantaged groups: an especially urgent task in fragile states (see chapter 20).

In short, education in Africa needs to better match the supply of jobs. Policies for education in the region must look away from classical education and toward the productive sector. They must embrace skills and technology, science and innovation.

The challenges of education in Africa

A skills-led strategy for growth and competitiveness will address three broad challenges in Africa:

- *The sheer size of the population of young Africans.* From 231 million today (ages 15–25), the number of young Africans will roughly double by 2050.
- *Low skills throughout the population.* Across Sub-Saharan countries, on average, 6.7% of workers ages 25–34 have an upper secondary education. Only about 4.2% have technical or vocational training or a tertiary education. Despite varying statistics across countries, the skills base is generally thin. (Further, these numbers represent the situation of the relatively young—who are generally better educated than their parents.)
- *A dearth of skilled jobs in African economies.* Across 23 Sub-Saharan countries, an average 83% of working-age adults live on subsistence farming and the informal sector. Only 10% earn their livings in the modern sector—and of these,

less than 45% could be said to work at skilled jobs. Upper secondary and tertiary graduates often find it difficult to find jobs (figure 16.1). Although the most able find jobs abroad, many of them do not take full advantage of their skills, instead working in the informal sector.

The weak demand for skills in Africa is consistent with the continent's small industrial base. Even so, in many countries higher education is growing much more quickly than the job market for graduates is. In Morocco, for example, the number of higher education graduates over 2005–2010 was two to three times higher than the number of highly qualified jobs—exacerbating unemployment and underemployment.

The poor performance of African education systems under these circumstances has four main factors:

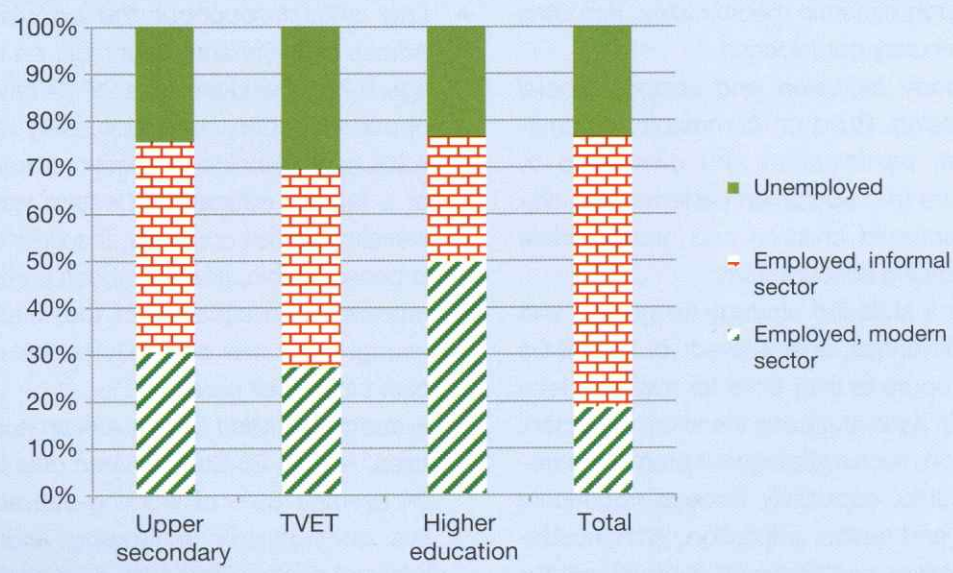
- *Limited access.* Education systems fail to meet the growing demand for school places and for quality education.
- *Unequal access.* Despite recent progress, a gender gap in access to education persists—alongside much wider geographic and socioeconomic disparities.
- *Low quality and irrelevant content.* Learning outcomes are poor, and what is taught does not respond to labor market needs.
- *Inadequate management and planning capacity.* Administration is too centralized and inflexible, information systems are poor and better monitoring and evaluation are needed.

Limited access

Opportunities for education in Africa have expanded in the past 10 years (figure 16.2). The gross enrollment rate (GER) is now estimated at 30% for preprimary education, 61% for lower secondary education, 35% for upper secondary education and 9% for higher education. Students in technical and vocational education and training (TVET) represent 8% of all students in the secondary stream. Since 2000 these figures have been increasing more rapidly than in other developing regions. For example, the GER for tertiary education has almost doubled in Africa while rising by only 53% in other developing regions. And the primary completion rate (PCR)—a measure of the Millennium Development Goals—rose from 53% in 2000 to nearly 70% in 2010. (For other developing regions the figures were 86% in 2000 and 95% in 2010.)

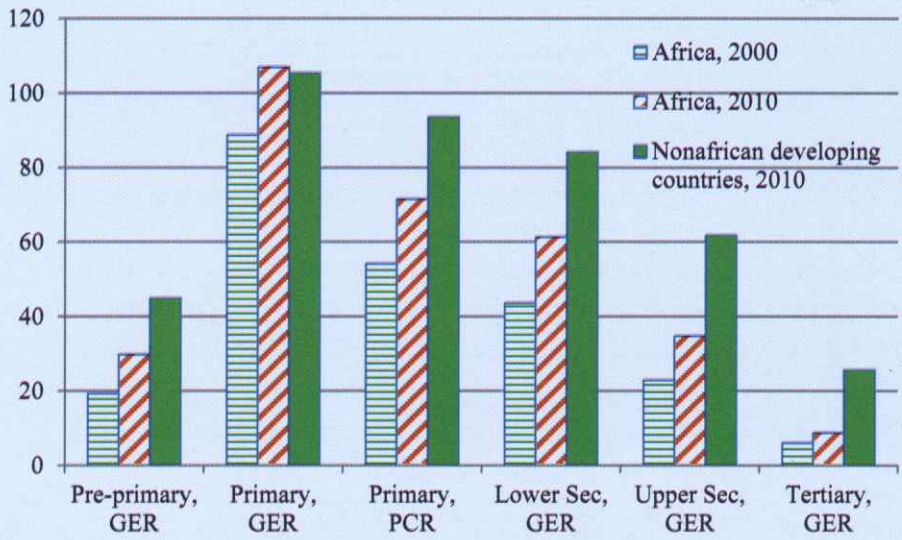
Although access to primary school has risen to nearly 100%, the rate of retention to the end of the primary cycle is much lower. Primary school dropout rates are high. In 42

Figure 16.1 **Employment status by education attainment, Democratic Republic of Congo, 2012**



Source: Authors' calculations based on the 2012 Household Survey for Democratic Republic of Congo.

Figure 16.2 Education enrollment rates for Africa and other developing regions, 2000 and 2010



Note: GER is gross enrollment rate. PCR is primary completion rate. Sec. is secondary.
Source: Authors' calculations based on UIS data.

African countries about 24.2 million primary-school-age children—53% of them female—were not in school in 2010.

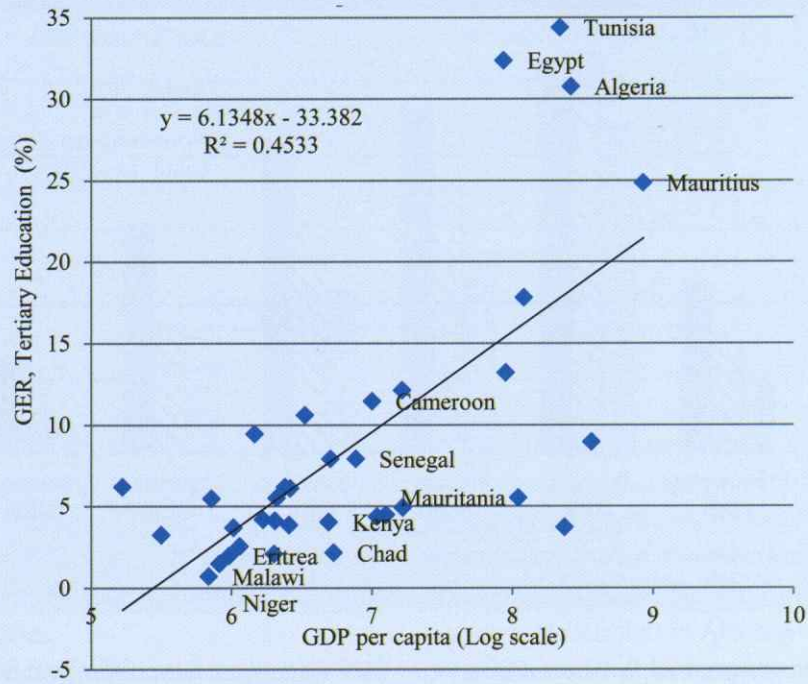
Similarly, adult literacy rate is low: it rose from 63% in 2000 to about 69% in 2010, compared with 85% for other developing regions. And whereas the 2010 African literacy rate was 76% for men, it was only 62% for women. Despite serious efforts in some countries, most national literacy campaigns have not succeeded. The reasons: poor participation by illiterates, poor motivation for learners, high dropout rates—and widespread relapses into illiteracy, which often result from a lack of reading materials for the neo-literate.[1]

That said, enrollment rates vary widely by country. Some countries have nearly attained universal primary education (Algeria, Botswana, Cape Verde, Egypt, Mauritius, Morocco, Seychelles, Swaziland and Zambia). In contrast, six countries have a PCR for primary education of less than 50% (Angola, Burkina Faso, Central African Republic, Chad, Eritrea and Niger). Lower secondary school GERs vary from 19% (Niger) to more than 100% (Algeria, Cape Verde, Seychelles and Tunisia). Upper secondary school GERs vary from less than 10% (Burkina Faso, Central African Republic and Niger) to more than 90% (Mauritius, Seychelles and South Africa). And higher education GERs vary from less than 2% (Eritrea, Malawi and Niger) to more than 30% (Algeria, Egypt and Tunisia).

Such wide variations partly reflect disparities in economic development (figure 16.3). But there is, however, a huge difference in the size of higher education among comparable countries. For example, higher education in Cameroon is 2.6 times more developed than in Mauritania, even though both countries' economies annually produce about USD1,100 per capita. It seems that higher education does not necessarily expand along with job opportunities for graduates.

Other factors in variable school coverage across Africa include culture, national education policies and disruption by civil strife and natural disasters (earthquakes, floods, mudslides). Particularly disastrous, though declining in prevalence, is armed conflict. Such conflict reduces enrollment by raising rates of repetition and early school withdrawal, as pupils seek refuge in villages or refugee camps. Armed conflict also destroys education systems through the shelling of facilities, the looting of educational materials and equipment and the nonpayment of teachers and other education officers. In effect, formal schooling often disappears, debilitating a

Figure 16.3 **The size of higher education tends to increase with the level of economic development, 2010**



Source: Authors' calculations based on UIS and IMF data.

whole generation of children—even as Africa as a whole is making great strides in school enrollment.

Unequal access

Enrollment expansion has narrowed the gender gap in access to education. In the 1960s there were almost twice as many boys as girls attending primary school. Today 94 girls are enrolled for every 100 boys enrolled in primary schools. This number declines to 92 in secondary education and to 84 in higher education—a pattern that mirrors the drop in overall education coverage from primary school to higher education.

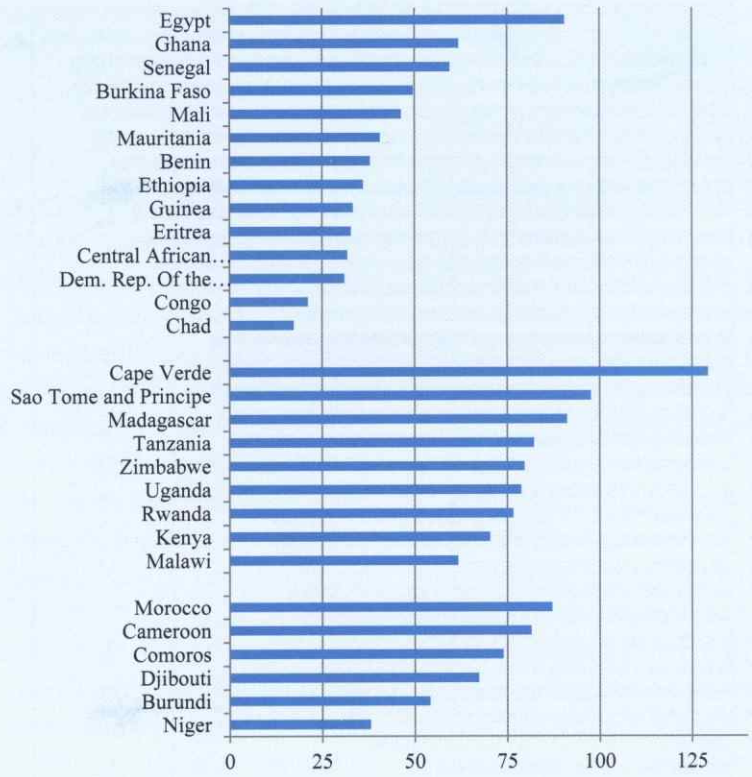
However, these gender gaps can vary among countries (figure 16.4)—even among countries with similar overall education coverage. In 9 countries, including 7 from East Africa, the number of girls enrolled for every 100 boys enrolled in higher education exceeds what would be expected, given the actual size of higher education in the country. But in 14 others, including 7 from West Africa and 4 from Central Africa, the ratio of girls to boys falls below the expected level. Beyond general policies to ease the inclusion of girls, some countries appear to require specific policies to attract and maintain girls in school throughout the education system.

In most African countries preprimary enrollment is equal for boys and girls—perhaps because overall enrollment ratios are low, tending to represent the most affluent. Yet girls are underrepresented in industrial skills at vocational training institutions. Girls represent 42.1% of TVET enrollments in Africa in 2010, with a variation from less than 35% in Central and North Africa to 43–46% in East and West Africa and to 53% in Southern Africa.

The lower participation of African girls and women in both formal and nonformal education has several causes related to both supply and demand. These causes can be classified as:

- *Cultural.* Early marriages, traditional rites and women's low status—all can influence parents' choices concerning a girl's education.
- *Economic.* Education imposes direct costs on parents—for books, school fees, transportation, uniforms and the like. It

Figure 16.4 **Female higher education enrollment as a percentage of male higher education enrollment, selected African countries, 2010**



Source: Authors' calculations based on UIS data.

also imposes indirect costs through forgone earnings and domestic labor. Parents must decide how to allocate their limited resources.

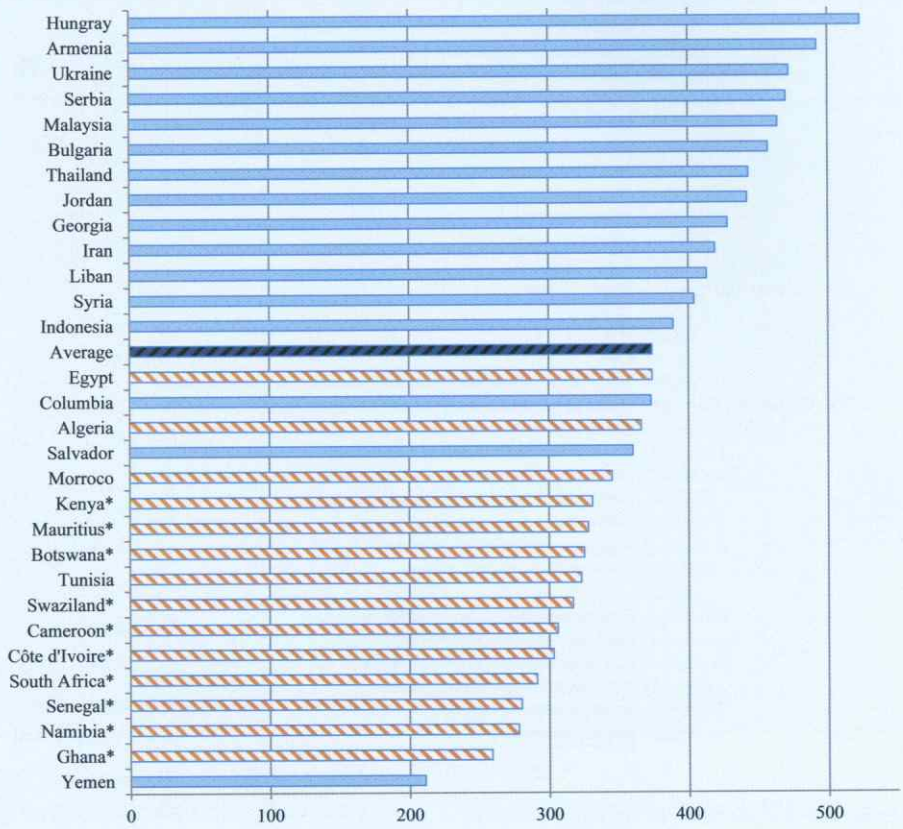
- *Social.* Images of educated women can be negative. The low representation of women in senior positions means that girls have few positive role models—in rural communities, none. And many African countries have yet to formulate specific policies promoting education for girls, especially in scientific and technical fields.
- *Institutional.* The education of girls can be impeded by a curriculum that is insensitive to gender, by the relative paucity of female teachers and administrators and by schools with physical structures that rarely take girls' special needs into account.

While gender gaps still exist, geographic and socioeconomic characteristics cause much more discrimination. Access is unequal between rural and urban areas and among various social, racial, ethnic and religious groups. For example, across 24 West and Central African countries in 2010 or the most recent year, only 19 higher education students lived in rural areas for every 100 who lived in urban areas. And only 14 higher education students came from the 60% poorest families for every 100 from the 40% wealthiest families. Similar, though narrower, gaps appear at other education levels. Efforts to reduce disparities in higher education would require corresponding efforts for primary and secondary education.

Low quality and irrelevant content

Although access to education has increased, repetition and dropout rates are higher in most African countries than elsewhere in the world (figure 16.5). Thus, in Sub-Saharan Africa an estimated 12% of primary school students, and 13% of secondary school students, were repeaters in 2010 (compare with 6% for primary and 4% for secondary in

Figure 16.5 **Average score of students on the Trends in International Mathematics and Science Study, selected countries, 2007**



Note: * denotes equivalent PASEC (Programme for Analyzing Education Systems of CONFEMEN's Countries Members) and SACMEQ (Southern and Eastern Africa Consortium for Monitoring Educational Quality) score on the Trends in International Mathematics and Science Study scale.
Source: AfDB 2012.

other developing regions). Available research shows that repetition has no impact on learning achievement. Even so, high repetition rates reflect a costly and inefficient policy that also tends to increase dropout rates.[2]

The achievement of African students is very low by international standards. For example, on international science and mathematics tests, while African countries rank far behind the industrialized countries, they are also often outdistanced by other developing countries. And among African students who have completed primary school, only 67% can read without difficulty as adults.

Most African universities rate poorly on university quality assessments. For example, only 3 African universities made a recent top 500 compiled by the Jiao Tong University of Shanghai, and only 4 appeared on a recent Times Higher Education Ranking. (One of the distinguished universities is in Egypt, the rest in South Africa.) The three main reasons for the low ranking of African universities are their comparative lack of resources, their inability to attract highly qualified students and their poor showing in research.

Evidence from some African countries suggests a steady decline in the quality of university education. Unit costs—the shares of GDP per capita that countries spend on higher education per student—have fallen steeply since 2000, as enrollment has risen without corresponding increases to education budgets.[3] Students perform poorly on university examinations. Staff recruitment and promotion criteria have become less rigorous. Employers complain that university graduates cannot perform adequately on the job. And institutional output—research and publication—has diminished.

The lower quality of education in African institutions has three main causes: high student–teacher ratios, low management and planning capacity, and an irrelevant curriculum, with insufficient emphasis on science and mathematics teaching (discussed below in more detail).

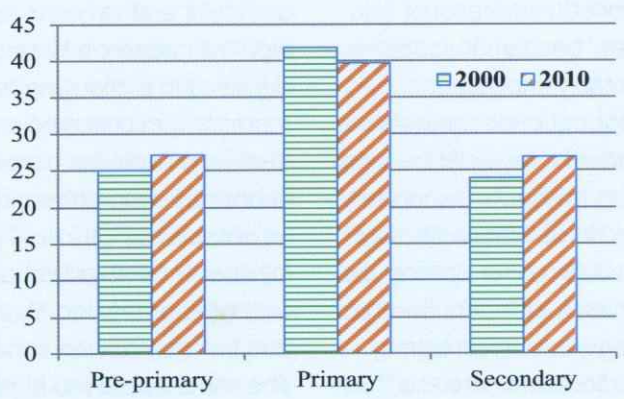
High student–teacher ratios. Student–teacher ratios are generally much higher in Africa than in other developing regions (figure 16.6). Although the ratios have declined slightly for primary education, they have risen at other levels. Many countries lack qualified teachers as defined by national or international standards. For example, in Rwanda 40% of secondary school teachers are qualified to teach only at the primary level—and among higher education lecturers only 16% hold a doctoral degree.

Low management and planning capacity. Management and planning capacity is fairly weak in most African education systems. One reason is that most educational administration systems are too centralized. Administrators at universities, and at regional and local schools, have little flexibility in setting fee levels, in setting locally raised funds, in adjusting the curriculum to local needs, in recruiting staff or in consulting with those directly affected by education decisions (students, parents, teachers, communities). As a result, many teachers and learning institutions do not feel accountable to their communities, while parents may not feel inclined to participate in school affairs.

Information systems for education are generally poor. Much of the education data gathered by education ministries is inappropriate for monitoring and evaluation, policy formulation or resource allocation. Data on resource allocation and utilization, or on inequities other than gender-based disparities, are scarce. And according to the UNESCO Institute of Statistics the quality of available data is low—especially for TVET and higher education, partly because both fall under various ministerial authorities and involve many private learning institutions.[4]

Performance is rarely monitored and evaluated, and planning and management are rarely based on evidence. Because of the teacher shortage, head teachers are usually overburdened with routine administrative matters as well as teaching commitments. It is difficult for regional, district and local education managers to provide teachers with professional training and supervision. Although school statistics are collected, they seem to be kept centrally and rarely used to inform school quality and decisionmaking. And many TVET and higher learning institutions do not produce data on the school-to-work transition of their graduates that can then be used to make training more relevant. In addition, most public education institutions use time inefficiently. Consider the misallocation

Figure 16.6 Student–teacher ratio in Africa, 2000 and 2010



Source: Authors' calculations based on UIS data.

of teachers among schools: on average 30% of teacher deployments to African primary schools are not correlated with school size.

And not all African schools are equally able to turn allocated resources into tangible results. Africa has a "classroom effect" stronger than that seen in developed countries: evidence from 25 African countries shows that being in one class rather than another—with identical pupil and context characteristics—can heavily affect school learning achievement. Why? The effect arises partly from disparities in the availability of resources at different schools. Yet it also reflects the effectiveness and efficiency with which resources are used. A leading hypothesis attributes much of the effect to unobserved teacher characteristics (motivation, charisma, teaching ability) and to differences in teaching hours.

The irrelevant curriculum. The curriculum is blamed for overemphasizing urban cultural norms, alienating children from their cultural roots, continuing to insist on instruction in European languages, containing too much material, stereotyping by gender, neglecting practical science and mathematics for theory and—finally—failing to promote student innovation and creativity. Crucial issues today, such as environment and population, rarely receive adequate attention.

In part because of dissatisfaction with a largely theoretical curriculum, countries have introduced more technical and vocational subjects into the schools—and they have established, or strengthened, vocational and technical institutions. Even so, the share of African students enrolled in vocational education (compared with traditional academic education) has not notably increased.

Many African educational institutions place too little emphasis on science and mathematics teaching. In upper secondary schools fewer than 10% of African students are enrolled in these subjects. As a result, the share of higher education students enrolled in science, technology and engineering is far lower in Africa than elsewhere[5]—a fact reflected in Africa's low production of scientific expertise. Inadequate attention to research and development limits the technological contribution of African universities to the region's economic and social development.

There are many reasons for low enrollment in scientific fields and for the ineffectiveness of the science curriculum. One is the lack of relevant teaching facilities (laboratories, workshops, equipment, books). Another is the use of inappropriate teaching methodologies, emphasizing theoretical knowledge and the memorization of facts. Then there is the lack of qualified science teachers and technicians (largely an effect of poor remuneration for government employees, compared with their counterparts in industry). Last, schools have limited access to modern information and communications technology (ICT)—which is not being used as it should be to meet the challenge of enrollment growth in a time of reduced unit costs.

Education and the overall economy. In most African countries education and training are mainly supply-driven, with less involvement of the private sector, key economic sectors and end-users of graduates in planning, service delivery and monitoring of education and training services. The education and training system has not been flexible enough in other countries to adjust to current and emerging employment opportunities.

The share of TVET enrollment in total secondary enrollment fell from 9% in 2000 to 8% in 2010. This declining demand for TVET has four causes. First, TVET typically costs twice as much as general education. Second, employers and industry rarely help develop curricula and provide apprenticeship training. Their absence hinders TVET from flexibly adjusting to a changing macroeconomic environment with changing employment needs (in trade, the business climate, emerging needs, economic transformation, informal sector growth and so on). So TVET graduates often fall short of employers' expectations, while a lack of support and financing makes it difficult for them to start their own businesses. The same applies to higher education. Third, TVET is often perceived as a path for low performers in general education—whereas

evidence from newly industrialized countries shows that a good TVET system requires a solid general education, enabling learners to progress beyond labor-intensive work and develop skills that involve technology and innovation. And fourth, TVET tends to be based in centers, with too few workplace apprenticeships and too small a presence in the informal sector (where labor productivity has halved over the last 20 years).

The excessive emphasis on general secondary education creates pressure on higher education while representing a missed opportunity to address unemployment. Countries should give unemployed youths short, tailor-made TVET courses to upgrade their skills—or to adapt their skills to the jobs they are likely to find (mainly in the informal sector). At the same time TVET systems should promote entrepreneurship. Incubation initiatives and financing mechanisms (including banks) can lead graduates to perceive themselves as employers, not just job seekers.

Inadequate financing mechanisms

Many of the shortcomings of African education systems discussed in this chapter are related to two basic challenges: the amount of education funding, and the use of that funding. African education systems receive, on average, 18% of national budgets and 4.9% of GDP. These shares exceed the averages for other developing regions (15% of national budgets and 4.6% of GDP)—a difference that reflects African efforts to develop human capital. Yet the amount varies vary by country: for example, the share of public expenditure for education ranges from less than 10% in Angola, the Democratic Republic of Congo and Zimbabwe to more than 25% in Burundi, Ethiopia and Morocco.

As scarce as government funding often is, national education financing systems tend to be inefficient in their use of it. First, the allocation is skewed toward higher education. Second, education institutions spend more than two-thirds of their funds on staff emoluments (or bursaries), with relatively little for key teaching and learning inputs. Despite growing recognition that such a disproportionate allocation is untenable in the long run, few African countries have the political will to change it. To increase efficiency, some countries have shifted from untargeted bursaries to student loans that are reimbursable and more targeted, explored the use of part-time and volunteer teachers and linked funding to performance indicators.

Overdependence on scarce government resources is a major shortcoming of today's African education finance systems. Financial constraints have forced most countries to shift some education costs onto families, communities, nongovernmental organizations (NGOs), external donors and the private sector. While teachers' salaries have largely remained the responsibility of governments, communities are increasingly being asked to share in the cost of buildings and their maintenance. The role of the private sector is also growing, especially in secondary and higher education. Small private universities sponsored by religious organizations and NGOs—and in some cases affiliated with foreign universities—are now common in most African countries.

What's needed

Education is intrinsically linked to other human development goals. Yet African education systems face many challenges. Millions remain mired in poverty, unable to reap the benefits that education could bring. Even where educational services are readily available, the quality of provision is often inadequate. At the same time, higher education is growing rapidly in most countries, outpacing job creation for graduates.

To overcome these challenges, African systems of general education, TVET and higher education must become more relevant by making school leavers more employable—particularly in agriculture and the informal sector, which are the main job providers. Graduates should also possess skills in communication, computers and entrepreneurship. Accordingly, this chapter recommends that countries reshape their education systems to:

- *Promote competitiveness and cultivate employment opportunities for the young.* To meet a need for scarce skills on

the labor market—and increase youth employment in a time of rapid technological change—education policies should focus on critical foundations in science, technology and innovation. Only by developing skills can Africa correct the present mismatch between education and jobs. Countries must shift from a classical model of education to one that is more oriented toward the productive sector.

- *Require value for money.* Even as access remains critical—especially in fragile states and for vulnerable and disadvantaged groups—new investments should focus on improving student outcomes, on adapting education and training to social and economic needs and on making education providers accountable.
- *Embody inclusion and support social cohesion.* For equity and good governance, countries should adopt tailored approaches building on community commitment, participation and ownership to support disadvantaged children and groups—even as they establish dynamic control and accountability mechanisms.

Promote competitiveness and cultivate employment opportunities for the young

To make the demographic dividend a reality, Africa needs a macroeconomic transformation—and efficient education policies. National education systems should focus on developing skills that will boost productivity among small and medium-size enterprises (SMEs), in agriculture and in the informal sector.

Because subsistence farming and the informal sector will remain the main job providers in the next decade, school leavers should possess skills that will boost labor productivity in these sectors. Investment in agriculture can yield human development benefits: job creation, food security and nutrition improvement. Yet the agricultural sector faces a shortage of skilled workers, seen in the lower adult literacy rate. To reduce high TVET unit costs, countries should identify efficiencies in the delivery of vocational training and should adopt policies that promote demand-driven, flexible TVET systems. In particular, countries should establish:

- Strong partnerships with the private sector and professional organizations.
- Experimental projects to boost the productivity of smallholder farmers, SMEs and informal enterprises.
- Innovative center and workplace-based training, including nonformal and literacy programs, technology transfer, technical assistance and access to financial assets.

To build a pipeline of young entrepreneurs, education systems should provide mentorship and technical assistance that support the design of financially sustainable projects with high job-creating potential.

Structural reforms should refocus tertiary education on engineering, mathematics, technology and, more broadly, science and innovation (see chapter 13). High structural unemployment among higher education graduates suggests a system growing more rapidly than the number of jobs for degree holders (see chapter 18). Even so, higher education must supply more of the skills needed to produce technology for Africa today and tomorrow. While students from Sub-Saharan Africa are the most mobile in the world, only about a fifth of those who cross national borders do so to pursue their education within the region (see chapter 20). In addition to better regulation and management for higher education enrollments—and a general focus on engineering, mathematics and science, reorienting tertiary education toward areas where the supply of skilled labor is critically short—Africa should create regional centers of excellence in biotechnology, health, agriculture, energy and manufacturing. Research production can be enhanced through outreach to communities, outreach to the private sector and connections with global knowledge systems.

Technology—particularly ICT—offers cost-effective provision alternatives. Examples include distance learning, virtual universities and communities of practice. Countries should develop national strategies to build science and technology capacities, speeding

up and expanding efforts to improve pedagogy in this area of the education system. They should optimize the system across productive sectors to advance a science-based economy, especially in agriculture, transport, infrastructure and manufacturing. They should increase mobility in education delivery, learning and training through innovative use of ICT and research. And they should promote sustainable investments in innovation to improve secondary and tertiary mathematics, science and technology education—while adopting policies for universal access to affordable ICT devices, content and connectivity.

To assess the skills gap and address it through policies and programming—planning for future regional economic and social needs—African countries need more timely knowledge generation. National and regional observatories of skills and employment must become better at mapping the demand and utilization of skills, using relevant data to inform education and labor policies and training providers. Higher education institutions should also receive the necessary resources to fully identify such needs (in collaboration with the existing observatories) and to develop the specific and scarce skills that Africa requires. Technical and vocational training must become more flexible and responsive to economic demand.

To raise the continent's share of complex exports to the rest of the world and attract increased foreign direct investment in the coming decade, Africa must speed up private sector investment in education and training. A dynamic private sector is needed, one that supports the development of new skills and capabilities for the labor force. Governments alone cannot make the necessary investment. The private sector can help expand training and increase its quality and relevance to the labor market—especially in secondary schools, vocational training and tertiary education. Countries should adopt policies to attract private sector investment in education and training, such as:

- Incentives and access to credit, land and facilities for a better education infrastructure.
- Sound private investment policies aimed at developing school management skills.
- An attractive regulatory framework with quality assurance mechanisms, conducive to a profitable return on investment—especially in higher education and vocational training.

Require value for money

How can education become more efficient while expanding to include all Africans? In most countries access to a quality basic education remains low; the quality of TVET and higher education remains low, with little ability to respond to economic needs (reflecting the lack of autonomy in most institutions); training is still overly center-based; and universities rank low internationally. In the medium term countries have a paramount need for better and more relevant higher education, with a focus on science and technology. Basic education should also be financed through transparent, accountable country systems that follow comprehensive country education strategies (see chapters 28 and 29).

Countries should promote school service delivery that is inclusive and of high quality, provide good education and training opportunities and improve student learning in both formal and nonformal settings. Today at least a third of African primary school leavers cannot read—a waste of resources that exemplifies the inability of education systems to produce relevant basic human capital. Countries require:

- Technical assistance to reform curricula, with common standards and norms for skills development.
- Support for language and numeracy in the early grades, as a foundation for further leaning in science and technology.
- Evidence-based policies to improve learning, with support to develop and harmonize leaning assessment tools.
- Policies that engage end-users, communities and the private sector in school management.
- Support for institutionalized quality assurance mechanisms at all education levels.

- Greater autonomy to TVET and higher education institutions, to make training more flexible and responsive to economic needs.

To make education systems accountable, the public should have a voice in decision-making—in part through performance-based financing. A community evaluation forum can be used to let clients, students, parents and communities influence the daily management of local and national education through their assessments of student learning and teacher performance. Incentives can be used to attract qualified teachers and administrators, retain them and support them by developing their skills. Policymakers can be empowered to enforce accountability through performance-based budgeting, funding formulas and contractual instruments to ensure the effective use of public resources. Accountability systems must take into account such failings as teacher absenteeism, the abuse of male teachers' authority over girls and women and other corrupt practices, such as extortion from the poor and vulnerable (which can occur even where education is provided free of charge).

All of these recommended steps for education reform will require strong, professional management teams and reliable information systems. To increase education management and planning capacity, countries will need to gain knowledge about the strengths and weaknesses in their education systems through data gathering and analysis. Monitoring and evaluation capacity building will be needed—for data collection, policy analysis, formulation and implementation—especially in TVET and higher education. With the help of recurrent country-specific and cross-country studies, countries will be able to gauge their progress in schooling, equity and learning outcomes and the relevance of training for the labor market, and they will be able to inform themselves about best practices in education planning and management elsewhere. Finally, regional networks and communities of practice can be supported to help education managers and planners share their skills and knowledge.

Embody inclusion and support social cohesion

Policies to increase equity, social participation and empowerment through education should be enhanced. Countries should adopt a broad set of policies to:

- Reduce dropout, generally a key determinant of vulnerability.
- Reform education provision for greater flexibility and accessibility—to disadvantaged and disabled children, to nomadic pastoralists, to migrant workers and to refugees.
- Address poverty and education quality through better tailored education programs, micro-finance interventions and other innovative models such as cash transfers (which could lower opportunity costs).
- Adopt specific gender-based policies—where relevant—for improving girl's education and increasing gender equity (along with other, complementary policies for increasing access and the efficient allocation of resources).[6]

Because early childhood is a critical time for the brain, countries should increase access to quality early childhood care and development, which can improve performance in the first years of primary school and reduce repetition and school dropout. Comprehensive policies should focus on child development, socialization and learning from birth to the start of primary school. To optimize resource use, countries can embed preschool into primary education.

Labor force productivity gains—especially in low-skilled jobs—require a full, high-quality primary education cycle. African countries that have not yet achieved universal primary education (30 of them have primary school completion rates below 75%) must strive to reach the most disadvantaged children. Others should extend basic education to 9 or 10 years. Training must be provided to vulnerable youth. And education systems in countries recovering from disasters (natural or manmade) must be rehabilitated and reconstructed—through building new schools, repairing damaged school

infrastructures, training teachers and providing teaching and learning materials.

Especially in fragile states, support is needed for peace education and the cultivation of other democratic values. Education-based initiatives should aim to ease the social reintegration of former soldiers and combatants.

Notes

1. Lessons from literacy and other nonformal education programs such as agricultural extension are that they are more successful when they are integrated in economic development programs than when they are run separately.
2. Repetition rates are lower, on average, for Anglophone African countries (10.5% for primary, 9.0% for secondary education) than for French and Portuguese speaking countries (13.9% for primary, 17.3% for secondary).
3. Unit costs have been reduced by an average of 40% since 2000 in nine African countries—Benin, Burundi, Malawi, Mali, Mauritania, Mauritius, Morocco, Rwanda and Tunisia.
4. For example, in Benin 70% of TVET students—and in Rwanda 49% of higher education students—are enrolled in private institutions. Such high ratios of private to public enrollment demand strong quality assurance mechanisms.
5. Most African students (69% across all countries, varying nationally from 39% in Eritrea to 88% in Mali) are enrolled in humanities, arts, education and social sciences.
6. For example, as indicated previously, the reduction of disparities in higher education calls for actions up front in primary and secondary education, along with specific actions within higher education.

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CHAPTER 17

Rethinking education and training

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This chapter describes the New Education Model for Africa (NEMA), which promotes greater involvement of economic and social stakeholders in formulating education content and quality. Raising education standards requires all stakeholders to engage fully in the education system and tap into the technological and social innovations of the new millennium. Ultimately, NEMA will enable African countries to fully realize their comparative advantages and transform their economies.

Outcomes of Africa's education model are alarming (see chapter 16). More than 182 million adults in Sub-Saharan rural areas—more than 20% of the population—cannot read.[1] One out of three students drops out of school without having acquired basic competence in math, science and reading and thus faces limited training opportunities. Primary and secondary education suffers from quality and governance problems, including school mismanagement, teacher absenteeism and shorter-than-prescribed schooling hours. Student numbers have risen owing to a "youth bulge," pressures to achieve universal primary education (Millennium Development Goal 1) and a shortage of high-quality teachers and professors. In Niger, for example, more than half of secondary school teachers have fewer than 30 days of teacher training. Higher education, especially in Sub-Saharan Africa, also has a shortage of qualified teachers. Lack of data on schools, colleges and universities further prevents policymakers and key stakeholders from accessing timely information to adjust or improve the system.

All over the world, rapid technological and social changes have led to substantial structural changes in education content, teaching methods and links between education and the rest of society. Until recently, education content, quality and delivery in Africa were determined exclusively by ministries of education and a "technocracy." But a shift toward incorporating diverse economic and social aspirations into designing and implementing education policies and programs has resulted in a new teaching and learning model.

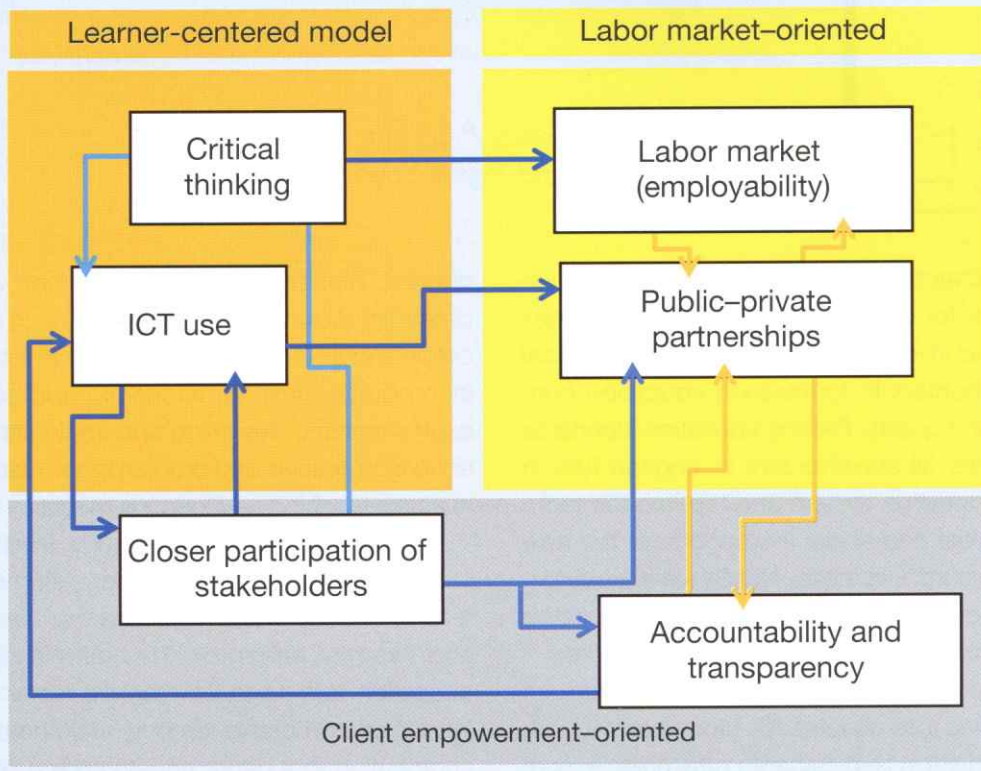
These rapid changes require involving external partners in defining education content and quality and in improving internal and external efficiency. This step enables education targets to be reached faster and increases ownership among stakeholders, contributing to a better understanding of the skills required in the labor market while optimizing resources, enabling greater transparency and helping to provide social safety nets for disadvantaged people.

A new model of education thus seems necessary, based on the following six simultaneous changes (figure 17.1):

First, to ensure sustainability, education stakeholders need to be more involved in management so that the system reflects its society's social, cultural and economic aspirations. Such involvement will promote nation-building ideas such as freedom and equality. Education engenders cultural values, supporting economic growth.[2] As a strong lever of change, education should reflect local conditions and adapt its content to social and economic contexts.

Second, partnerships with employers and professional associations should be forged to integrate youth more in the labor market. The failure to do so has frequently generated a skills mismatch between the education system and the labor market. The lack of coordination between labor supply and demand has ultimately led to "revolutions" and major social crises in North Africa. Sub-Saharan

Figure 17.1 **The New Education Model for Africa**



Source: Authors.

countries might follow this trend if no corrective action is taken.[3]

Third, involving private stakeholders in education through public–private partnerships can expand the system's expertise and funding, thus improving the qualitative and quantitative adjustment of education and training. Rapid population growth and rising enrollments are straining the education system, and the swelling share of the dependent population has resulted in severe budget constraints. Many African countries have already begun to privatize their education systems, but this practice needs to become more common, if it is well regulated: public–private partnerships are ideal for African education.

Fourth, rapid technological change and globalization have further pressured the African education system. Curricula need to keep up with the pace of change—otherwise, African students will be unable to compete in the global economy. The rapid development of information and communications technology (ICT) in education offers new opportunities for learners and teachers. In addition, many learning processes take place outside school and need to be considered in formal education. A learner-centered model is developing around the world, and Africa is beginning to explore it.

Fifth, teaching critical thinking, central to modern learning systems, needs to be put at the core of the curriculum. Africa's poor performance in science, coupled with employer demand for individuals with critical thinking skills, requires education authorities to incorporate such skills into the curriculum. Although some countries, such as South Africa, have had systems in place since 1997, implementation remains weak.

And sixth, African education has to be more transparent and efficient, with better governance and greater use of data. To monitor the education system and assess whether outcomes and objectives have been achieved, useful data are needed. There is also a need for evidence-based research on the system's transparency, effectiveness and efficiency, including independent systematic evaluations, some using ICT.

Implementing and coordinating these changes in African countries would enable far-reaching changes in education process and outcomes. Steps relating to these six components have already been taken in many African countries, but only in a partial and uncoordinated manner.

Securing greater participation of education stakeholders

South Africa's Department of Education (2002) defines "stakeholders" as all the role players in an organization.[4] Stakeholders in a school include educators, learners, parents, administrative clerks and general workers, as well as nongovernmental organizations and all community members who have an interest in education. It is essential to identify, understand and empower the key players in any proposed change.[5] Without empowerment, people feel disconnected, undervalued and ultimately not engaged in their work.

The education system in most African countries needs deep change to include all constituencies. Education should improve equity, create knowledge and skills and accomplish its missions more efficiently, even with scarce resources. A "new governance framework" is required, forging a solid partnership between the state and the various stakeholders.

The World Conference on Education for All (EFA) in 1990 is the starting point of the education partnership.[6] The diversity of stakeholders emphasizes the need for a "true partnership" to respond to the system's challenges and needs. The Dakar Framework for Action reaffirmed this partnership by highlighting the importance of "governance and participatory management."[7] The 2008 EFA report again supported this partnership's importance.[8]

Who are the key actors?

The state can no longer effectively ensure financing, management and control of the education system.[9] Many African countries have failed to draft, implement, monitor and evaluate education strategies, so there is pressure to mobilize and involve all stakeholders. The state needs to open the decisionmaking process to other actors, share responsibilities and implement an approach based on complementarity. This partnership between government bodies (ministries and their representatives) and civil society is essential.[10] Stakeholders have been present in the education system for many years, but their missions and contributions have recently begun to change.

The effectiveness and efficiency of this state–civil society partnership hinge on defining and clarifying stakeholder roles and duties. Civil society need not replace the state in education's essential responsibilities and prerogatives.[11] But it can play the role of alternate service partner where state action is absent or insufficient. Since civil society actors are more flexible than public authorities, they are closer to the base—students and teachers. These bodies must therefore act as agents of innovation, particularly by drawing inspiration from successful experiences and practices in other countries. They must also emerge as pressure groups to monitor education quality and oppose corruption. One example of such a civil society organization is the Ghana National Education Campaign Coalition (box 17.1).

Box 17.1 The Ghana National Education Coalition

The Ghana National Education Campaign Coalition, formed in 1999, is a civil society organization involved in public education. With a membership of 200 organizations, it serves as an advocacy group that monitors education quality and aims to achieve free universal and quality basic education.

Examples of its activities include engaging in advocacy, monitoring education resources for effective service delivery, conducting awareness programs on issues affecting education and their most effective solutions and working closely with the government, policymakers, development partners and other education institutions. Its advocacy actions helped to increase investment in the education sector by securing grants. Since 2004 the coalition has also transformed popular consultations on education into national results.

Source: http://gnecc.org/new/.

Strategies for involving stakeholders

The NEMA approach is based on a pluralistic and interactive vision of collective decision-making within an education institution. By coordinating actors with divergent and sometimes even contradictory interests, the NEMA vision can address complex problems and multiple decisionmaking points.[12] Such stakeholder involvement also counteracts state limitations in logistical and financial resources for education (box 17.2).

Resources allocated to education are often not linked to results, indicating weak resource optimization. It is thus urgent to remove barriers to efficient service delivery and improve performance in target areas. For this purpose, NEMA promotes operational instruments to improve participation by attracting students (particularly girls) into specific programs and giving voice to students' and parents' associations. This ensures equity by enabling access to quality education for the most vulnerable. NEMA can substantially improve accountability in the education sector by focusing on outcomes rather than inputs (box 17.3 and see chapter 29).

Transferring some responsibilities from central to base levels gives the initiative to stakeholders, who are in most cases the direct beneficiaries. The relationships between stakeholders and the state should be based on a "dynamic partnership" with "plural involvement," where all stakeholders seek consensus to determine strategy. Stakeholder involvement is built on subsidiarity, so that each authority is entitled to exercise all powers vested in it without resorting to a higher authority, and decisions are made at the lowest level close to the beneficiaries. The principle aims to harmonize the actions of many actors and stakeholders, building bridges between responsibilities within the school community.[13]

Transparency is fundamental to good governance. In a school the main challenges of managing, administering and accessing education resources should be fully and accurately described so that each stakeholder has proper notice of them. Transparency, subsidiarity, pluralism and responsibility will improve school management and planning through stakeholder participation.

Box 17.2 Mechanism of nonstate actors for effective governance of Senegal's education system

Funded by the European Union with a contribution from the Coalition of Organizations in Synergy for the Defense of Public Education, this pilot project (December 2012–November 2014) aims to improve participation of nonstate stakeholders for better education system governance across Kaffrine, Diourbel and Tambacounda, the lowest-ranked regions by gross enrollment rate in Senegal.

In assessing these regions' problems, the Ministry of Education noted failures in system governance. It concluded that nonstate actors should be involved in setting up a model for a successful school year without disruption and with satisfactory results, relying on school management committees and local communities.

Box 17.3 Parental involvement and complaints in Madagascar

The Africa Education Watch survey results in Madagascar show a positive correlation between the number of parents' annual visits to schools and the number of education-related problems identified and followed up. Results also stress the correlation between parental involvement in school management and complaints taken seriously by the authorities at school and local levels. This Malagasy example seems to reinforce the case for strong parental involvement as a way to heighten authorities' responsiveness.

Linking education to labor markets (employability)

Africa's education system was built to provide basic education for youth and train an elite class to handle the reins of government and countries' general affairs. Sixty years after most African countries gained independence, young people's challenges and aspirations have changed. The technological revolution allows many of them to share the global aspirations for decent jobs and a higher standard of living—for several decades, virtually guaranteed by further education. In some societies education allowed for social mobility. But the revolution in North

Africa shows that providing higher education to youth without guaranteeing them employment is a major political risk. Government efforts must thus tighten the link between the labor market and education and training to ensure greater youth employability. Employability is defined as "a set of achievements, skills, understandings and personal attributes that makes graduates/individuals more likely to gain employment and be successful in their chosen occupations, and which benefits themselves, the workforce, the community and the economy."[14]

A range of political reforms may solve the problem, but all accept the need to bring together stakeholders in education and the labor market to codetermine training and education content.

The employability of youth, especially graduates, is a major challenge. At 16%, unemployment among young African graduates is twice as high as overall unemployment. In North Africa the rate is even higher—for example, 31% in Tunisia in 2009. So there is a need to adjust the content, quality and pace of study.[15] With its growing young population, Africa faces a serious threat unless it improves youth employability (see chapter 19).

Yet this mass of young people offers an opportunity: educating them and integrating them into professional and technological fields should boost Africa's productive sectors. The numerous avenues to improve youth employability include teaching entrepreneurship, providing technical and vocational education from a young age, offering short vocational courses in education institutions and opening these institutions more to the environment and especially the business world, all with an eye on the jobs of the future. Unfortunately, training appears to be lagging behind labor market trends and needs.[16]

Many actors could be involved in defining education content, quality and pace to ensure better coordination with the labor market and greater youth employability. These actors include unions, businesses, alumni associations, professional associations, employers' associations, labor market observatories and departments in charge of employment, labor, youth and vocational training. Finland's education model offers an inspiring example (box 17.4).

Codetermining training

Involving companies in setting training content is central to reforming African education. Codetermining qualifications and labor market skills allows the education sector to align training with labor market needs, particularly in the many countries where high youth unemployment in some sectors coexists with a labor shortage in others. Many training programs are built without companies giving input on their needs, a disconnect exacerbating unemployment and the labor shortage. Thus vocational and technical training is often weak, leading to higher unemployment among graduates from these streams than from general university courses.

Acquiring technical and vocational skills must lead to gainful employment. For this to happen, it is important to gear training toward labor market needs. One way of doing this is to create a mechanism for identifying and predicting the skill gaps and shortages by following labor market dynamics. What are

Box 17.4 The Finnish education model EduCluster—an inspiration

The Finnish model is a success in developing human capital, judging by Finland's ranking on the Human Capital Development Index and its performance in international assessments of education achievement in science, reading and civics. This success comes from organizational and contextual factors.

Finland had difficulties in the early 1990s (with 20% unemployment) due to the collapse of the Soviet Union, one of its major trading partners. Recovery took place thanks to improved export competitiveness, facilitated by education innovations. Today the country has only 7.7% unemployment.

African countries should consider the EduCluster model, which is based on regional cooperation (training institutions, local authorities, private sector). The African Development Bank has taken steps to exchange experience between Finland and Tunisia, a dialogue that could usefully be generalized to all countries with similar contexts.

the human resource requirements for the economy's different sectors? To engineer an education delivery system that is flexible and responsive to the employment sector's skill needs, establishing a labor market observatory or Labor Market Information System is a priority (box 17.5).

Increasing technical and vocational teaching and remedying their weaknesses would improve learners' qualifications. This approach is now a major focus of reform, and most African countries are establishing such teaching (in short courses) to provide the technicians needed in business. Tunisia, for example, provided training in electronic engineering but did not have enough intermediate technicians. Beyond more widespread training, exchanging best practices among regional member countries would help make up for shortfalls in technical education and reduce youth unemployment.

To strengthen education–business ties, academic actors need to get closer to the business world on vocational training. Highly dynamic, the market for professional training reflects the continued growth of worker and corporate training as technology changes. Maintaining skills requires life-long learning, particularly virtual training. In this way universities and other education institutions can diversify their resources, while their collaboration with companies helps to employ their graduates. This proactive approach, already adopted by some countries, needs to be extended across the continent.

Diversifying the education system to better respond to labor market needs

Teaching entrepreneurship should be generalized throughout the education process. The education system should be able to produce sustainable business entrepreneurs in Africa, but is poorly set up to do this. International experience, particularly in Canada, shows that entrepreneurialism develops at a young age (elementary and primary school) and further consolidates in high school and college, so teaching entrepreneurship only at the university level (or through incubators) is but a partial solution.

Box 17.5 Better understanding and addressing the skill gap

As a result of high demographic growth, 182 million Sub-Saharan adults are illiterate.[1] This number is likely to rise in the coming decade and hamper the workforce's ability to make Africa competitive. A third of African companies report failing to fill positions due to talent shortages, and challenges impede the search for on-time knowledge data on skills to inform policies or staff businesses. There is still an unmet goal to anticipate critical skill needs. To address this challenge, NEMA promotes a participatory and iterative approach in setting up skills-for-jobs observatories throughout the continent. A major best practice consists of assisting higher education institutions to partner with labor market observatories in identifying national and regional economic needs and developing effective skills development strategies with businesses. A critical area of intervention that could lead to broader impact is developing regional bodies' capacity to gather statistical data on labor market skills and conduct comparative analysis to better inform businesses, policymakers and training providers.

Note

1. UNESCO 2013.

The emergence of new jobs, skills and knowledge requires greater flexibility and responsiveness in the education system to train youth for careers of the future. One job out of three may not yet exist—just as the jobs of web designer, web marketer, web security expert or community manager did not a few years ago—and companies will need many young people for them.

A strategy for retraining unemployed graduates, produced after consultation with businesses, is needed. Offering a second chance to unemployed degree holders is a social, economic and ethical response. It could take several forms (such as public employment, reenrollment in technical courses or assistance in business development), but private actors should also be involved. National programs to reduce unemployment among young graduates should consider the needs of companies and trade associations on this "second and better" chance.

Recognizing the role and the place of Africa's informal economy can improve

vocational training program design (see chapter 6). While most public policies target formal training, Africa's informal training systems are widespread. Such widespread systems should be carefully assessed when reforming education and vocational training. Using experienced informal workers as skilled trainers or experts in vocational training programs can be a successful strategy. There is a strong need to support schemes to improve poor statistics and knowledge of the informal economy.

Informal apprenticeship practices need to be gradually upgraded. Efforts to improve youth training quality can also benefit adult literacy and vocational training in the informal economy. In fact, pre-employment schemes can help early school leavers build on their education and improve employment options. There is a need to find balanced funding mechanisms to make training systems sustainable and support the move beyond training toward social inclusion and job creation. Means to provide such support can be intellectual (tutoring, monitoring), practical (tool kits) or financial (microcredit).

Promoting public–private partnerships

Several reports suggest that the Millennium Development Goal of achieving universal primary education and gender equality in education by 2015 will not be attained unless governments act quickly.[17] This position was reiterated in the Global Monitoring Report on EFA in 2010, which estimates that donors would need to commit up to USD16 billion a year for low-income countries to achieve the goal.[18] Financing secondary and higher education is a major concern for policymakers in developing countries, particularly in Africa. Universal access absorbs more than half the education budget in most of Sub-Saharan Africa, and as the cost of a high school student is at least four times that of an elementary school student there, financing secondary and higher education might seem unsustainable. This anxiety goes beyond the difficulties in primary education, such as stagnant participation rates, worsening education services and wasted scarce financial resources. For example, while the number of students has risen 10-fold, the government funding of higher education in Rwanda has been reduced by 25% every year, starting from financial year 2010/2011.[19]

Continuing efforts to achieve the EFA goals and Millennium Development Goals and finance the development of secondary and higher education will be at the heart of discussions until 2015 and even beyond. The international community is trying to find funding sources to cope with education spending increases in most developing countries (especially in Africa). Innovative financing is one solution to bridge the gap, including the public–private partnership (PPP) model (box 17.6).

Box 17.6 Definitions of PPPs

Hodge and Greve (2005): "Institutional cooperation between the public and private sectors designed to increase the efficiency and effectiveness of public service delivery."

Hayllar (2010): "A contractual arrangement involving the private sector in the delivery of public services based on a partnership approach where the responsibility for the delivery of services is shared between the public and private sectors, both of which bring their complementary skills to the enterprise."

Van Ham and Koppenjan (2001): "A cooperation of some sort of the durability between public and private actors in which they jointly develop products and services and share risks, costs and resources that are connected with these products."

Chan and others (2010): "Collaborations in which public and private sectors each bring their complementary skills to a project, with different levels of involvement and responsibility, for the sake of providing public services more efficiently."

Smith and Wohlstetter (2006): "Typically consist of voluntary, enduring arrangements that involve significant levels of resource-sharing and joint decisionmaking."

Public funding in developing countries is usually not enough to meet increased demand for education. It requires huge additional funds to build infrastructure, develop human resources, create innovative educational resources and manage the system. Since 1999 initiatives and international forums (proposed by Kofi Annan to establish a global pact between the United Nations and the corporate world) have thus been created to encourage new actors to take part. The Monterrey Conference (2002), Doha Conference on Financing for Development (2008) and Forum on Aid Effectiveness in Accra (2008) called for mobilizing new partners. In 2009 the first World Innovation Summit for Education invited stakeholders to collaborate in an innovative and practical way to effect creative change in education. In 2010 the EFA forum, held in Addis Ababa, called for studying innovative approaches to financing education, such as engaging new partners and supporting recent initiatives. PPPs are examples of such approaches.

What is the PPP model in education?

The public and private sectors (corporations, foundations, associations/groups of entrepreneurs and so on) have different but complementary skills and resources. If implemented well together, they can advance public and private property (box 17.7).[20] A PPP involves pooling resources and skills from the two sectors to achieve better results than possible if each partner were single. There is a consensus that PPPs are the ideal way to support governments that have failed or are simply ineffective.[21] Governments list the main reasons for engaging in PPPs as follows: better spending targeting, better fiscal spending through more efficient service delivery, access to private sector expertise and ability to meet new requirements while facilitating innovation in service provision. Other reasons are economies of scale and increased access to services, particularly for groups disadvantaged in traditional forms of service.[22] Thus PPPs will enable African governments to address inefficiencies in the

Box 17.7 The types of PPPs in education

Provision of infrastructure. In this model the private partner builds, owns and operates the infrastructure facilities, and the government uses these facilities for running the school through a long-term agreement.[1] The private sector has to arrange for finances and has the responsibility to build and maintain the infrastructure, for which it is paid a fee over the contract period, usually between 20 and 30 years.

Provision of support service. The private sector provides certain support services in the school, such as meals, IT facilities, laboratory, gym and transport, for which the government pays.[2] These support services can be bundled along with building infrastructure or can be provided separately. This is advantageous as the private partner with expertise in particular core areas would be able to provide such services efficiently.

Infrastructure, support services and educational services. The school is set up and managed entirely by the private partner. This includes constructing the school building and providing support services and education services. The private partner manages the school, including recruiting teachers and staff.[3] A system of incentives is built in so that the schools are motivated to continue improving their performance; schools that fail to perform do not receive payment from the government.

Management services. The government entrusts school management to a private partner that provides management services for the staff, finance and planning.

Operational services. A government school is operated by a private partner that deploys its own teaching and nonteaching staff. This results in greater management control by the private partner and greater staff accountability, making the schools more autonomous.

Professional services. Certain professional services, such as teacher training, quality assessment, student evaluation and other supplementary services can be contracted out by the government to a private partner.[4]

Notes

1. Akintoye, Beck and Hardcastle 2003.
2. DfEE 2000.
3. Patrinos, Barrera-Osorio and Guaceta 2009.
4. Alderman and others 2003.

public provision of education.[23] They will also give political leaders the latitude to optimize their missions and respond more effectively to demand for new approaches. They will impose strict control, focus more on planning and delivering construction projects and related services and contribute to innovation in services (pedagogy, resources and teaching techniques and equipment).[24]

How can PPPs contribute under NEMA?

PPPs can speed up private sector investment in education. In the coming decade Africa needs to greatly raise its share of complex exports and attract more foreign direct investment. Tapping such an opportunity requires building a dynamic private sector that supports the development of a dynamic primary education system that leads to forming new skills and capabilities for the labor force. A division of labor is needed since governments alone cannot meet the investment needs. The private sector can provide additional resources for expanding and improving education, especially at the secondary and tertiary levels. Potential interventions include providing innovative funding for education through incentives, credit and land and facilities for infrastructure; supporting countries such as Kenya, Morocco and Nigeria, where sound private investment policies have been formulated to develop school management skills; and encouraging lower performing countries to establish a liberal and attractive regulatory framework conducive to profitable return on investment while setting in place quality control mechanisms to follow up on education outcomes.

With NEMA, PPPs are expected to provide four major benefits to the public sector.

First, PPPs can help widen access to education. The public sector experiences considerable resource constraints in financing and providing education services to all. Indeed, there is a huge gap between needs and school infrastructure, especially in Sub-Saharan Africa. Without PPPs, different states may not provide facilities for the influx of pupils. PPPs can also increase access by using private schools to absorb the excess demand for schooling in particular geographical areas. This directly increases access for those attending private schools and reduces class sizes for students in overburdened public schools.

Second, PPPs can help make education delivery more efficient. This can occur in a variety of ways. Using nonstate education providers may lead to innovations in school and teacher management. PPPs also allow governments to overcome the rigid regulatory frameworks that govern state schools in many countries, including outdated pay and employment arrangements. And partnerships allow governments to transfer responsibility for certain functions, such as delivery, to the private sector, while the government focuses on areas of comparative advantage, such as policy, planning and quality assurance.

Third, PPPs may help lift education quality by incorporating the knowledge, skills and innovations available in the nonstate sector, whether pedagogical or technical. PPPs, by increasing choice in education and linking education subsidies to demand, may also lead to increased accountability for education results.

Fourth, PPPs allow greater flexibility, risk sharing and mitigation, and greater accountability for results, with performance the responsibility of schools and those who manage them. Since government systems are rigid, the private partner will enjoy greater autonomy in organizing school life and recruiting teachers.

At the same time Africa may face some risks in implementing PPPs. Three of these risks need to be considered.

- The contracting underlying PPPs may be complex and require considerable government design, implementation and monitoring capacity for the benefits to be realized. This is of particular concern in countries in which the state has limited experience working with the private sector and with contracting, which may leave it exposed to financial and quality risks. Fragile African states may need strong support in implementing PPPs in education.

- The nonstate sector is not developed or large enough to allow for PPPs in education, particularly in poorer areas. Sufficient capacity in the nonstate sector is required if the government is to contract for education service delivery. Inadequate regulatory and policy frameworks and administrative systems in developing countries may also hinder effective PPP implementation and quality education delivery.
- Limited government capacity and a weak policy framework mean that PPPs can result in a loss of accountability to the public as the duty-bearer of education. Ministries of education are traditionally among the most conservative over curriculum, language policies and politicization of content, and thus may be reluctant to relinquish control to nonstate provider partners.

The potential market for private sector involvement is huge. But for this partnership in NEMA to work well, there must be coordination among the actors—a serious drawback so far.

Fostering ICT use in education

Using ICT has consequences for teachers, learners and education institutions. For teachers the range of online educational resources has grown exponentially. Using these resources, teachers improve their teaching through trial and error. Access to these resources prompts learners to investigate material in greater depth and begin self-learning and "self-apprenticeships" processes that complement classroom interaction. Finally, all education institutions try to structure these consequences and include them in their education strategies. This technological shift helps move from the classical teacher-centered model to a learner-centered model. Beyond pedagogy, ICT helps in managing institutions and learners, as well as in planning and using resources efficiently.

Africa is already reaping an ICT education dividend

Africa needs to invest more in e-learning. The huge range of digital education resources has prompted some African countries to think about using this technological revolution to reform their education systems. ICT for education (ICTE) offers opportunities for Africa to use e-learning as a channel for education, access e-learning objects at lower cost and widen interactions beyond school hours to ease absenteeism and teacher shortage.[25]

E-learning is helping Africa widen its education system and enroll many new learners. Distance learning consists of supplying education to rural populations through courses, methods of learning (corrected exercises, homework, simulations and so forth) and exams for learners who cannot physically get to the place of learning. The Internet has been offering such opportunities for two decades, and e-learning is common in several countries. The Tunisian Virtual University, for example, is ranked number one among Tunisia's universities by several ranking institutions, such as Webometrics. The African Virtual University is another powerful example of e-learning (box 17.8).

ICTE could help make up for insufficient infrastructure and education resources. As discussed, resources are inadequate for African education institutions, but ICTE offers new possibilities at minimum cost. A strategy for using these resources better is necessary.

Box 17.8 The African Virtual University

The African Virtual University has established a large distance and e-learning network in more than 27 Sub-Saharan countries, graduating more than 40,000 students. It hosts 219 open education modules ranging from math and science to teacher education and ICT skills—freely available in English, French and Portuguese. The university's interactive portal is accessed beyond Africa in 142 countries, with the majority of visitors from Brazil and the United States. It continues to gain international recognition for increasing access to high-quality education for thousands of Africans, and was awarded the top prize for Best Emerging Initiative by more than 4,000 people in the first OpenCourseWare People's Choice Awards. Created in 1997 to increase African students' access to quality education through ICT, the university moved its base to Kenya and became a pan-African intergovernmental organization in 2003.

Prerequisites for integrating ICT in African education

Fast ICT access is patchy, and varies among countries (tables 17.1–17.3). In 2011 only 15 Sub-Saharan countries had a 3G network. Mobile broadband penetration is still very low at 4% at most (versus 54% in Europe) and only 2,000 bit/s bandwidth per user (90,000 in Europe). Only 8% of African homes have a computer and only 6% have an Internet connection (against 25% and 8% in most developing countries).[26] Despite huge efforts, most African schools lack Internet and broadband access. A continental project linking all African education institutions to broadband by 2020 is highly recommended.

ICT is rarely brought into classrooms effectively. Integrating ICT in education requires a profound knowledge of ICT and its features, as acquiring digital skills is not easy (see chapter 11).[27] Some teachers prefer to continue as before, simply ignoring the technological revolution. Others use ICTE in a disorganized manner and fail to follow education logic.

Technological change can only improve education outcomes if organizational change accompanies it. Unless course formats, contents and interactions are modified, ICT's impacts will be minimal.[28] The

Table 17.1 Mobile phone ownership, 2000, 2006 and 2012 (per 100 people)

Country	2000	2006	2012
Algeria	0.27	60.85	97.95
Angola	0.19	17.84	47.07
Benin	0.80	12.50	83.65
Botswana	12.66	43.41	153.79
Central African Rep.	0.14	2.73	25.26
Chad	0.07	4.50	35.36
Congo, Dem. Rep.	0.03	7.94	30.58
Côte d'Ivoire	2.93	23.02	91.23
Djibouti	0.03	5.69	24.72
Egypt	2.06	24.66	119.92
Equatorial Guinea	0.96	19.31	68.05
Ethiopia	0.03	1.11	22.37
Gabon	9.79	63.56	179.47
Gambia, The	0.46	27.28	85.20
Ghana	0.69	23.73	100.99
Kenya	0.41	19.97	71.17
Liberia	0.05	8.27	57.12
Libya	0.77	69.07	155.77
Madagascar	0.40	5.56	39.38
Mali	0.10	12.27	98.38
Mauritania	0.56	32.74	106.00
Mauritius	15.19	63.49	119.87
Morocco	8.16	52.66	119.97
Mozambique	0.28	10.84	36.24
Namibia	4.32	29.66	95.02
Niger	0.02	3.53	31.45
Nigeria	0.02	22.55	66.80
Seychelles	32.54	79.74	147.80
Somalia	1.08	6.33	22.56
South Africa	18.59	81.08	130.56
Sudan	0.07	11.90	74.36
Tanzania	0.32	14.04	56.96
Togo	1.03	12.45	49.86
Tonga	0.18	29.57	53.36
Tunisia	1.25	72.23	118.08
Uganda	0.52	6.76	45.00

Source: ITU Statistics (www.itu.int/ict/statistics).

Table 17.2 Households with a computer, 2005–2012 (%)

Region	2005	2006	2007	2008	2009	2010	2011	2012
Africa	2.9	3.3	3.9	4.4	4.9	5.5	6.7	7.8
Americas	40.9	42.8	45.5	48.1	49.4	51.8	55.3	58.4
Arab States	14.7	17.0	19.4	22.8	26.3	28.3	31.7	34.0
Asia and Pacific	19.8	20.9	22.6	24.4	26.2	26.9	29.0	31.0
Commonwealth of Independent States	16.6	20.8	24.5	31.6	37.1	41.8	46.0	50.4
Europe	52.4	56.3	61.2	65.1	68.5	71.9	74.2	76.2

Source: ITU Statistics (www.itu.int/ict/statistics).

Table 17.3 **Households with Internet access, 2005–2013 (%)**

Region	2005	2006	2007	2008	2009	2010	2011	2012	2013
Africa	1.0	1.3	1.5	2.0	2.7	3.4	4.2	5.3	6.7
Americas	32.7	34.5	36.8	38.9	42.4	45.3	50.7	56.0	60.8
Arab States	9.5	11.2	13.4	15.3	19.2	23.2	26.0	29.6	33.6
Asia and Pacific	11.8	13.5	15.8	17.0	18.5	20.4	24.5	28.6	32.7
Commonwealth of Independent States	11.1	14.0	16.8	20.7	27.5	33.0	37.3	42.1	45.7
Europe	42.0	46.4	51.7	57.8	62.4	67.8	70.6	74.0	77.3

Source: ITU Statistics (www.itu.int/ict/statistics).

teacher's traditional role must expand, as he or she becomes a moderator and facilitator structuring informal learning outside the classroom, so teachers need to understand these new learning practices. Mobile learning is an example worth considering (box 17.9). Schools' ICT infrastructure also needs to be improved, supported, maintained and upgraded, and its potential to serve special education students explored (box 17.10).

Teaching critical thinking

Critical thinking enables students to make sound logical and unbiased decisions, and in education situations it has been shown to lead to better learning and transfer outcomes (box 17.11).[29] More than many other education innovations, critical thinking has not only persisted,

Box 17.9 **M-learning: The Yoza cellphone project in South Africa**

Previously called M4Lit, Yoza Cellphone Stories (Yoza) was initiated in a "book-poor" environment: 51% of South African households own no leisure books and only 7% of public schools have functional libraries. South Africa has low Programme for International Student Assessment (PISA) reading scores, reflecting the absence of a strong reading and writing culture among young people, especially in poorer communities. By contrast, upwards of 90% of urban youth have access to mobile phones, 70% of which are estimated to be Internet-enabled. The country also has a well-established mobile infrastructure with inexpensive data transfer. Young people spend much of their time on their mobile phones, leading educators in the region to explore mobile learning's potential to improve and promote reading and writing among South African youth.

Box 17.10 **Recommendations for improving ICT infrastructure**

Improving schools' ICT infrastructure. School ICT infrastructure needs to be improved. To ensure adequate ICT access for students, African countries should strive to reduce their student–computer ratio and equip not just all schools but all classrooms with appropriate ICT infrastructure. Consideration should be given to equipping all classrooms with at least a computer for teachers' use, broadband Internet access with adequate bandwidth and a fixed data projector and screen for presentations.

ICT technical support and maintenance. To ensure that ICT has the greatest possible impact on teaching and learning, ICT technical support and maintenance must also be provided. ICT maintenance in schools needs to be addressed in a coordinated fashion at the system level so that all schools can benefit from a secure and reliable infrastructure that will facilitate ICT integration throughout the school.

ICT upgrading. Funding for ICT infrastructure should provide schools with the capacity to not only acquire ICT facilities but also regularly upgrade these facilities and dispose of obsolete computers and other equipment in a planned way. This increased funding may be delivered through increased capitation grants or direct grants. Schools should plan to use the available funding to acquire and maintain ICT facilities and manage their computer obsolescence more effectively.

ICT and students with special education needs. Schools should fully tap ICT's potential to support the learning needs of special education students. Currently ICT is used mainly to support the acquisition of literacy, but the technology can be applied much more widely in special education settings and support students with special education needs in mainstream classrooms.

Box 17.11 Definitions of critical thinking

There is no universally accepted definition of critical thinking. Critical thinking derives from Dewey's definition of "reflective thinking" (1933). Reflective thinking involves a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates, and acts of searching, hunting, inquiring to find material that will resolve the doubt, settle and dispose of perplexity.

Epstein (2006) puts it nicely: "Thinking critically is a defense against a world of too much information and too many people trying to convince us."

Paul (1985, 1988): "Critical thinking is the ability to reach sound conclusions based on observations and information . . . identifying and challenging assumptions, and imagining and exploring others."

Chaffee (1992): "Critical thinking involves a variety of cognitive activities that include solving problems and making informed decisions, developing evidence and arguments to support views, critically evaluating the logic and validity of information, applying knowledge to various contexts and new circumstances and exploring issues from multiple perspectives."

Pohl (2005) defines critical thinking as disciplined mental activities where opinions are evaluated, ambiguity identified and judgments made that can guide the improvement of values to make correct decisions in everyday life.

Facione (1986) defines critical thinking as "purposeful, self-regulatory judgment [that] results in interpretation, analysis, evaluation, inference, as well as explanation of evidential, conceptual, methodological, criteriological or contextual considerations upon which judgment is based."

Pascarella and Terenzini (2005): "Most attempts to define and measure critical thinking operationally focus on an individual's capability to do some or all of the following: identify central issues and assumptions in an argument, recognize important relationships, make correct references from the data, deduce conclusions from information or data provided, interpret whether conclusions are warranted based on given data, evaluate evidence of authority, make self-corrections and solve problems."

but also inserted itself into the fabric of education missions and practices.[30] Knowledge and skills specific to academic disciplines are important, but the multitude of evolving disciplines makes broad, comparative achievement benchmarks impractical. Developing students' critical thinking skills is central to modern postsecondary institutions' missions because of growing recognition that these skills fuel innovation and economic growth.[31]

Importance of critical thinking for African education

Critical thinking is important for African education for at least three reasons: politics, job market skills and lack of scientists.

First, Africa's often unstable political situation requires that citizens be able to express their points of view and expectations. Critical thinking is essential for democratic citizenship.[32] It is therefore important for all students, especially in countries encountering political and socioeconomic problems. Following the global trend, Africa is developing student-centered teaching (active learning)—critical thinking skills are central as the education model shifts from teacher-centered teaching (passive learning).

Second, critical thinking is a vital skill in modern jobs, which demand problem solving and interaction with other workers. Critical thinking helps workers innovate and perform better. OECD (2004) confirmed that applying information technology to business operations has profoundly changed the needed skills and talents of new economy workers. Markets in the new economy are rewarding workers who have strong technical skills. As a result, the 21st-century worker—including in Africa—must have creativity, e-skills, math and science skills and the ability to solve complex problems. Some countries, such as Botswana, set out curriculum and policy reforms in the 1990s that shifted emphasis from a "generic worker who follows directions in hierarchically organized work environment" to "a multiskilled, adaptable and flexible workforce."[33] Critical thinking drives change that leads to innovation.

Third, poor scientific performance of African students is due to lack of critical thinking.

What role does culture play?

The cultural environment in which a learner grows up is a major factor in developing critical thinking. While it is hard to refer to "African culture," several cultural characteristics are shared among Africans. Africans seek consensus and harmony among the group. They focus less on individual interests and "self-sufficiency" than on collective solidarity and building harmony and reconciliation. A sense of collective agency governs the thinking of African culture.[34] Traditional African education prepared people for life—young people were taught collective social, economic, spiritual and political stewardship. They were taught to seek collective interdependence and not individual independence in these spheres of life.[35] African culture prepares children to become good community members who follow rather than question their elders. The former South African president Nelson Mandela stresses in his memoirs that as a child he was expected to learn through imitation, not by questioning but by observing and following the practices of older peers and adults in the community.[36]

Recent researchers identify the explicit link between culture and critical thinking in Africa. Grosser and Lombard (2008) found that "the inability to execute critical thinking skills is clear from this research and it seems as if the various cultural worlds of these prospective teachers have not prepared them for the execution of critical thinking abilities." Mangena and Chabeli (2005) found that one of the major obstacles to critical thinking in nursing institutions in South Africa is students' cultural background. "Children in most cultures are socialized not to question anything said by an adult," and this hampers critical thinking. Language may also be a barrier to critical thinking if learning is in a foreign language, as students spend their time translating rather than critically analyzing.

Strategies for promoting critical thinking

There are three main strategies for promoting critical thinking: modifying students' attitudes, changing educators' methods and pedagogy, and transforming the education system and learning atmosphere.

Modifying students' attitudes. Promoting critical thinking requires changing students' attitudes from passive to active learning. In proposing an approach to fostering group critical thinking, Schamber and Mahoney (2006) incorporated principles of collaborative learning, group dynamics and the writing process. They emphasized the role of multiple perspectives or collective input: "Collaborative learning can facilitate the development of high-level critical thinking and problem-solving abilities of students because of its focus on collective input from members of the group."

Changing educators' methods and pedagogy. Only critical thinkers can teach critical thinking. Most educators did not have their own critical and reflective thinking developed when they were learners, which makes it hard for them to facilitate such thinking among students. Educators' roles, beliefs and attitudes are important in influencing students' thinking. Educators should be open-minded, flexible, supportive and approachable. They should not hold strong beliefs (such as their own ideas or their place in the hierarchy), but value and trust students' opinions, accept changes and be open to students' challenges. Their behavior, such as role modeling, facilitating, guiding and prioritizing, plays key roles in students' critical thinking. Halpern (1998) noted that the methods that were usually applied in teaching content knowledge in specific subjects were not suited to teaching critical thinking skills applicable across multiple knowledge domains.

Transforming the environment/atmosphere and culture. Positive learning environments facilitate students' critical thinking, such as encouraging students to speak out, ensuring safe and free discussions and expression and creating a nonthreatening atmosphere. For example, in Tshuware University of Technology in South Africa, using critical thinking methods with first-year students over

three months developed students' critical thinking skills, in turn helping them get better academic marks (box 17.12).[37] Koosimile and Suping (2011) relate the experience in Botswana to an attempt by preservice teachers at debating contemporary issues in science education to enhance their critical thinking skills.[38] Mangena and Chabeli (2005) indicated that there is a need for nurse educators to model critical thinking in all aspects of nursing education.[39]

Improving accountability and transparency

Why evaluate the education sector?

Good governance in education, broadly defined, is about ensuring that the necessary resources for an efficient and effective education system (financial, material and human) are managed transparently and accountably (see chapters 28 and 29). A well-organized, well-managed and transparent education system is essential for achieving quality education. All over the world the evaluation culture progresses (box 17.13). Education, teaching and research are at the center of reforms designed to create better resource allocation, targeting the best outcomes.

There are three main reasons for evaluation in the education sector. First, limited public finance resources created a clamor to act for efficient use of public money, an effort that requires reliable indicators. Second, the demands of citizen-taxpayers and education stakeholders have become palpable, requiring feedback from officials on budget execution and results. And third, evaluation will enable policymakers and project developers to identify innovations, lessons learned and best practices; standardize procedures, documents and even the lexicon among stakeholders for a better understanding; and better fit projects to user needs and expectations.

Box 17.13 Example of an evaluation body: Institute for Fiscal Studies

The Institute for Fiscal Studies in the United Kingdom is an independent nongovernmental association that focuses primarily on evaluating public policies. To avoid dependence on vested interests, funding is based on a multiplicity of funding institutions and companies. The only essential grant is received from the Economic and Social Research Council, the public agency responsible for funding social science research in the country. Scientific expertise is provided by the recruitment of social scientists and long-term collaboration with academics. Results of the institute's evaluations are used to advise members of Parliament or the government, as well as various groups in civil society.

Source: www.ifs.org.uk/.

Levers of accountability

Information and participation are steps toward building accountability frameworks in schools. These are the relationships, mechanisms and processes by which providers are held responsible for service delivery.

Box 17.12 South Africa's experience of developing critical thinking in its education system

One of the challenges of education in South Africa is to ensure that students gain the knowledge, values, skills, creativity and critical thinking required to build democracy, establish lifelong learning and promote social development and growth in the 21st century. The National Department of Education has identified critical thinking skills as prominent in achieving its education goals. Learners should no longer be treated " as empty vessels that have to be filled with knowledge."[1]

This implies that educators have to base their teaching on constructivist principles that will provide learners with the opportunity to develop as thinkers. "Despite efforts to transform South African education into a dynamic instrument capable of promoting positive learning outcomes, the current national education policies' focus on the enhancement of critical thinking skills is vague and needs further elaboration."[2]

Many first-year students enter higher education without the ability to use higher-order thinking. These students prefer to "follow authority, do not question, are not curious and rely on others to think for them."[3]

Notes

1. South African Qualifications Authority 1997.
2. Grosser and Lombard 2008.
3. de Jager 2012.

The accountability framework in schools is complicated when national bodies are responsible for critical aspects of service delivery, such as teachers, materials and infrastructure.

Contracting. Education institutions are bodies set up by the community for its own benefit as well as profit-oriented firms that provide commercial services to individuals and operate in a competitive environment. In both cases there is an obligation to set up a program based on achieving targets through contracts between institutions and regulatory bodies. Such contracts enable institutions to push through with strategies focusing on labor market needs, autonomously managed facilities and accountability to the regulator (and civil society).

Independent evaluation agencies. Contracting requires an evaluation mechanism, covering pedagogical, administrative and financial aspects, as well as self-assessment. Dedicated autonomous evaluation agencies need to be set up for the education system—or at least, as a first step, for higher education (box 17.14). The same institution cannot be judge and jury, responsible for designing, implementing and evaluating a program or a policy. The evaluation must show credible outcomes and a transparent process. The challenge is to get institutional and scientific partners to cooperate while preserving the evaluation agency's independence, given the obvious conflicts of interest when the evaluation is conducted by administrations, ministries or other entities responsible for a given program.

Evaluation findings have to be widely disseminated. Freedom to do this is a key requirement for evaluation agencies' independence. Lack of compliance with this principle—putting pressure on the agency—violates that independence, and makes irrelevant any scientific debate on methods and results. The results must be compared with evaluations from other disciplines, widely discussed through debates or conferences, to provide citizens with the right information to enable them to judge public policy's efficiency and impact.

Box 17.14 National Agency of Evaluation of Higher Education and Scientific Research in Morocco

The new strategy of Moroccan higher education, as legislated in 2000, is to raise the quality of teaching and research by accrediting all branches of public and private education, establishing an evaluation system and creating forums for evaluating and controlling the system.

Given moves to professionalize university courses and regionalize the economy, the Council of Government will adopt the text on establishing the National Agency in 2013. This should enable deployment of self-assessment and internal audit systems in half the country's universities.

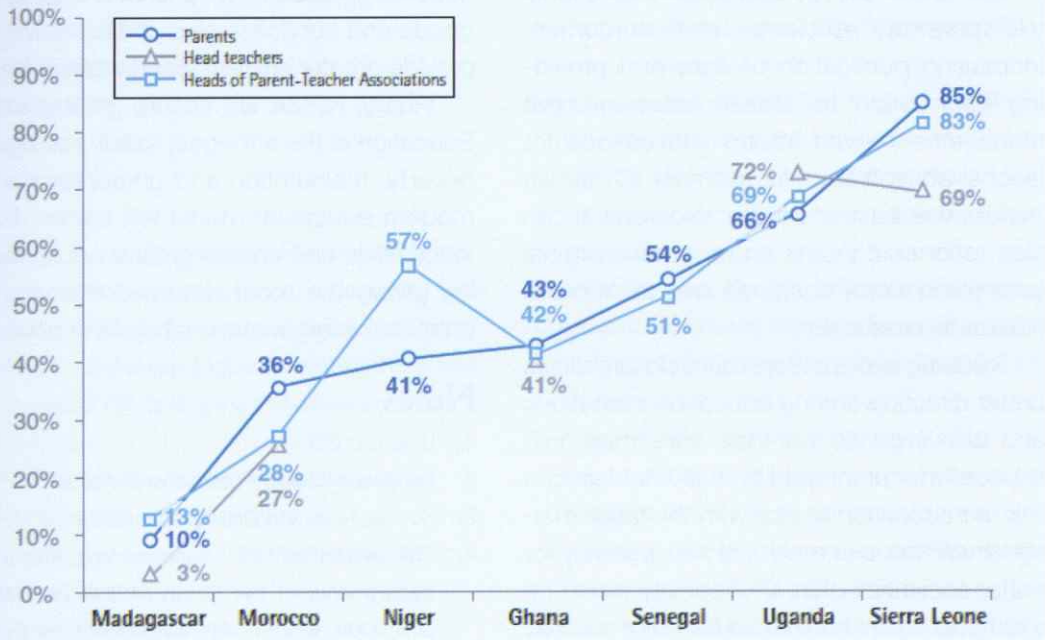
Consistent, timely, reliable and comprehensive data are critical to quality evaluations. But equally important are procedures to match data among databases and make them usable. There is also a need to set up institutions to provide and ensure data reliability. The observatories in Tunisian universities, which should have been cornerstones of the country's employability-focused education system, remain empty shells.

Transparency International defines corruption as the abuse of entrusted power for private gain, differentiating between "according to the rule" corruption and "against the rule" corruption. Facilitation payments, where a bribe is paid to receive preferential treatment for something that the bribe receiver is required to do by law, constitute the first type. In education this corruption can manifest as enrollment fees in schools where such fees have been waived by the state or charges for textbooks that are supposed to be distributed for free. The second type of corruption may be a bribe paid to obtain services the bribe receiver is prohibited from providing, such as changing exam results. The education sector requires anticorruption monitoring (figure 17.2; box 17.15).

Links among NEMA components

The links among the six NEMA components are as important as the components

Figure 17.2 **Proportion of parents, head teachers and heads of parent-teacher associations who think "the education system is affected by corruption"**



Source: Transparency International 2010.

themselves. NEMA's novelty is of two orders: the model creates a strong link between education and the labor market, and all the components in the model interconnect.

Critical thinking is a prerequisite for fully using knowledge and information with ICT devices. Students must acquire basic e-skills to efficiently use the pedagogical tools and contents available on the Internet (see chapter 11). They must also compare sources, avoid plagiarism and "copy–paste" attitudes and use social media well.

The link between critical thinking and employability is becoming obvious in many jobs. Critical thinking was introduced in nursing education, for example, because of increased need for patient-centered care, evidence-based practice and patient satisfaction.[40] Nursing managers also require critical thinking to make their working environments more efficient. The education system must prepare social players for greater ICT use at work. These skills are key elements of employability, and people cannot

Box 17.15 **Evaluating education, Senegal and Morocco**

Sierra Leone: Anti-Corruption Commission

The Anti-Corruption Commission, established in 2002, identified education as a sector prone to corruption and appointed "Integrity Officers" with a brief to seek out corrupt practices. Their responsibilities included on-site school inspections.

The commission has also suggested anticorruption measures for education, including improving local procurement, introducing a complaints system, improving procedures for managing teachers and verifying their qualifications and providing head teachers with training and better guidelines on how to manage financial receipts and expenditures.

Morocco: access to information

In Morocco resources transferred to schools by the Ministry of Education are in kind only. But a high share of school community actors in the schools are not aware of the nature and quantity of resources allocated to their schools. This includes 93% of head teachers, 93% of parent-teacher association (PTA) chairs, and 60% of district personnel responsible for education finances. The majority of head teachers and PTA representatives are not informed of resource transfers.

hope to do well in the job market without them.

ICT use improves education institutions' transparency, efficiency and outcomes. Increasing publication of data and providing information to stakeholders improve management—with strong implications for teacher absenteeism, for example. ICT allows better traceability of political decisions. It can also rationalize inputs and reduce marginal (and some fixed) costs, as well as improve education outcomes.

Involving stakeholders more closely allows better direction among education institutions and convergence on their core missions, especially for employability. Stakeholders can link the education sector with the labor market or with another means of transparency for better social inclusion. Civil society would be a rampart against antisocial behavior such as corruption.

Deeper private sector involvement in education improves access. By attracting a share of the population to private education (for example, the richest), access to education will be widened. Subsidies that initially went to the richest can go to the poor. The private sector is better able to attend to education quality and student employability.

Conclusions

Africa's education model remains centered on teachers rather than students. It suffers from oversized classes, lack of funding, high teacher absenteeism, low student performance on international tests, low graduate employability and lack of labor market links. It needs to change—and soon—to keep up with 21st-century structural and societal transformations, including growing calls on public funding from other sectors (see chapter 18).

Although most African countries are enacting NEMA's six components of change, they are doing so in a piecemeal fashion. NEMA stresses the need for all six components to be implemented together for mutual reinforcement.

NEMA will help African countries meet their needs in competitiveness, growth and employment in the 21st century. It will give Africa the skills required to improve international specialization and move up global goods and services value chains. It will also provide greater efficiency and transparency.

Finally, NEMA will ensure greater equity. Education is the strongest safety net against poverty, malnutrition and unemployment. A modern education model will narrow social inequalities and ensure greater social mobility, giving the most deprived a chance to break the intergenerational cycle of poverty.

Notes

1. UNESCO 2013.
2. Bangwayo-Skeete, Rahim and Sikhali 2011.
3. Soucat, Nzau and Elaheebocus 2011.
4. The Department of Education was one of the departments of the South African government until 2009, when it was divided into the Department of Basic Education and the Department of Higher Education and Training. It oversaw the South African education and training system, including schools and universities.
5. Amos and others 2008.
6. WCEFA 1990.
7. UNESCO 2000.
8. UNESCO 2008.
9. Commonly found in West African countries. In Guinea-Bissau, Mauritania and Nigeria the share of the budget allocated to education is less than 15% (UNESCO 2006).
10. "Civil society" in this case includes all nongovernmental and nonprofit groups and associations and partners in education: nongovernmental organizations, teachers' associations, parents' associations, students' associations, professional bodies and so on.
11. The state must define the general objectives of education policy. It should also be responsible for setting education policy, content, qualifications and certification. It also provides construction operations or expansion of facilities.
12. Governance is understood here as a mechanism for regulating problems and conflicts in which actors reach mutually satisfactory decisions through negotiation and cooperation.
13. Hallak and Poisson 2009.
14. Pegg and others 2012.
15. Subrahmanyam 2011.

16. Tazeen 2008.
17. UNESCO 2004, 2012.
18. UNESCO 2010.
19. Nuwagaba 2013.
20. Ingram and others 2006.
21. Draxler 2007.
22. LaRocque 2008.
23. Patrinos 2006.
24. OECD 2008.
25. ICTE is "a set of tools designed and used to produce, handle, store, exchange, classify, find and read digital documents for purposes of education (teaching and learning apprenticeship)." ICTE is thus a subset of ICT for learning and education.
26. ITU 2011.
27. Ben Youssef, Ben Youssef and Dahmani 2013.
28. Ben Youssef and Dahmani 2008.
29. Helsdingen, van Gog and van Merriënboer 2011.
30. Barnes 2005.
31. Levy and Murname 2004.
32. Schiever 1991.
33. Tabulawa 2009.
34. Ayisi 1992.
35. Mbigi 1997.
36. Rothstein 2000.
37. de Jager 2012.
38. Koosimile and Suping (2011) found that preservice teachers in Botswana were reluctant to debate issues outside the realms of their experience. Rather, they made "parallel contributions" that lacked critical reflection and thorough analysis.
39. "Now with the introduction of outcomes-based education many of us are unhappy because we have to move out of our comfort zone of teacher-centered education to one that is learner-centered, and many of us feel threatened by these changes" (Mangena and Chabeli 2005).
40. Chan 2013.

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16. Tazeen 2008.
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18. UNESCO 2010.
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23. Patrinos 2006.
24. OECD 2008.
25. ICTE is "a set of tools designed and used to produce, handle, store, exchange, classify, find and read digital documents for purposes of education (teaching and learning apprenticeship)." ICTE is thus a subset of ICT for learning and education.
26. ITU 2011.
27. Ben Youssef, Ben Youssef and Dahmani 2013.
28. Ben Youssef and Dahmani 2008.
29. Helsdingen, van Gog and van Merriënboer 2011.
30. Barnes 2005.
31. Levy and Murname 2004.
32. Schiever 1991.
33. Tabulawa 2009.
34. Ayisi 1992.
35. Mbigi 1997.
36. Rothstein 2000.
37. de Jager 2012.
38. Koosimile and Suping (2011) found that preservice teachers in Botswana were reluctant to debate issues outside the realms of their experience. Rather, they made "parallel contributions" that lacked critical reflection and thorough analysis.
39. "Now with the introduction of outcomes-based education many of us are unhappy because we have to move out of our comfort zone of teacher-centered education to one that is learner-centered, and many of us feel threatened by these changes" (Mangena and Chabeli 2005).
40. Chan 2013.

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CHAPTER 18

Strengthening higher education

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Building and strengthening higher education institutions (HEIs) through innovative business models to enroll Africa's fast-growing student population is the main challenge for the next decades. The continent's population has already hit 1 billion and is expected to reach 2.3 billion by 2050 (see chapter 2). With most of its population young, it is expected that an increasing proportion will be enrolled in HEIs, including in technical and vocational education and training institutions (see chapter 1). The number of university graduates tripled in Sub-Saharan Africa from 1.6 million in 1999 to 4.9 million in 2009.[1]

Africa has become a fast-growing continent and a more attractive destination, stimulating moves to create high-quality learning institutions and a larger focus on research. The main challenges are forming a critical mass of talent in priority areas for the current and emerging labor market, slowing the brain drain and enhancing mobility within the regions and the continent through uniform accreditation.

On the 2013 Academic Ranking of World Universities (ARWU) by Shanghai Jiao Tong University, only four African universities belong to the top 500: three in South Africa and one in Egypt. The ARWU may be criticized because it offers only one way to see what should be done to be part of top-tier HEIs. Comparing HEIs between different countries and continents as well as for-profit and nonprofit organizations through the same lens induces biases in the analysis. Therefore, the business model appears as a convenient conceptual tool to overcome this problem. A growing body of literature has flourished during the last decade and provides us with a better shaped cognitive tool to grasp and reflect differences between developed and developing countries.[2]

What is a business model? "A business model is an organization's blueprint for creating, delivering and capturing value and for generating the revenue needed to cover costs, reward stakeholders and reinvest funds in order to remain competitive. All organizations, both for-profit and nonprofit, have a business model, whether or not that business model is explicit."[3]

According to Rubin (2013), there are three types of business model for online higher education: traditional nonprofit, for-profit and, he suggested, a third way combining the two (table 18.1). "All higher educational institutions, whether for-profit or nonprofit, private or public, have a business model. A 'business model' does not mean that organizations are designed or operated like traditional businesses with a goal of maximizing profits; it refers to the way that an organization meets people's needs, operates and organizes itself to produce its products or services, and manages its costs and expenses to remain solvent."[4]

While the management literature has focused on how to build business models in higher education,[5] it has said little about how to customize business models in given countries or regions. Thus the following sections discuss higher education priorities and challenges, look at four options for business models and round off with some conclusions.

Higher education: Priorities and challenges

HEIs are expected to play a pivotal role in the economic and social transformation of Africa,[6] but must prioritize among its challenges: a growing student population, too few resources, inadequate number and quality of faculty staff, low-quality curricula and delivery,

Table 18.1 **Rubin's typology of online business models (two existing models versus a possible third way)**

Teaching	Traditional nonprofit (craft)	For-profit (mass-production)	Third way
Required activity	Conducted by all faculty	Conducted by all faculty	Conducted by some (pedagogic) faculty
Division of teaching tasks (separation or integration of design and instruction)	Design and instruction integrated	Design and instruction separated	Design and instruction separated
Training	Course design and teaching learned via apprenticeship, not required	Teaching learned formally, required for all faculty	Course design and teaching learned formally, required for some (pedagogic) faculty
Proposal and design process	Idiosyncratic	Standardized and formalized	Standardized and formalized
Work with instructional designer	Not required, sometimes available	Required	Required
Control over course design, pedagogy	Held by faculty, minimal standards	Held by instructional designer, tight standards for design	Held jointly by instructional designer and faculty, guidelines for design
Control over formatting, "look and feel," structure and so on	Determined by faculty	Standardized across courses by instructional design team	Standardized across courses within departments by instructional design team and pedagogic faculty
Intellectual property rights	Held by faculty	Held by university	Jointly held, or held by university
Course delivery policies (such as response times)	Determined by faculty	Standardized across courses	Standardized across courses
Course review and revision procedures	Ad hoc	Ad hoc or standardized	Standardized
Course offering dates	Two to three semesters or terms, excluding summer	Frequent starts, including summer	Three to four semesters or terms, including summer
Creation of new courses and majors	Held by faculty	Held by administration	Held by faculty and administration
Assessment of learning	Generally indirect assessment	Generally indirect assessment	Direct and indirect assessment
Student advising	Low-intensity, provided by advisors or faculty	High-intensity, provided by advisors	High-intensity, provided by advisors

Source: Rubin 2013.

and low innovation and R&D (compounded by gaps in industrial linkages) (box 18.1).

Enrollment in higher education

While primary and secondary enrollment rates have shot up, the trend will also affect tertiary education, with a rise from 5 million to 20 million in the future. To address this unprecedented growing demand, there is a need to find innovative solutions, including the development of business models.

The international drive toward Education for All and the Millennium Development Goal on primary education has led to a doubling of enrollment in primary and secondary schools in Africa since 2000. The major shifts are seen in Angola (from 50,000 in 2000 to 300,000 in 2010), in Ethiopia (180,000 to 640,000) and Ghana (230,000 to 850,000). This rapid growth has generated huge demand for higher education services. The United Nations Educational, Scientific and Cultural Organization reports that the tertiary gross enrollment rate (GER) for Sub-Saharan Africa doubled from 4% to 8% between 1999 and 2011. From an initial low GER of 1%, Ethiopia's GER grew to 8.0%. At the extreme, GER in Mauritius grew from 10% to 40%.[7]

Few resources for higher education

Resources allocated to higher education by Sub-Saharan countries are still low even in the context of increasing enrollment. While most Organisation for Economic Co-operation and Development (OECD) countries allocate about 25% of their education budget to higher education, leading Sub-Saharan countries like South Africa and Mauritius allocate only 12% and 8%, respectively. The situation is more severe in countries like Rwanda where this proportion fell from 35% to 13% while enrollment increased 10-fold. Following the recommendation of major international development and donor agencies, most Sub-Saharan countries have invested less in higher education and more in

Box 18.1 African Union's higher education priorities

The Second Decade of Education in Africa Action Plan (2006–2015) recognizes the role of knowledge and innovation in the world economy. It also views the role of higher education as a core resource base for attaining the Millennium Development Goals and highlights the need to fully exploit the "potential of higher education to provide African-led solutions to African problems in the spirit of Africa's collective vision."

The priorities defined for higher education in the Action Plan are: promotion of research and original knowledge production in higher education; promotion, development and assurance of quality in African higher education in all its dimensions, to facilitate mobility of students and staff; increased involvement of universities in the continent's development efforts, including the development of the lower levels of education; and ensuring appropriate levels of funding for higher education.

While the Action Plan period is close to conclusion, the African Union (AU) has produced a Science, Technology and Innovation Strategy for Africa (STISA) (2014–2024), recognizing key drivers for transforming and sustaining African growth. The STISA supports the AU in its role in strategic coordination, knowledge sharing and commitment in advancing science, technology and innovation at the center of Africa's social and economic development. This is in response to Africa's vision for the next 50 years through its long-term developmental agenda within the framework of Agenda 2063. In this endeavor, the STISA aims to improve readiness of science, technology and innovation in infrastructure, professional skills, entrepreneurship development, R&D and education. Each of the Pan African University Institutes covers an area of skills needed in Africa, linked to the six priority focuses of the STISA.

Source: AU's Science, Technology and Innovation Strategy for Africa 2014–2024; Second Decade of Education in Africa Plan of Action (2006–2015).

primary education to meet the targets of the Millennium Development Goals. Meeting universal access to primary education and nine years' education for all have absorbed the major part of the budget leading to underinvestment of public resources in higher education—although on GDP per capita in higher education the situation is different: unit cost of public higher education in Africa (in GDP per capita unit) is 2.06 compared with 0.67 for OECD countries.[8] For individual countries this unit cost varies from 0.18 (Mauritius) to 6.43 (Ethiopia). Africa needs to diversify its sources of funding for expanding higher education. The funds it allocates to higher education are insufficient, but paradoxically high when expressed in GDP per capita.

Lack of qualified staff and teachers

One major issue is to train higher education faculty to respond to the increasing number of students. Most countries face shortages, and their own education systems cannot "produce" the numbers needed, especially in science, technology, engineering and mathematics (STEM) fields. This has led several countries to recruit faculty staff without the relevant qualifications and training. In these instances, most staff, as in Tunisia, do not have a doctorate degree—and the same applies to most Sub-Saharan countries.

The initial low quality of faculty staff implies a low quality of education, competitiveness and employability of graduates. For example, in Burkina Faso, only 6% of higher education faculty received training in 2012.[9] African universities need to invest in staff training.

African higher education faculty also need to acquire new skills in information and communications technology (ICT).[10] In addition, the nature of education is changing, implying an organizational change and re-tooling of skills.[11]

Investing in STEM in order to challenge R&D and Innovation

African countries are generally expanding their capacity for STEM. But with bulging student enrollment and expectations for quick returns, it seems easier to invest in building skills in social sciences and arts than STEM, an approach that has led some countries like Angola to have 80% of its students enrolled in these subjects.

Africa is a study in contrasts: while in Burkina Faso only 13% of students are enrolled in STEM, 18% are in Algeria and

Morocco, 29% in South Africa and about 31% in Tunisia. Investing in STEM is vital to sustain the production of scientists and engineers, especially as African countries have the lowest ratio of scientists and engineers in R&D: they contain 13.4% of the world's population, but its production of knowledge is only 1.1% of the world's.[12] Out of 4 million scientific papers, African scientists account for only 1.8%. Only four universities, as seen, belong to the top 500. Countries in Africa average 35 scientists and engineers per million inhabitants compared with 168 in Brazil, 2,457 in Europe and 4,103 in the United States. Tertiary students from Sub-Saharan Africa are among the world's most mobile, with nearly 6% (200,000) studying outside Africa, mainly due to lack of appropriate high-profile institutions and to the low proportion of students in scientific fields (figure 18.1).[13]

Low quality of higher education and low employability

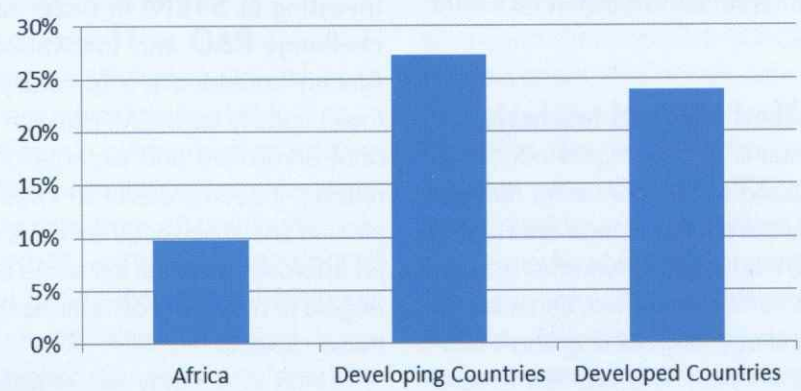
A large proportion of the active population ages 25–34 with higher education training are unemployed (25%) or employed in the informal sector (20%). The unemployment of higher education graduates is a major political and economic challenge. In North Africa, graduating from higher education entails greater chances of being unemployed. The education system does not appear to have moved on from its historical role of preparing people for jobs in the public sector. Most countries have an oversupply of university students getting degrees in "soft" subjects and an undersupply of engineers, scientists and technicians—the drivers of economic growth in other regions and in contrast with high-performing East Asian economies, where over 40% of students major in science, technology and engineering.[14]

Under-representation of women in science and technology

The *World Development Report 2012: Gender Equality and Development* shows that globally girls and boys participate equally in primary and secondary education, while in tertiary, a clear bias is emerging that favors women, with enrollment rising faster for women than men.[15] However, women dominate health and education studies (84%) and men dominate engineering and sciences (82%).

The gender parity index for tertiary education enrollment is 0.625 in Sub Saharan Africa against 1.077 for the whole world. The parity index is only 0.182 in the Democratic Republic of Congo and 0.333 in Chad, Eritrea and Mali, but 1.440 in Algeria and 1.556 in Tunisia. Data from UNESCO indicate a wider spread in the relationship between GER and gender parity for tertiary education enrollment in Africa than the world average.[16] The current proportion of females among science and technology graduates is 5–18% in Africa. It is expected that women will represent at least

Figure 18.1 **Share of students enrolled in science and technology fields, 2010**



Source: Authors' calculations based on UNESCO data (http://data.uis.unesco.org/).

40% of total Pan African University enrollments (see below).

New business models in African higher education: Success stories

This section surveys four options for extending higher education in Africa and addressing the challenges mentioned in the previous section. The business model concept offers a convenient cognitive tool to grasp differences between HEI models that do not compete on the same grounds (public/private, for-profit/nonprofit, state/market, mass education/elitist).[17] It enables us to compare in a fair way (compared with the ARWU lens alone) different models with divergent objectives.

The African Virtual University

The first option is to build new universities and campuses based on ICT, trying to harvest the digital dividend (such as digital content and free pedagogical resources) and to provide education to as many African students as possible. Such virtual universities have emerged in countries like Mauritius, Senegal, South Africa and Tunisia.

The African Virtual University (AVU) is a continental pan-African institution that has established the largest distance and e-learning network in over 27 Sub-Saharan countries, graduating more than 40,000 students. Created in 1997 to increase African students' access to high-quality education through ICT, AVU moved its base to Kenya and became a pan-African intergovernmental organization in 2003.

The project-leveraging ICT revolution in Africa

The Multinational Project AVU aims to strengthen capacity of target institutions to improve access to quality and affordable higher education through ICT innovations for open, distance and e-learning (ODeL). The project chose ODeL for program development and delivery, which has made it possible to offer programs that use a flexible, learner-centered approach and that draw on partnering universities as experts.

AVU hosts 219 open educational modules including mathematics, science, teacher education and ICT skills—all free of charge in English, French and Portuguese. The AVU's interactive portal is accessed beyond Africa in 142 countries with the majority of visitors from Brazil and the United States.

The project has two phases. The first enabled access to more than 5,000 students in target countries. The project's Phase 1 immediate beneficiaries are the 10 universities affiliated with the project: Jimma University, Ethiopia; University of Nairobi, Kenya; Université d'Antananarivo, Madagascar; Universidade Pedagogica, Mozambique; Université Cheikh Anta Diop, Senegal; Amoud University, University of Hargeisa and East Africa University, Somalia; Open University of Tanzania; Kyambogo University, Uganda; University of Zambia; and University of Zimbabwe.

The project has enhanced capacities of target institutions, mainly universities, to deliver high-quality, flexible, relevant and affordable ICT-enhanced educational programs in science and mathematics, ICT short courses, and training in computer science.

Phase 2 targets 22 Anglophone, Francophone and Lusophone countries beyond technological, language and cultural barriers.

The project has prioritized teacher education in sciences and mathematics and development of ICT skills, which are some of the key investment areas required to increase Africa's economic competitiveness, given the persistent shortage of qualified teachers in Africa.

Professional skills development for faculty

The AVU's ODeL Professional Development (ODeLPD) program builds skills in e-learning technology; development and delivery of e-learning materials; governance, management and financing of e-programs; and professional development of staff in target universities. More than 500 staff have been trained in ODeLPD, enabling target universities to develop other e-learning programs beyond teacher education and ICT programs. The AVU is considering piloting delivery of the ODeLPD program through massive open online courses to increase access to these ODeL skills.

The AVU continues to gain international recognition for its work. The AVU project was a winner of the Education-Portal.com's first Global Open Courseware Consortium People's Choice Awards in the Best Emerging Initiative category. The costs for setting up this kind of university are high for host countries and they cannot carry such investments.[18] Networks to develop ICT-enhanced modules therefore represent value for money (see chapter 29).

The Pan African University: Networked universities targeting excellence

The second option is to build a new university at the continental level to produce excellence in key science and technological areas—the Pan African University (PAU).[19] Its aim is not to provide education for the largest number of students but to promote African excellence at postgraduate level. The students are trained to develop solutions for "key issue" thematic areas in science, technology, governance, regional integration and social sciences at African institutions. This aim fits in the wider plan to fulfil the Pan African vision as stipulated in Agenda 2063 and the Science, Technology and Innovation Strategy for Africa (2014–2024). The PAU project is being implemented with the Southern Africa region hub (which is yet to be launched).

The PAU pursues several objectives. First, it aims at establishing a higher quality of educational and research institutions—this is urgent, as seen. Second, it aims to formulate a strategy for harmonizing higher education in Africa—as Africa has wide heterogeneity in degrees, diplomas and qualifications. Third, it aims to slow the brain drain and to attract back members of Africa's diaspora. Fourth, it aims to improve the ranking of African universities by investing in centers of excellence in the "key issue" thematic areas. Research and high-quality education delivery are at its core, with ICT and industrial linkages supporting the programs.

Adopting an innovative business model, the PAU works for the long haul. Based on existing infrastructure and the technical and financial guidance of lead thematic partners (LTPs), the business model is sustainable in the short term; planning is ongoing to address long-term sustainability.

The PAU will consist of a rectorate to be located in an African country and to manage the five thematic institutes hosted by a university institution, in each of Africa's five geographical regions. Each regional institute will be required to network as a hub for up to 10 centers of research and doctoral training on the continent. The rectorate is being hosted temporarily in the AU (Addis Ababa). The five PAU Institutes are:

- Basic Sciences, Technology and Innovation, in East Africa (Kenya).
- Earth and Life Sciences (including health and agriculture), in West Africa (Nigeria).
- Governance and Regional Integration, Humanities and Social Sciences, in Central Africa (Cameroon).
- Water and Energy Sciences (including climate change), in North Africa (Algeria).
- Space Engineering, in Southern Africa (South Africa).

The PAU will ultimately be a network of 55 universities and institutions of higher learning linked to each other by ICT to provide access to its selected online programs for all African students.

The main value proposition is to provide a network of excellence between HEIs but also to train future African leadership and step up to international excellence to retain Africa's best students and engage them with Africa's fate. The "customer segment" would be the best African students either from their country of origin or from the diaspora. The only criterion is excellence. The first two or three batches of graduates have a big incentive in the form of a full scholarship to reward their choice of PAU over international competitors. The channels used to meet these students are the existing network of HEIs and the PAU faculty.

Multiple stakeholders are involved: African states, African students, AU, host universities, LTPs (Germany, Japan, India and Sweden), African Development Bank (AfDB), European Union (EU), and the private sector. In the short term, AU and AfDB are significant

assets but should phase out in the second stage of the PAU.

Spillovers with host universities

Host universities were selected on the basis of their history in delivering postgraduate programs and their potential. Most of them are interested in the cooperation/competition relationship between the independent PAU institutes and their institutions. Supporting intra-African mobility of highly skilled persons through the PAU will be a key element in strengthening regional integration and addressing the brain drain. The African host universities' expectations are of pan-Africanism but also spillovers benefiting their own interests.

International linkages and cooperation network

Joint ventures will be encouraged and each of the five institutes will have an LTP—one of the novelties of the PAU's business model. Each LTP is expected to coordinate PAU partners, provide technical support and mobilize resources for its thematic network. The LTP should have know-how in its own topic and a willingness to share it and link the PAU to top-quality research centers and research programs. Several emerging economies initially expressed interest, including Brazil, China and India, but at the final stage only India made a commitment to be an LTP.

The African Union Commission has received financial and technical assistance from bi- and multilateral partners in human resources, including the EU, Germany, Sweden, India and Japan. The LTPs are the Swedish International Development Cooperation Agency (SIDA), EU, India, the German International Cooperation Agency (GIZ) and the Japan International Cooperation Agency (JICA).

SIDA has committed to be the LTP for the PAU thematic Institute at the University of Yaoundé 2 (Cameroon) in governance. It has commissioned a preliminary needs assessment and has already had two missions in Cameroon. JICA is an LTP for the PAU Institute for Sciences, Technology, and Innovation at the Jomo Kenyatta University of Agriculture and Technology in Nairobi. The government of India is the LTP for the West African Thematic Institute on Earth and Life Sciences at the University of Ibadan (Nigeria). For North Africa, the LTP is Germany with support through its technical organs of the GIZ, KfW (Reconstruction Credit Institute) and DAAD (German Academic Exchange Service). LTP expectations are building partnerships with African states and forming bilateral agreements.

Highly qualified staff

The strategy of the PAU is to hire, on the international higher-education market, top-class academics. Some LTPs have committed to engage visiting professors from their countries (mainly Japan in Kenya and Sweden in Cameroon). The PAU will also involve high-profile national higher faculty. Salaries and fees are not based on the living standards of the country, but are competitive internationally. The diversity of staff recruited and the fact that they will work to high standards and in good conditions—which they expect to be the same as in other international HEIs—suggest there will be no issues over the coming years on this aspect.

Private sector involvement

The host universities have been traditionally engaged with the private sector and the PAU offers them an opportunity for strengthening existing partnerships. The private sector is involved in all stages of the project: during program elaboration (to ensure future graduates' employability); some of the teaching courses and lectures (from private specialists); in the Steering Committee as well as monitoring and evaluation of the project; the design and implementation of the internship program (and will make job offers for future graduates); and capacity building and strengthening (private sector coordinators will be recruited at each PAU institute and at rectorate level). The project's evaluation also includes an indicator on private sector involvement and how the PAU is responding to demand from it.

The PAU will provide professional services for the private sector like training, resolving

practical problems (PhD thesis subjects), innovation workshops and seminar consultations. The capacity of revenue generation in the long term will strongly depend on private sector involvement; building a strong partnership with it in the short term is a key success factor.

Taking African universities to the top: Carnegie Mellon University in Rwanda

The third option is to raise higher African universities. As Rwanda is aiming to become a technological hub in Eastern Africa, the Carnegie Mellon University (CMU) in Rwanda is a key actor, which set up campus in Kigali in 2011. The CMU campus promotes regional mobility of students, staff and researchers.

Elsewhere, business schools have opened in Egypt and Morocco. Bilateral agreements between universities allow for common degrees among North America, Japan, EU and Africa. This model helps improve quality, relevance, competitiveness of African universities and their progress toward world-class institutions.

Active learning, critical thinking and innovative approaches

CMU has the strategic and innovative role in the Regional Information and Communication Technologies Centre for Excellence (RICT CoE) project (box 18.2). (The RICT CoE is among the five ICT centers of excellence recommended at the Connect Africa Summit in Kigali in October 2007.) The RICT CoE addresses weaknesses in the design and delivery of ICT training programs through collaboration with CMU—in designing curricula for Master's programs in engineering, teaching and research. Once fully operational, the RICT CoE will provide a state-of-the-art research, teaching and learning environment, building on CMU's track record. It will be the first advanced center in the region blending teaching, research, entrepreneurship, incubation, innovation and linkage to industry in ICT.

The project harnesses ICT for teaching and learning. Some of the courses under the MSIT and MSECE programs are delivered from the Pittsburgh campus through distance learning technologies, including the broadcasting of live lectures in some cases and web-based delivery of lectures in others. The majority of courses taken by CoE students are being delivered by resident CMU faculty in Kigali. As part of the program, students are expected to pursue a three-month industrial internship.

Box 18.2 Main aspects of RICT CoE

Delivery of a professional graduate degree and research program:

- Masters of Science in Information Technology (MSIT) focusing on networking, mobile computing, software engineering and data security.
- Masters of Science in Electrical and Computer Engineering (MSECE) focusing on telecommunication systems, computer communications, energy systems and embedded computing.

Promotion of business development and partnerships with the public and private sectors and the ICT industry:

- Design and delivery of entrepreneurship program.
- Development and execution of partnerships agreements between public and private sector and industry in Africa and worldwide.

The RICT CoE linkage with industry and the private sector is a best-practice example. The CoE has contacted 56 companies in Africa, the United States, United Arab Emirates, Japan, India and Europe. Twenty-four internships were supported by 18 companies in four countries, including South Africa and United Arab Emirates. Companies offering internships include Citrix, BSC, EWSA, COMZAfrica, ESRI, Google, IBM Research Africa, Marriott, MFS Africa, Microsoft, RDB, VISA and ZTE.

Strong links to the labor market

The RICT CoE project aims to address the acute shortage of advanced ICT skills in Rwanda and the region. The project's financial and economic feasibility study revealed that the computer science and engineering courses in the region lacked practical-oriented skills due to outdated curricula and inadequate faculty, inability of existing universities to blend teaching and research, lack of

industry experience and internal governance problems.

Market analysis of Rwanda (and the region) indicates growing demand for highly skilled ICT professionals, notably in wireless networking, mobile computing, broadband applications, information security and Voice over Internet Protocol technologies. The thriving private sector in the region is increasingly data and information driven and this creates demand for high-quality ICT professionals. Training in these ICT aspects also has the potential to create jobs through ICT service-sector entrepreneurs. (All taxes are waived on computers and software in Rwanda and in most of the region's countries, which provides a favorable environment for enterprises in ICT-related businesses.)

Once completed and fully functional, it is estimated that within 10 years, the RICT CoE will create at least 1,142 high-level jobs in ICT in the region, including 30 direct jobs at the CoE, 855 graduates employed or employers, and 257 employees of graduates.

A new model of training engineers in Africa: ESPRIT in Tunisia

ESPRIT—the fourth option—is a private, innovative engineering HEI in Tunisia dedicated to engineering and technology, founded in 2003 by higher education faculty discontented with the established educational model. During its first academic year (2003/04), only 30 students enrolled; now, ESPRIT is a key actor in higher education in Tunisia with 4,000 students enrolled (box 18.3). The school offers four majors degrees in engineering: telecommunication, software, electro-mechanical and civil.

To some extent, ESPRIT has set a new model of education in engineering, and it seems very close to the New Education Model for Africa (see chapter 17).

Active learning, critical thinking and innovative approaches

The teacher-shareholders—the initiators of ESPRIT—were convinced that the pedagogical model in the country's public engineering schools was no longer adapted to train students in the 21st century. Their main concern was that they were unable to implement this radical change in their public institutions, and that the private sector was freer for this.

ESPRIT has relatively few students per classroom and adopted active learning methods based on team projects and resolution of real-situation problems. School management was convinced that a quality management system and high standards were needed to ensure a top-class education for engineers. Today, they are looking for the accreditation by the European Academy of Bozen/Bolzano.

This model of education is based on an extensive use of ICT allowing for synchronic and asynchronic interactions between students and teachers and among students. ICT also serves as the basic approach for active learning.

Training of trainers

One of the main innovations at ESPRIT is the investment in training of its own trainers (higher education teachers). New teachers

Box 18.3 Key figures about ESPRIT

- A network of more than 1,300 alumni.
- 3,300 students in engineering enrolled this academic year.
- 600 students in professional training following evening classes.
- 110 students in preparatory schools for the French "grandes écoles" of engineering.
- 2% foreign students with 15 citizenships.
- 600 new graduates in different branches.
- 150 new graduates in evening classes.
- 10% of graduates in engineering at national level.
- 25% of engineering graduates in ICT at national level.
- Examination success is over 85% in engineering diplomas.
- More than 85% examination success for preparation to French high school in engineering at Esprit-Prepa (Polytechnique-ENS, Mines-Ponts, Centrale-Supélec).

spend one academic year in training to catch the "spirit of ESPRIT," familiarizing them with active learning. They learn how to become a learning facilitator instead of a standard teacher. An innovative pedagogical center facilitates this reform.

ESPRIT has 200 tenured positions for its staff—an unusual practice in private higher education, which most often uses temporary contracts and temporary positions, and in fact accounts for half of the total permanent positions in private higher education in Tunisia. This gives more incentives to teachers to commit themselves to pedagogical change and to high-quality education within ESPRIT.

Strong links to the labor market

Another innovation reflects ESPRIT's management desire to link its graduates to the job market's needs. ESPRIT aims to train "operational" engineers—engineers with a scientific and technical background and soft competencies and personal skills (such as interpersonal and relational). The school has an impressive rate of getting its graduates into the Tunisian job market (around 85%). Many ESPRIT alumni are working in some of the best ICT firms in Tunisia and Europe—the school is close to an ICT technopark (El Ghazela) where many ICT multinationals have plants. The ties between the school and those firms lead to a good knowledge of the labor market's needs for skills, explaining why the school has substantially increased its ICT enrollment.

Promotion of applied research

ESPRIT decided to create a dedicated operational environment for R&D (Esprit-Tech), stressing innovation and development. Operational R&D activities put the accent on technology and advanced technologies, including prototypes, research valorization, and transfer and dissemination of research results. Ten research teams are involved in, for example, cloud computing, mobile applications, ambient intelligence, ubiquitous computing and embedded computing systems and wireless networks.

An open and inclusive school

The school has international cooperation agreements and partnerships with several universities around the world. It is also delivering French degrees with universities like the university of Paris-Dauphine and Paris I-Sorbonne (for a joint executive MBA); a double diploma with Polytech'Sophia of the University of Nice Sophia-Antipolis; a double diploma with Télécom Lille; and a double diploma with Télécom Ecole de Management. It also has a joint venture with Mines-Télécoms Paris Institute on operational research and innovation.

ESPRIT has agreements with big players in international ICT market like Sun, Cisco, SAP, Microsoft, Google and Samsung. In 2013 it has joined the CDIO (Conceive Design Implement Operate) Initiative launched by a hundred or so best universities in the world including MIT, Harvard and Stanford to set training standards for 21st century engineers.

To become a key actor in Tunisian higher education and compete in the African higher education market, ESPRIT needs to invest more in R&D and continue targeting its specific niche to extend its network in Africa. A new shareholder—a subsidiary of the French Agency for Development—may play an important role as it operates throughout the continent and has the knowledge for extending higher education across Africa.

Conclusions

First, Africa's economic landscape is changing very fast, thus calling for new sets of skills to meet the current and emerging labor market needs. The ICT revolution and discovery of oil, gas and other minerals requires high-quality STEM skills in critical masses. Africa faces a major shift in its higher education and needs to adopt best practices to rapidly expand access to quality and relevant higher education with very limited resources and a declining official development assistance. How? For example, how do we consider higher education in Africa—along private-market or public lines? Who can regulate this market? And what are the functions of the state?

Second, the ongoing regional integration in Africa, including regional labor mobility protocols and efforts to harmonize curriculums and accreditations, create an opportunity to further develop quality HEIs through cost-effective ways. Countries are pooling resources to establish regional centers of excellence and network existing HEIs. This approach could be further strengthened through the CoEs formally collaborating with "world class" institutions to review curriculum, exchange faculty and carry out joint research activities.

Higher education is a private, self-organized market where business models coexist. In Sweden, for example, universities are entirely financed by public funds. Public universities in the United States are considered a market service, even if they are less costly than the elite universities (Ivy League), where fees are high.

These business models show the vision of higher education and the policies of countries, reflecting decisions on the role of the state in education. Is it a provider-state deeply involved in giving access to higher education to everyone by supporting it financially (and ultimately through taxes)? Or is it a more free-market state characterized by economic pragmatism, which lets the wider market organize higher education? With governments acknowledging the need for private sector engagement to expand access to HEIs in Africa, "a soft loan" fund is needed for the private and public universities to access affordable credit for HEIs development. The conditions for the fund could include a focus on STEM, leveraging ICT, e-libraries, enhancing research and women access to HEIs.

Depending on state's educational policies the outcome of knowledge (diplomas, skills and employability) and the context of learning (HEIs) are different, varying by cost to the state and learners. Providing a person an education always comes at a cost but there is a difference between a state that considers its duty to support all the cost (such as Sweden); one that considers it has to support most of the cost (such as France); and one that considers that the larger part of learners has to support the larger part of the cost for all the others (such as the United States). For-profit and nonprofit institutions always co-exist on the educational landscape: the differences are mainly the extent of public funding, the quality of institutions and the employability of graduates. Student's access to loans for HEIs is very limited. Governments and universities need to engagement the private sector in a structured manner to enable expansion of student's loan revolving funds and creation of the same where these do not exist.

Africa's growth is on a positive trajectory, and HEIs can only grow at a higher rate to support Africa's emerging knowledge-based economies through research and ensure the required workforce, in the right skills and numbers, is in place. Innovative models to expanding HEI are thus important.

Notes

1. World Bank 2009.
2. Johnson, Christensen and Kagermann 2008; Demil and Lecoq 2010; Zott, Amit and Massa 2011; Osterwalder and Pigneur 2010.
3. Flanagan 2012, 14.
4. Rubin 2013.
5. Castillo-Merino and Sjöberg 2008; Christensen and others 2011; Rubin 2013.
6. Furniss 2005.
7. Oxford Analytica 2013.
8. Education Sector Analysis Unit (UNESCO-BREDA) and calculations based on data from the OECD and the World Development Indicators database.
9. AfDB 2014.
10. Ben Youssef, Omrani and Dahmani 2013. And Ben Youssef, Ben Youssef and Dahmani (2013) show that Tunisian higher education teachers are acquiring these skills and have some innovative usage of these technologies in their classrooms.
11. Ben Youssef and Dahmani 2008.
12. NEPAD 2010.
13. UNESCO 2010.
14. World Bank 2008.
15. World Bank 2012.
16. http://data.uis.unesco.org/.
17. Johnson, Christensen and Kagermann 2008; Osterwalder and Pigneur 2010; Zott, Amit and Massa 2011.

18. The African Development Bank has been an active partner in creating AVU and invested USD7.3 million in 2004. In 2011, it provided a USD15.6 million grant to create 12 new open distance and e-learning centers and upgrade 15 e-learning centers at the 27 AVU partner institutions using ADF funding. ADF-12 provided a grant of USD15.6 million for AVU II.
19. Nabudere 2003.

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CHAPTER 19

Putting youths to work

Amadou Bassirou Diallo, Borel Foko, Ginette Nzau, Ali Eyeghe and Anouar Ouedraogo

All over the world, the situation for youths[1] is deteriorating, and it has worsened since the great depression of 2008. Developed and developing countries are facing the tragic situation where economic growth is not sufficient to absorb the new cohorts of entrants on the labor market. Developed countries, such as Spain and Greece, even witness jobs destruction. Amid this, Spain has now 27% of total unemployment and more than half of youths unemployed. The whole Euro zone has reached unemployment of 12.1%—19.2 million jobless people.

According to the International Labour Organization (ILO)'s 2008 Global Employment Trends for Youth report, youths represent approximately 40% of total unemployment worldwide despite accounting for only 25% of the working-age population. About 75 million youths were unemployed globally in 2012, 4 million more than four years ago, representing an unemployment rate of 12.6 percent.[2]

With an important share of young population, youth unemployment and underemployment is a challenging issue for Africa. Africa has the youngest population of the world with 200 million people between ages 15 and 24, comprising more than 20% of the population.[3] In 2009 there were 15 million young people that were openly unemployed in Africa. Youth unemployment rates are twice those of adult unemployment in most African countries.[4] Overall on the continent, young people constitute 60% of the unemployed population, though they constitute about 40% of the working-age population. Both in Sub- Saharan Africa and North Africa youths constitute a very large share of the total unemployed at 43.3% and 51.2%. In 2011 the youth unemployment rate was 11.5% in Sub-Saharan Africa and 27.9% in North Africa.[5]

Youth unemployment varies by region, country's degree of development and residence in an urban or rural area. In the Maghreb, in South Africa and in middle-income countries, the issue is more about youth *un*employment; in low-income and Sub-Saharan countries, it is more about their *under*employment, since most youths are working and the question then is how to help them become more productive and provide them with decent jobs.

Central to the high rates and persistence of youth un- and underemployment are rigidities related to labor, capital and product markets, skills mismatches, a preference for public employment (many countries have a high proportion of public jobs), rapid population growth (implying rapid growth in the labor force) and a large informal sector.

Economic development cannot be dissociated from employment issue. Job concerns are at the core of any social and economic development debate. As recognized by the last 2013 *World Development Report,* "development happens through jobs and the development process should be watched and analyzed through the lens of jobs creation."[6] Work allows people to earn income, to plan a better future for their family, and to contribute to wealth creation and social cohesion.

Unemployment in Africa: What do we know?

Many scholars and institutions have researched youth labor force issues during recent years, especially since the beginning of this decade. Authors generally investigate the characteristics, causes and policy responses to this phenomenon.

As underlined by Page (2012), African countries with relatively organized labor

markets and a large formal sector have higher unemployment rates than other countries. The explanation of this difference in unemployment is largely documented. In poorer countries young people are generally less educated and are therefore available for low productivity occupations. Young people are thus underemployed rather than unemployed, often working in low-productivity jobs for survival compensation, mostly in the agriculture sector.[7]

One explanation comes from the urban/rural location. In low-income countries more youths live in rural area as compared with those in middle-income ones. It is thus easy for them to work in agriculture as self-employed rather than waiting for a high-quality job. In addition, youths in low-income countries often cannot rely on solidarity networks and support from families or government safety nets as much as youths in richer countries. In better-off countries, with relatively good labor and social security institutions, youths prefer waiting for better quality jobs in line with their high educational degrees rather than accepting jobs implying what they perceived as bad conditions. In poor countries the share of vulnerable workers remained therefore very high.[8] As a possible solution, Acemoglu and Shimer (2000) argue that unemployment insurance may increase labor productivity, because it reduces the risk of looking for higher productive jobs.

The benefits of education investments seem particularly limited in Northern Africa. Greater numbers of students in this region have acquired more education, but the numbers do not always translate into higher rates of employment and wages. This region has had one of the fastest increases in the average years of schooling in the developing world, but training curricula have not necessarily helped young people find jobs and move into the workforce. For Tunisia for instance, the higher education graduate unemployment rate was 23% in 2010 and 29% in 2011. Due to the high unemployment rate, many young people have given up or put off the job search, and continue their stay in the educational system or become discouraged workers.

In Africa youths are also particularly affected by social conflicts and economic shocks. They are usually a somewhat marginalized class of citizen, especially in rural areas, lacking access to basic services, including education, health, land and other livelihood opportunities. In many African conflict-affected countries, because of youths' involvement in conflicts and the impacts they had on them, the situation for youths is of concern for governments and donors. A large number of them are inactive, unemployed or underemployed. Most of them are uneducated, lack basic employability skills and work experience, in good part as a result of the conflicts and this affects their formative years.[9] In many countries youths that survived and witnessed wars, or who were perpetrators, still need to heal. For instance in Rwanda, in 2010, the Ministry of Health's National Commission for the Fight against Genocide recognizes that the youths are the largest group affected by the conflict, particularly those ages 15–21. According to the study, tens of thousands of youths have lost their families and are still suffering physical and psychological wounds. Because many families have been destroyed, many youths fail to go to school because of lack of resources. Those lucky enough to complete secondary degree must compete to find daunting limited jobs.

All these factors threaten long-term development prospects along with the restored stability and security. This situation is not without consequence on global peace and stability. It is argued that countries with high youth bulge (that is a big share of youths in the total population—usually 20% or higher) face higher risk of political instability.[10]

For the last decade or more, the international development community has neglected youth employment issues. Global strategies and documents have hardly touched on labor and employment; the assumption has been that economic growth will automatically solve the problem. But with Africa's noninclusive, decade-long solid growth and the Arab

Spring, the question of youth employment is now on the agenda.

Africa's challenges

Africa is witnessing a youth bulge contributing to an employment crisis. Almost 1 billion people live in Africa, a figure forecast to more than double to 2.3 billion in 2050, reflecting the demographic transition (see chapters 1 and 2). It is already the youngest continent: 200 million of its people are ages 15–24. By 2040 its workforce will be larger than China's or India's. In 2050 the continent is forecast to have about 1.4 billion young people ready for the job market (figure 19.1).

The job crisis has been triggered by the combination of major growth in an increasingly educated youth population, the slow pace of job creation in the formal economy and persistent low productivity and underemployment in the informal sector. Today there are 1.2 billion youths (ages 15–24) in the world (17% of the 7.1 billion total population), and 1 billion of them live in developing countries. Africa's 200 million youth make up 20% of its population (box 19.1).

For the last decade the continent has averaged economic growth of 5% a year, but growth has not translated into job creation. In fact, income inequality and unemployment rates have risen. Youths are the most affected, accounting for an average of 60% of unemployment although they make up only 37% of the working-age population. Worse, educated youths are deeply affected, mainly due to high reservation wages, and more and more African talent is wasted in unproductive sectors like subsistence agriculture and other informal employment, or the talented become part of the continent's brain drain.

This youth bulge is a unique opportunity for Africa—with the right policies, the continent can benefit from the demographic dividend. But if jobs are not available for these

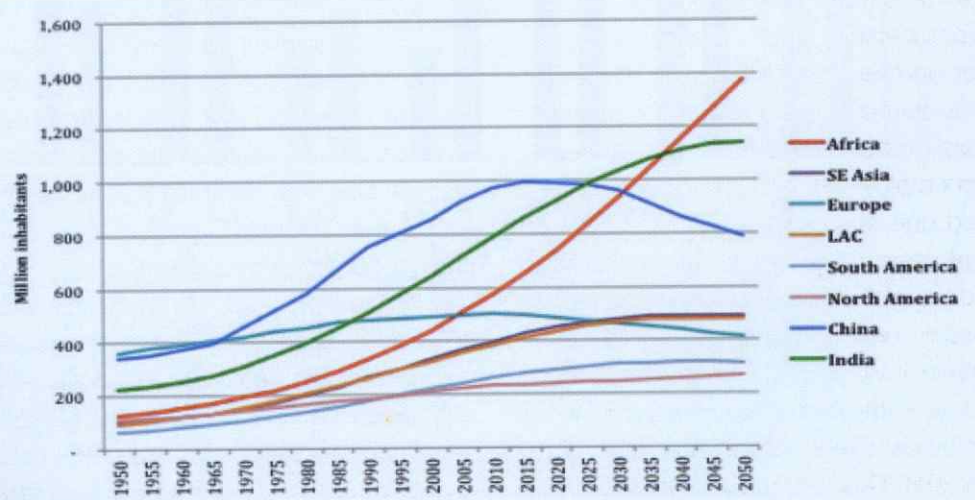
Box 19.1 Who is the typical African youth?

According to household and labor force survey data, the typical African youth is about 18 years old, living in a rural area, literate but not attending school. Girls tend to work more than their male peers but are more likely to be underemployed and not part of the labor force.

Youths are more likely to be unemployed in urban areas and more likely than adults to work informally. Youth migrants are more likely to be unemployed and out of the labor force than nonmigrants.

Source: World Bank 2009.

Figure 19.1 Africa will have the world's largest workforce by 2050 (working-age population [ages 15–64], millions)



Source: ILO 2011b; United Nations Population Division 2010.

young people, the potential boost could turn into a massive drag.

Africa could benefit from the demographic dividend as the dependency ratio falls (figure 19.2). But to do so fully it needs to better educate its young people and provide them with the skills they need to become economically productive, either as entrepreneurs or as employees. Still, compared with other regions in the world, dependency ratios are likely to stay high throughout the continent, calling for both determined measures for contraception and family planning and pension schemes for elders so as to fully benefit from the demographic dividend.

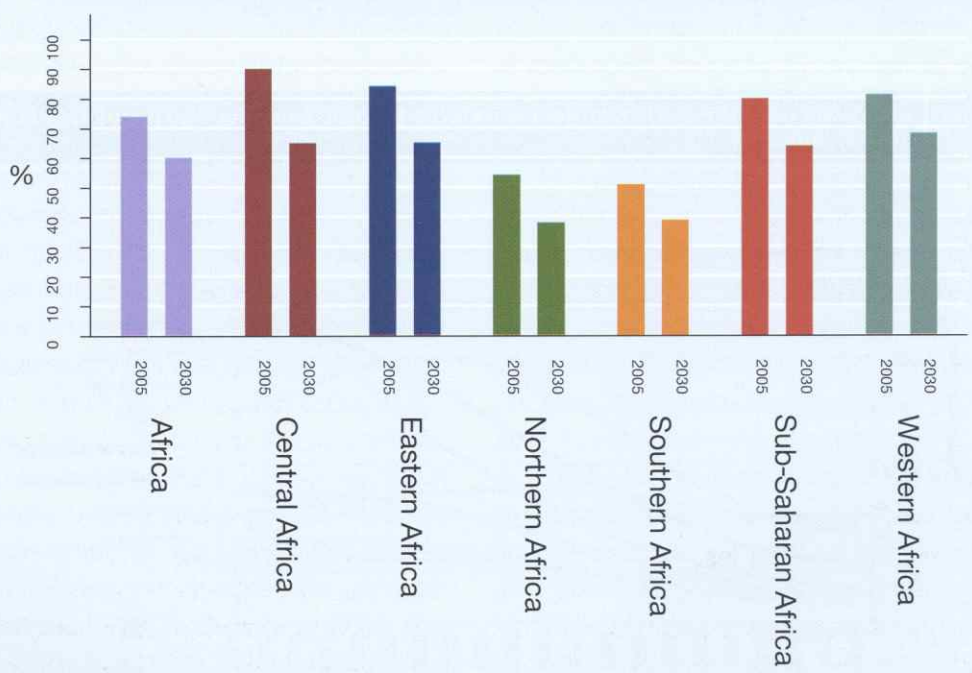
At 46%, youth participation in the African labor market is lower than the world average of 51%. It is lower than that for adults because young people have fewer job opportunities. Youths are often inactive and discouraged. The youth-to-adult labor force participation ratio averages 0.7.

The lower participation rate in North Africa (38%) than in the rest of Africa (55%) points to higher inactivity there; the rate is also lower than in the rest of the world as well. Sub-Saharan Africa's paucity of educational opportunities and its steep poverty rates explain its higher participation in the workforce. Since 2000 youth labor force participation has not changed in Sub-Saharan Africa, but it has actually worsened in North Africa (table 19.1). According to UNDP (2011), expected years of schooling are 10.3–16.6 for North African countries and 9.2 for Sub-Saharan countries. Youth labor participation is also lower in urban than rural areas in Africa, partly because rural areas offer fewer opportunities for young people to finish their studies (see chapter 3).

With an average African unemployment rate of 25–30% (figure 19.3), youths account for 60% of the unemployed. The ratio of youth to adult unemployment is far higher in North Africa than Sub-Saharan Africa—young people there are often three to six times more likely to be unemployed than adults. Africa-wide, though, the ratio of youth to adult unemployment is relatively low, about 2.3, compared with 2.6 for Europe and 3.0 for Asia and the Americas.

Youth unemployment is the tip of the iceberg in Africa—youth are often trapped in a vicious circle of poverty, poor education and

Figure 19.2 **Dependency ratios are slowly falling throughout Africa**



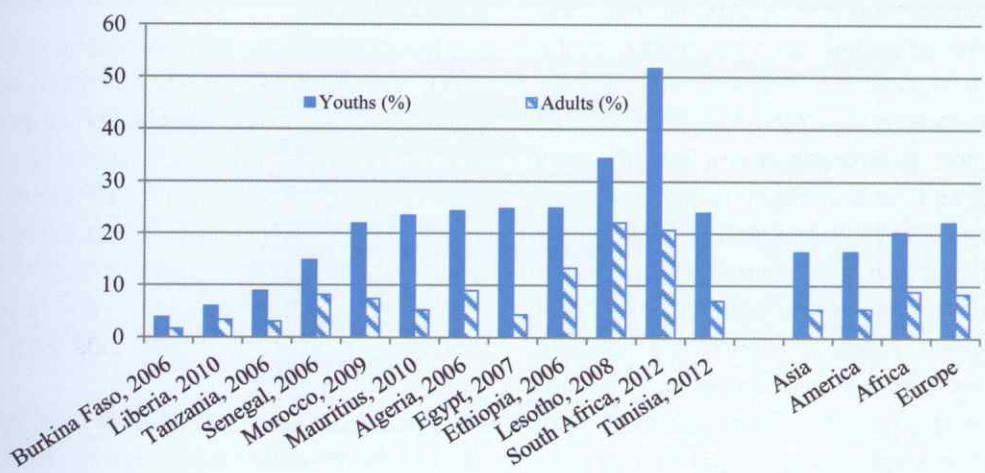
Source: United Nations Population Division 2010.

Table 19.1 **Youth labor force participation in Sub-Saharan Africa, North Africa and the world (%)**

	Youth labor force participation			Youth-adult ratio of labor force participation		
Year	Sub-Saharan Africa	North Africa	World	Sub-Saharan Africa	North Africa	World
2000	55.6	39.0	53.6	0.716	0.683	0.769
2001	55.6	38.8	53.1	0.715	0.679	0.756
2002	55.6	38.6	52.9	0.713	0.676	0.756
2003	55.5	38.9	52.5	0.710	0.680	0.751
2004	55.6	39.0	52.4	0.709	0.681	0.749
2005	55.6	38.9	52.2	0.707	0.680	0.747
2006	55.6	37.9	52.0	0.706	0.656	0.744
2007	55.7	36.9	51.7	0.706	0.638	0.740
2008	55.7	36.8	51.4	0.704	0.636	0.735
2009	55.5	36.6	51.1	0.702	0.632	0.732

Source: ILO 2011a.

Figure 19.3 **Globally, unemployment is higher among youths than adults**



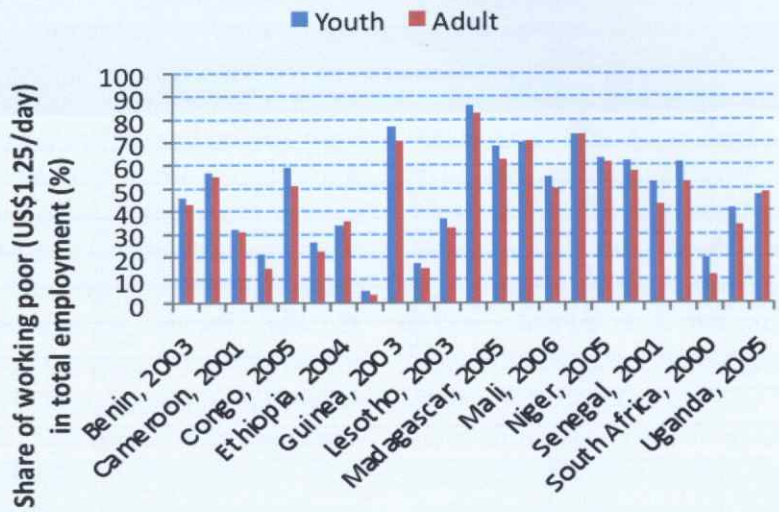
Source: ILO and national statistics institutes data.

training, and low-productivity, mainly informal jobs. This pernicious combination exacerbates intergenerational poverty. The incidence of the working poor is higher among youth than adult workers in most African countries (figure 19.4). This reflects a global trend, one that has been worsened by the financial crisis.

Because the jobs available are often of very poor quality, it is less the unemployment rate that causes concern than the types of jobs young people can find. Most opportunities (about 90%) are in the informal sector and are thus taken up by vulnerable workers (defined by the ILO as the total of self-employed and unpaid family workers; see chapter 6). According to the ILO (2011a, xii), "With more than three-quarters of workers in Sub-Saharan Africa in vulnerable employment and around four out of five workers living with their families on less than USD2 a day, Sub-Saharan economies faced daunting decent work challenges."

Countries with low unemployment rates generally have very high levels of informality. In contrast, countries with well-structured labor markets and large formal sectors tend to have high unemployment levels. This underscores the assertion that effective labor market analysis in Africa must consider not

Figure 19.4 **Working poverty is more common among youths than adults**



Source: ILO 2011b.

only unemployment but also the quality of employment (figure 19.5). Despite their motivation to set up their own businesses or join a family business, the productivity of these young workers is all too often hampered by the lack of technical and employability skills that would enable them to connect with other providers in the value chain; information about jobs and markets needs and niches; and entrepreneurial and financial skills. These constraints, linked to inadequate collateral (such as savings and property) to secure loans and an insufficient employment track record, prevent young people from helping make the informal sector more productive (see chapter 26).

Countries show wide variations on the ILO's three criteria. About half the unemployed people in urban Republic of Congo are youths, while their number is almost close to zero in Rwanda (figure 19.6). Youth unemployment is generally higher in urban areas and youth underemployment higher in rural areas.

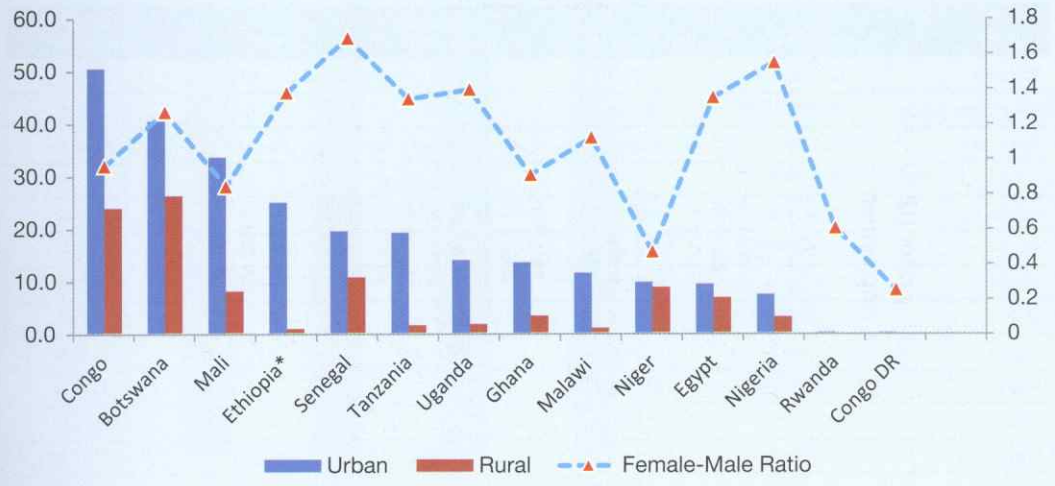
Inactivity rates are also very heterogeneous, highest in Nigeria and Senegal (figure 19.7).

Vulnerable employment, mainly informal, is most common for youths in Africa. Mali has

Figure 19.5 **Lack of opportunity pushes young people into the informal sector**

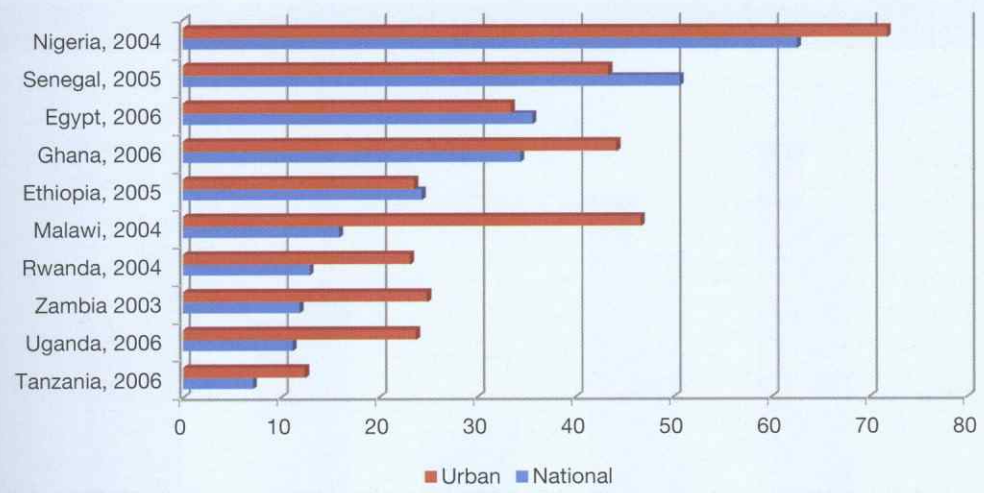
Source: ILO 2011b.

Figure 19.6 **Youth unemployment is high in urban areas and for many women**



Source: Households' survey data. For Ethiopia, data are from the ILO.

Figure 19.7 **Youth inactivity varies widely on the continent**



Source: Household survey data.

the highest share of vulnerable youth employment (95%), South Africa the lowest (12%) (table 19.2). For those with more stable jobs, self-employment is predominant, followed by work in family businesses and wage employment. According to ILO (2013), in 2012 the number of vulnerable workers grew in most developing regions, including North Africa and Sub-Saharan Africa.

Despite being better educated than their parents, African youths have less chance than their elders to get a good job because of the mismatch between the skills provided at school and those the labor market needs (figure 19.8). This outcome also reveals a high reservation wage rate among educated youths. Finally, because the most educated tend also to be among the richest in the population, educated youths are more able to afford being unemployed, as in Tunisia.

Africa's working youths are mainly in agriculture, followed by services (figure 19.9).

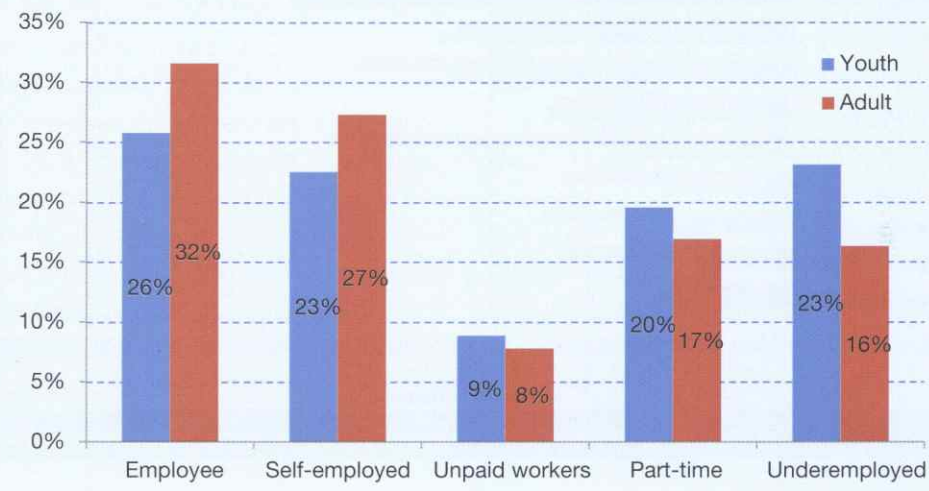
Poorly educated and from modest and disadvantaged households, most of them are engaged in unproductive activities in rural areas. But local labor market conditions make a difference and may explain the continent's heterogeneity: middle-income

Table 19.2 **Employment status of youths and adults in selected African countries (%)**

Country	Wage employment	Self-employment	Contributing family work	Other	Vulnerable employment
Botswana	62.8 (62.8)	7.2 (13.7)	29.9 (23.5)	0.1	35.7 (32.8)
Congo, Dem. Rep.	10.2 (19.5)	49.1 (63.2)	36.3 (15.5)	4.4 (1.8)	85.4 (78.8)
Congo, Rep.	20.1 (28.7)	55.3 (59.7)	17.2 (2.5)	7.5 (9.1)	72.5 (62.2)
Egypt	64.9 (69.5)	4.1 (7.0)	31.0 (23.5)	—	35.1 (30.5)
Ethiopia	17.9 (15.3)	24.1 (65.7)	58.0 (18.9)	—	82.1 (85.6)
Ghana	13.3 (18.4)	26.2 (62.2)	50.4 (13.7)	10.2 (1.0)	75.6 (75.9)
Malawi	14.9 (22.8)	18.9 (22.8)	56.0 (48.1)	10.3 (6.3)	74.9 (70.9)
Mali	5.4 (9.0)	41.6 (72.6)	53.0 (18.4)	—	94.6 (91.0)
Nigeria	72.6 (64.1)	17.0 (31.7)	8.5 (2.9)	1.9 (1.3)	25.5 (34.6)
Rwanda	27.7 (21.4)	16.8 (48.9)	55.5 (29.7)	—	72.3 (78.6)
Senegal	12.3 (20.3)	41.7 (67.4)	46.3 (12.3)	—	88.0 (79.7)
South Africa	84.8 (74.3)	7.1 (15.5)	5.9 (9.5)	2.1 (0.7)	11.8 (19.1)
Tanzania	8.0 (10.4)	9.0 (14.9)	20.2 (8.1)	62.8 (66.6)	28.5 (20.9)
Uganda	14.0 (17.3)	20.9 (61.0)	63.6 (20.9)	1.6 (0.9)	84.4 (81.9)

Note: Figures in parentheses are for adults (ages 25 and older). — is not available.
Source: Household survey data.

Figure 19.8 **Youths are more likely to be either underemployed or unpaid than adults in Africa**



Source: AfDB and others (2012) using Gallup data.

countries, for example, have a different pattern, reflecting better labor market conditions.

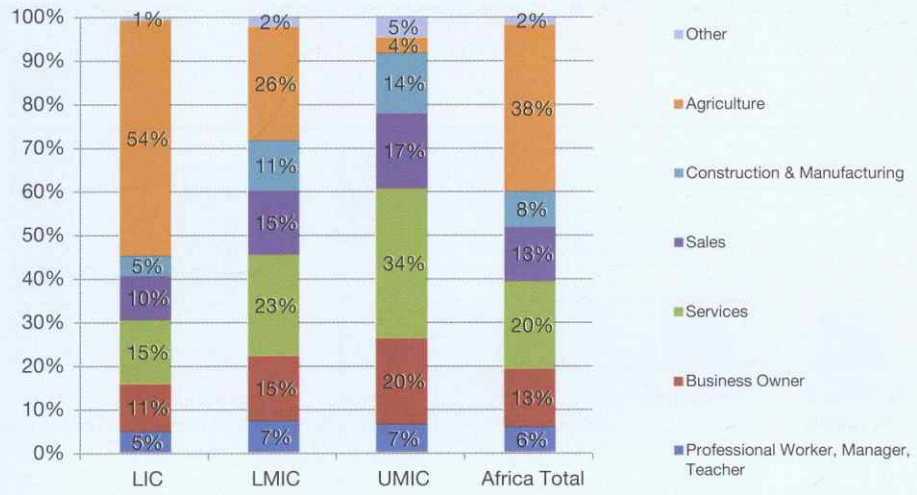
Over the last 25 years the potentially dynamic and buoyant informal sector has not effectively absorbed job seekers. Although agricultural productivity has risen, the sector is relatively marginalized because of its mainly rural aspect and inadequate technology—both of which limit its ability to attract the more educated. Another concern is the fall in average labor productivity of the nonagricultural informal sector in low-income countries (figure 19.10).

Finally there is the problem of the educated unemployed among those ages 25–34. Unemployment rises with education and wealth (as seen), signaling an issue with job quality and a skills–labor mismatch, notably for the highly educated (figure 19.11).

Roots of the youth employment crisis

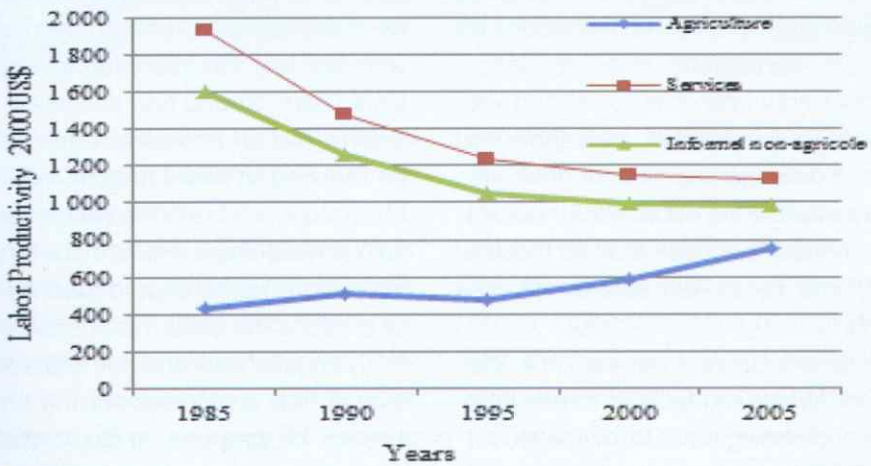
Several factors constrain African demand for labor in general, and youths in particular.

Figure 19.9 **Youths are more likely to work in agriculture**



Note: LIC is low-income country; LMIC is lower middle-income country; UMIC is upper middle-income country.
Source: AfDB and others (2012) based on Gallup data.

Figure 19.10 **Labor productivity has improved in agriculture, worsened in the nonagricultural informal sector**



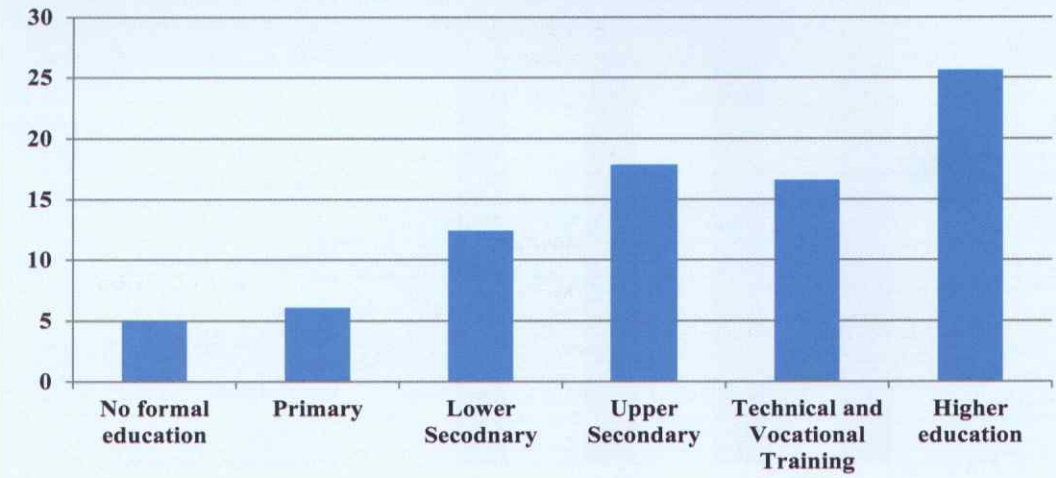
Source: ILO 2011a.

African economies are relatively small and have enclaves with excessive dependence on primary commodity exports, capital-intensive extractive industries, a weak industrial base and a predominance of subsistence agriculture and informality. Also, because of its emphasis on low-skilled labor, the private sector is generally unable to contribute to creating stable jobs for youth.

Nor is the investment climate conducive to productive jobs, especially in the informal sector where most youths are condemned to vulnerable work. Overcoming obstacles to a better business climate is thus vital, as is building entrepreneurial skills by providing funding, low-interest credit and coaching. Similarly, weak institutional capacity and lack of adequate infrastructure, particularly in rural areas, have hampered job creation for youth because infrastructure inadequacies effectively double the cost of doing business in Africa.

A poor education system has much to answer for. The prevalence of illiteracy among African youths (25%—the world's highest) and a disconnect between a 20th century

Figure 19.11 **Unemployment increases with education in Africa (%)**



Note: Average for 24 countries, 2004 or close, ages 25–34.
Source: Majgaard and Mingat 2012.

education system and a 21st century labor market cloud youth job prospects (see chapter 16). Yet African universities and colleges are turning out about 5 million educated youths each year, adding to the educated unemployed, particularly in North Africa, where higher education has expanded with little regard for job-market relevance and where the knowledge and skills of graduates are more relevant to the public sector requirements of previous decades than to those of today's private sector–led economies (see chapter 17).

These factors prevent the equitable participation of African students in formal labor markets, condemning them to low-productivity, poorly paid and vulnerable jobs.

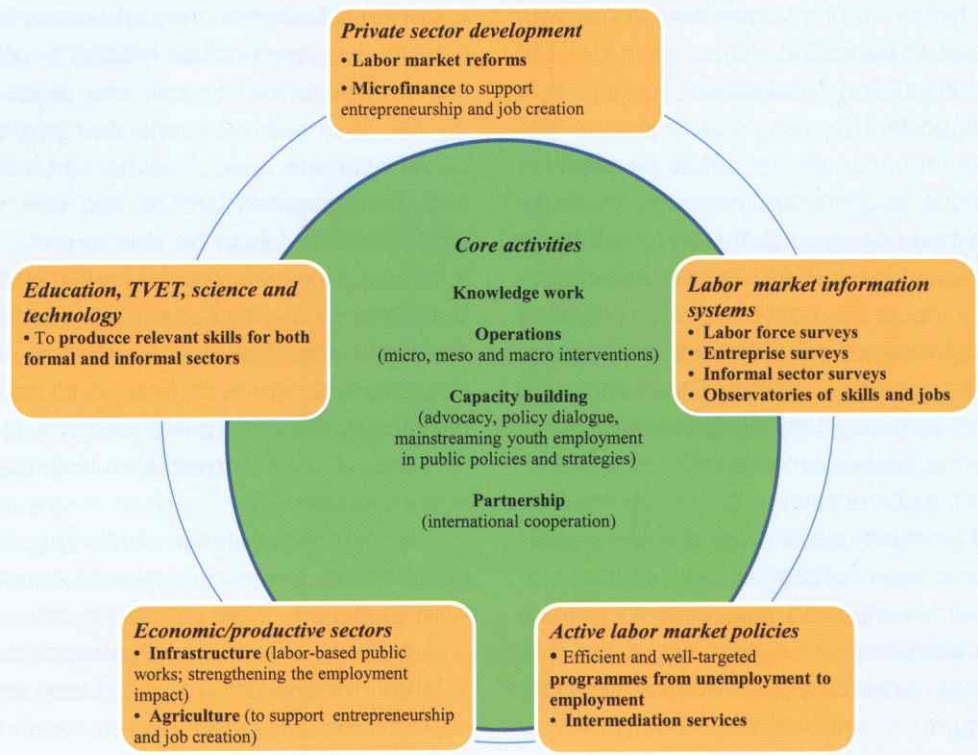
Ways forward

Unemployment requires an approach that deals with both supply and demand issues. This entails policy formulation as well as youth-employment-related projects and programs. The approach should also reinforce mechanisms to ensure a smooth match between labor force supply and demand. The main areas of focus are summarized in figure 19.12 to alleviate youth unemployment in Africa.

On the skills for competitiveness side, a comprehensive approach is needed. In 2020 there will be 317 million African youths ages 15–30, 19% of the world population of the same age group, up from 17% in 2012. This amplifies the challenge to create enough decent employment opportunities for those who are currently unemployed and those who will join the labor force over the next eight years. Strong and sustained economic growth and an economic transformation will be required to make growth more inclusive. Macroeconomic reforms will be necessary to help achieve these results in the long run. The education model should also be reformed to produce the skills that African economies really require (see chapter 17). Interventions should thus try to improve the employment impact of projects and programs, build capacity for mainstreaming youth employment in various stakeholder interventions to maximize their impact and address the skills gap for productive self-employment.

As for efficient and inclusive service delivery, many African countries lack the information they need to assess the characteristics of the formal and informal labor markets, their dynamics and the unemployment challenge—information that could help them design efficient education and employment policies. Even so, many African countries, whatever their level of economic development, have put in place such instruments as labor market information systems and active labor market policies to help the unemployed find jobs.

Figure 19.12 **Youth employment in relation with both supply- and demand-side interventions**



Source: Authors.

When resources are scarce, it seems logical to avoid duplicating instruments that address the same populations.

Many countries have an employment or intermediation agency, but very few job seekers, even from urban areas, are registered, partly because the quality of service they receive is low. In those cases, interventions should try to support labor market reforms, generate knowledge on youth employment, collect data (through surveys, routine data collection, employment observatories and the like) and formulate country and regional employment policies (apart from general data constraints, there is evidence that demand for skilled workers is quite weak in Africa). And they should help countries assess the efficiency, effectiveness and coherence of active labor market policies and intermediation services in order to design sustainable and equitable instruments that make better use of the scarce resources invested. Often there are numerous programs within a given country that are managed by different ministries or semi-autonomous agencies, some targeting more or less the same groups. Also common are situations where the most vulnerable (the less educated, rural or poor) are not served by any of the programs available.

One central issue is to make the informal sector more productive by providing youths with the necessary skills—accounting, management, planning, marketing, information technology and so on—to be more productive themselves. African governments should consider firms in the informal sector as assets, not targets to be destroyed, and take steps to train people for higher performance in the sector. Finally, too few youths become entrepreneurs, calling for action by the education system.

Finally, on risk protection, inclusion and social cohesion, often a sizable share of a country's unemployed have never been employed or have been seeking a job for more than a year. This situation signals that structural obstacles are preventing them from finding jobs. Those who experience long-term unemployment or who have never been employed are likely to lose the skills they

have, which lowers their chances to find a job. As noted, the unemployment rate tends to be higher among youths and to rise with the level of education. Although this fact is useful in guiding employment policies, it is also important from an equity perspective to take into account the actual contribution of various socioeconomic groups to unemployment. In doing so, it may be found that in many countries, individuals with less education contribute the most to the unemployment rate, but they are not systematically targeted by the programs available. This illustrates a need to help countries design balanced and efficient active labor market policies. Depending on the characteristics of the country, they would focus on one or more of these generic issues: a wage or fiscal subsidy program that enables unemployed graduates to acquire experience through a paid internship that could be a window to direct job creation; a program to improve the employability of unemployed graduates through complementary training or retraining/certification or on-the-job training; and an entrepreneurship program that provides job seekers with technical and financial support so that they can set up their own businesses. This latter option could target the most vulnerable (poor, workers or apprentices in the agriculture and informal sectors).

Conclusions

There are economic, political and social reasons for governments to focus on youths. Economically, as youths are the future of a country, it is logical to invest in them, especially providing them a quality education and give them a critical thinking mind and shark spirit. Politically, events witnessed around the world since the Arab Spring incited many governments to be more prudent toward youths. In countries such as Tunisia, Egypt and Libya, youths have been key actors to force government responses to their concerns and key actors of regime change. Socially, in many countries, youths ages 15–35 are at disadvantage compared with children and adults as they most heavily felt the impact of conflicts and economic crises. This affects their human capital development and their transition to adulthood. Some generations do not enjoy the safe environment and protection of parents and communities needed to acquire learning skills and to become productive adults. They rather experienced migration, social instability, sporadic school attendance and disaggregated families and communities. Holding a job to be able to provide for a spouse, kids and parents is a key and fundamental element of reaching adulthood. Thus, the lack of ability to reach this stage, due to lack of income and job, could lead to a rejection by the society, delay in family formation and, ultimately, frustration, violence and social instability.

Recognizing all these challenges, many governments, even in developed countries, have launched or are launching new plans and models to face the situation and provide youths with decent jobs. Many African countries have launched the so-called "new generation" Poverty Reduction Strategy Paper with heavy focus on employment. At the heart of these strategic documents/plans, youths often become a top priority. Creating job opportunities for young and older people seems to be a top priority for many governments. It is important to assist them for a good implementation of these plans.

Notes

1. Usually defined as those ages 15–24.
2. ILO 2012.
3. World Bank 2013; AfDB and others 2012; United Nations 2007.
4. World Bank 2013; AfDB and others 2012.
5. ILO 2012.
6. World Bank 2013.
7. AfDB and others 2012; World Bank 2013; ILO 2012; Fine and others 2012.
8. Fine and others 2012.
9. Peeters and others 2009.
10. Collier 2000; Miguel and others 2004; Urdal 2006, 2012; Colino 2012; Taydas and Peksen 2012.

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CHAPTER 20

Working across borders

Anne Sofie Westh Olsen with Chukwu-Emeka Chikezie

There is compelling evidence from around the world that there are significant human development gains to be made from migration. For Africa, advantages could accrue from well-managed intraregional migration because these flows are most accessible to poorer people and even modest gains can make a considerable difference to them. The country where people are born deeply influences the opportunities they have to develop their human capital, while the degree of regional integration affects their chances of doing so elsewhere. On paper, the element of free movement of people has been a centerpiece of regional integration. In practice, however, there are steep restrictions on immigration, such as strict visa regulations and few work permit approvals. The result: intra-African migrants face considerable insecurity and many obstacles to enhancing social mobility. The losers are not just the migrants and their families left behind but also the destination and origin countries.

Mobility and migration have always been an intrinsic part of human capital development, and migration can be considered a capability-enhancing act in itself. A search for better or more secure livelihoods is the main cause of migration.[1] Most African migrants move within the continent. Most people move to urban areas in their own country, but an estimated 31 million Africans migrate across borders—and at least half migrate within their subregion.[2] After comparing migration trends in African subregions, this chapter analyzes why the human development effects of intra-African migration are limited and discusses the five main structural constraints to jobs, health care and social mobility for migrants in Africa.

The current situation of structural constraints to movement within Africa signals a critical lack of coordination and collaboration on youth employment, labor market flexibility, innovative cross-border social safety nets and social policy reforms. While recognizing the difficulties of overcoming structural impediments, this chapter looks outside as well as inside the continent for best practices and then proposes practical measures that policymakers can take to maximize the benefits of intra-African migration for the continent.

Human development effects from migration are limited in Africa

Most migration, internal or international, leads to higher incomes, better access to education and health and improved prospects for migrants' children. Since 2000 there has been a resurgence of optimism about such benefits of migration. The 2009 *Human Development Report* set out evidence about the positive impacts of migration on human development, such as increased household incomes through remittances and improved access to education and health services; however, the evidence was mainly from south-north flows.[3]

Carling and Åkesson (2009) refers to a migration divide between those who can and those who cannot migrate in support of his theory of involuntary immobility. This chapter suggests that there is also a migration divide between those who have the human, social and financial capital to migrate beyond Africa and the large majority who migrate within Africa as a livelihood or resilience strategy. Due to structural constraints on accessing jobs, health care and social mobility, human development effects from migration within Africa are limited.

Intra-African migration could have greater impact on reducing inequalities and poverty.

Wouterse (2006), for example, showed that regional migration, which is less costly and thus more accessible, may do more to reduce poverty than migration out of Africa. More than three-quarters of migrants travel to countries with a higher level of human development than their country of origin.[4] In Africa most movements occur between countries with contiguous borders and small differences in income; since most of these migrants are poor, even small increases in income can have significant impact on their human development and that of their families.[5] For the individual, migrating can imply access to jobs, skills and health care, which can again have positive effects on those left behind. Remittances received by poor households, for example, can have a large effect on social inclusion.[6]

Intercontinental migration requires more social and economic resources and yields greater increases in income and livelihood security than intra-African migration and thus tends to exacerbate household inequalities.[7] While restrictions on mobility for poor Africans have increased, elites and high-skilled Africans are encouraged to leave to join the global north. Skilled migrants with a tertiary education thus have more opportunities for migration. Richer households are also more likely to have a family member who is an international migrant. Migrants from middle-income African countries tend to disproportionally migrate to destinations outside Africa, while migrants from poorer regions move to neighboring countries. It is plausible that this relates to the costs of migration[8]—GDP per capita has a large effect on the capacity to migrate to more distant destinations. Poverty is thus a major deterrent to mobility. Households receiving remittances from outside Africa are in the top consumption quintiles and were already wealthy relative to the general population before family members migrated.[9] Shimeles (2010) has stated that migration could increase continental levels of inequality and exacerbate differences in GDP per capita if migration has a net welfare gain to countries of origin. In Africa preferential access to migration is likely to reinforce structural inequalities between rich and poor.[10]

Many economists favor relaxing restrictions on immigration.[11] One of the most important economic arguments for open borders is that enhanced labor mobility would considerably increase world GDP and lead to more equitable distribution of wealth.[12] Also, liberalized movement of workers could significantly reduce world poverty,[13] mainly by increasing the incomes of those who move and thus remittances to their countries of origin.[14] But opinions diverge on the exact benefits of freer movement of people—for example, the effects of low-skilled versus high-skilled immigration in the destination country.

Even so, free movement of people is one of the least integrated policy areas in African regional integration (see chapter 5). This is in part due to the prevalent notion that migration is a security issue, in part to the divergence of interests between sending and receiving countries and in part to the unknown social, economic and political effects of migration. Over the last decade there has been almost no progress in ratification and implementation of regional Protocols on Free Movement, except in the East African Community (EAC). There is a large gap between the visions in the founding treaties of the regional economic communities (RECs)—which consider movement of people to be one of four freedoms—and the current reality. Only the EAC and the Economic Community of West African States (ECOWAS) offer visa-free movement, EAC for six months and ECOWAS for 90 days. However, all African subregions lack regional recognition of qualifications and right of establishment; limit the application of General Agreement on Trade in Services (GATS) Mode 4 on temporary movement to provide services; and restrict internal access to social services such as health and education.

Despite such constraints, migration is a key livelihood strategy for Africans. The poor often migrate because they are in vulnerable situations with few resources or choices. But their welfare gains are limited. Within Africa the social mobility of migrants is not facilitated and migrants have few opportunities for

breaking their low career ceiling and reducing intergenerational poverty. The extent of regional integration conditions the micro and macro levels of labor mobility and heavily affects human capital development. Without an environment of safe and rights-based migration, the benefits are low. In addition to high immigration restrictions and selectivity, Africa is also one of the global areas with the stiffest visa requirements. Consequently, large numbers of migrants are in irregular situations. Constraints on labor mobility in African subregions and reduced opportunities to exercise agency thus have negative impacts on migrant well-being as well as on the poverty- and inequality-reducing potential of migration.

Migration and mobility are a strategic resource, and recent theories underline the contradictory reality of enormous flows despite increasing restrictions on mobility. de Haas (2009) has underlined that rather than applying classifications such as forced and voluntary migration, it is more appropriate to conceive of migration occurring along a continuum from low to high constraints along which all migrants deal with varying degrees of structural constraints. All are confronted by some structural constraints that limit opportunities for social mobility and for structural change in receiving and sending communities. But as this chapter shows, the constraints are higher for migrants that cannot afford to migrate beyond the continent. It is mainly countries with more noticeable south-north migration patterns, such as Cape Verde, Ghana, Morocco and Senegal, that have benefited from support to migration for co-development, circular migration and other bi- or multilateral agreements. The EU-Africa Partnership on Migration, Mobility and Employment also addresses migration in terms of labor market disparities. These efforts need to be replicated in Africa.

Human development gains for migrants can be maximized and sustained by regional social policies conducive to inclusiveness and social cohesion. Social protection systems must be central for coping with the shocks that a more open and competitive regional market brings (see chapter 21). Specific measures are thus needed to ensure maximum benefits of migration for African youth, such as services for labor migration within subregions; more relaxed visa systems; options for dual citizenship; skills recognition; right of establishment; urban and territorial planning; cheaper remittance fees; better access to services such as education and health (including mobile banking) and their transferability (such as pensions); and structural legal changes to allow migrants to own land. Migrant agricultural laborers would need special attention, as would the gender dimension at all stages of migration. Intra-African remittances also need more attention to improve their effect on financial inclusion and poverty reduction. There is almost no consideration of the African diaspora within Africa itself, even though most Africans migrate mainly within their own subregions.[15]

Migration trends in African subregions

Migration is a privilege that is unevenly distributed between people from developed and developing countries. The Migration Without Borders scenario underlines the global divide between the free mobility of people from developed countries and those from most developing states.[16] Wealthier people and societies are generally more mobile than poorer people and societies. Emigration rates as a share of population are about 2.1% in low-income countries and 3.6% in high-income countries.[17] Indeed, migrating to the global north has become more difficult in recent years. This is blatant in Africa: Africans account for only about 10% of the foreign-born in Organisation for Economic Co-operation and Development (OECD) countries, less than in any other region in the world.[18]

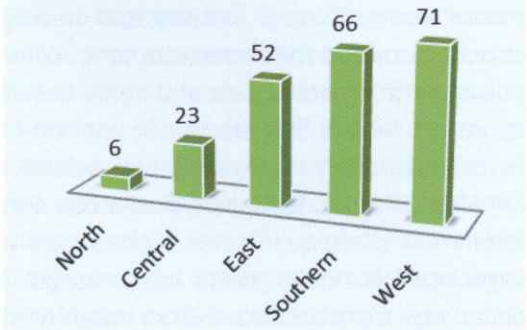
One of the global trends in this age of migration is its regionalization, especially in Africa.[19] There is indeed more south–south migration (understood as migration between developing countries) than migration from the south to high-income countries within the OECD. Migration within Sub-Saharan Africa is the largest south-south movement of people

in the world: 65% of migration takes place within the continent and often within the subregions (figure 20.1).

Although cross-border movements are high, there is no coordination of supply and demand of skills. In Africa 80% of south-south migration occurs between countries with a common border, compared with 20% of south-north migration.[20] Almost all African countries are today migration destinations. The main African corridors are Burkina Faso to Côte d'Ivoire, Zimbabwe to South Africa, Côte d'Ivoire to Burkina Faso, Uganda to Kenya and Mozambique to South Africa (figure 20.2).

North Africa is the outlier region in Africa, since 90% of migrants move to countries beyond the continent. Although long-term youth unemployment in North Africa is a social emergency, cross-country opportunities are not fully exploited. Intraregional mobility is limited, and although data on intraregional migration are scarce, it appears that few North Africans migrate to Sub-Saharan Africa. Within North Africa, Egyptians and Tunisians are the dominant migrant populations. Before 2011, 1 million Egyptians and an estimated 95,000 Tunisian workers were officially resident in Libya, many of them unskilled and employed in the informal sector.[21] Libya has been a magnet for migrants, and as part of its pan-African policies it has looked beyond the region to Sub-Saharan Africa to fill labor gaps.

Figure 20.1 Percentage of African migrants moving within their subregion

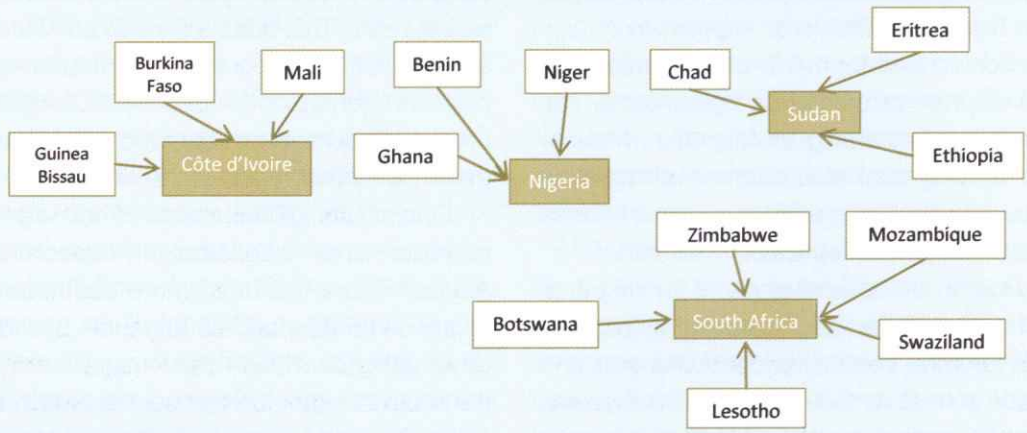


Source: Ratha and others 2011.

Sub-Saharan Africans are increasingly migrating to North Africa. An estimated 4.5 million of them were living in irregular situations in North Africa.[22] Some migrants use the region as a transit point to Europe; tens of thousands try to cross the Mediterranean each year. Some migrants end up staying in migration hubs along the way. In fact, according to de Haas (2005) trans-Saharan migration has caused trade to flourish and has helped revitalize ancient trans-Saharan caravan trade routes and desert oasis towns in Mali (Gao), Niger (Agadez), Chad (Abéché), Libya (Sebha and Kufra), Algeria (Tamanrasset) and Mauritania (Nouadhibou).

West Africa is the most mobile subregion of Africa. The majority of migrants from ECOWAS countries stay within West Africa, partly because ECOWAS allows 90-day

Figure 20.2 African countries and main migration destinations within the continent



Source: Shimeles 2010.

visa-free travel and partly for historical and cultural reasons, notably precolonial empires and forced migration during colonization. Coastal urban areas continuously attract labor from landlocked rural areas; Côte d'Ivoire, The Gambia, Ghana, Nigeria and Senegal have been receiving migrant workers from landlocked Burkina Faso, Chad, Mali and Niger.[23] The railways connecting Bamako with Dakar and Niger with Abidjan correspond to today's main migration trajectories. Nigerian industries and Ghanaian and Ivorian gold mines also attract workers, about equally from East and Central Africa.

The corridor from Burkina Faso to Côte d'Ivoire has the largest bilateral flows in Africa (1.6 million), even after violent conflict and increased discrimination.[24] During the colonial period major migration to the sparsely populated Côte d'Ivoire boosted cocoa development.[25] Until the 1990s the vibrant economy of Côte d'Ivoire partly concealed the fractious relations between *étrangères,* typically of Burkinabe and Malian heritage, and "pure-blood" Ivoirité.[26] In 2002 deportation and return movement surged due to violent conflict and increased xenophobia against the Burkinabe workers in the declining Ivorian cocoa industry. But Côte d'Ivoire is still the main destination for the Burkinabe. Even though it is the main migrant-sending country in Africa, official remittances to Burkina Faso have declined since 2000, and remittance fees from Côte d'Ivoire to Burkina Faso are among the world's highest.

Central Africa is the least integrated region on the continent: its basic infrastructure is minimal and there are overlapping memberships in multiple regional organizations. It also has the lowest human development scores in Sub-Saharan Africa. Peace and security is a deep concern; hotbeds of tension and insecurity—the Central African Republic, Chad and the Democratic Republic of Congo—stimulate cross-border refugee flows and camps. Gabon has traditionally been the main destination for migrants. Even though a third of the population lives below the poverty line, the World Bank estimated that nearly 19% of those resident in Gabon (284,127) in 2010 were migrants attracted by oil production; many of the rest were refugees.[27] But oil production, the backbone of Gabon's economy since it gained independence, is declining. Its GDP per capita is still one of the highest in Africa, but its human development indicators are below average for middle-income countries, and unemployment among young people is 30%, much higher than the national average of 16%.

Migration in East Africa is largely affected by forced displacement in Somalia and the Democratic Republic of Congo. Over the past decade East Africa, especially the Horn, has been plagued by civil wars, cross-border conflicts, social strife and arms trafficking. In several fragile states, remittances are estimated to exceed 50% of GDP, but the need to tap the large diaspora for skills is underdeveloped. Among concerns for the region are fragility, insecurity, cross-border conflicts, governance challenges and cross-cutting issues related to gender (such as human trafficking), the environment and climate change. Migration and labor mobility pose health and education challenges for migrants. Kenya is a critical hub for mixed migration in the region, by involuntary migrants, economic migrants and bona fide refugees, particularly from south-central Somalia. Kenya hosts the largest refugee population of Somalis (more than half a million) as well as many Ethiopians. It is also a regional hub for smuggling and obtaining false documentation for visas or new identities. Most of its emigration involves educated Kenyans leaving for educational or business opportunities in the EAC, Common Market for Eastern and Southern Africa, North America and Europe.

South Africa, a major destination for intra-African migration, is the largest net recipient of low-skilled migrants from the Southern Africa: 67% of migrants in South Africa are from its near neighbors. The region is a diverse mix of middle-income, low-income, landlocked and small island countries—with some hotbeds of political tension, notably Madagascar and Zimbabwe. In Southern Africa the movement of people across borders has long been linked to work in diamond

and gold mines and on commercial farms and plantations in South Africa, Zambia and Zimbabwe. South Africa has been a net recipient of labor migrants not only from the countries bordering it but also from the rest of Africa and abroad. According to the 2011 mid-census estimates, South Africa received 1.4 million labor migrants in 1996–2011. The high immigration rates have led to a more restrictive immigration policy and to some xenophobia in South Africa.

Finally, while movements within Africa have mainly been bilateral, all countries show a growing prevalence of temporary and circular migration. That has produced opportunities for human capital development and skills transfer—but circularity can be a problem for policymakers.

Structural constraints on human development gains

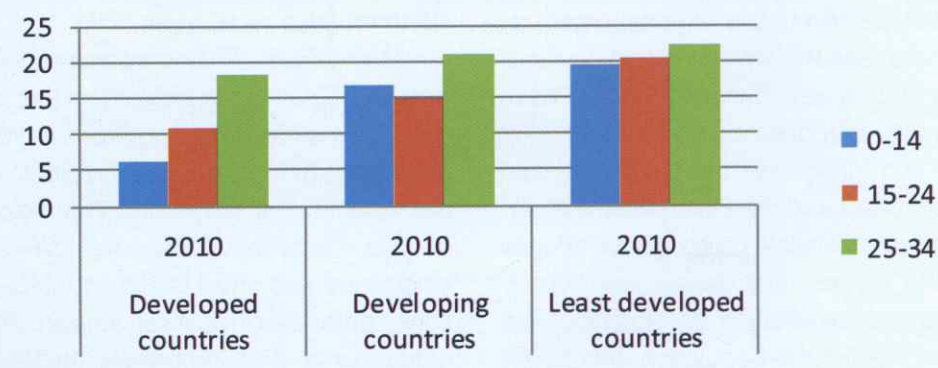
A search for better or more secure livelihoods is the main cause of migration. In Africa it is a necessity for some and an opportunity for others. Some people move because of such stress factors as climate change, war and poverty. Migration is also a response to relative deprivation and may represent a livelihood strategy and an investment or insurance function for diversifying income.[28] Africa's slow progress toward regional integration leaves space for improving dimensions that are important for human capital development, such as employment, health and social protection. African countries and RECs can do more to ensure development results from migration, from high- and low-skilled migrants.

Employment

Demographic growth combined with rising youth unemployment is a strong push-factor for migration. Neoclassical economics conceptualizes migration as an investment in human capital, motivated by differentials in wages and employment conditions between countries in order to maximize income. People migrate to obtain and build skills or to achieve further value and income for skills already acquired. Migrants in developing countries are mainly young men—though the numbers of women are rising—ages 18–29 searching for job opportunities (figure 20.3).[29] "Migration was the crucial chain linking labor force to employment through the intermediary of fertility and population growth."[30] In 2015, 61% of Africans will be under 25. This represents a growth opportunity as young people enter their productive years, if they can put their talents to productive use. The rising number of African youth is increasingly educated and mobile—but ever more un- or underemployed, exacerbated by a disconnect between labor market needs and skills produced in the education sector.

Because migration also represents a household decision to minimize risks and reduce relative deprivation, it is a means for self-insurance. African labor markets, both rural and urban, have structural limitations

Figure 20.3 **Percentage of international migrations by age and development group**



Source: UNDESA 2011.

that render them unable to absorb streams of workers. Mobility reduces such market failures.[31] Africa also lacks well-developed markets for capital and consumer credit. Further, national insurance markets are rudimentary and government unemployment insurance programs are limited or nonexistent; households cannot protect themselves from risks induced by un- or underemployment. This creates incentives for self-insurance and access to finance by diversifying the areas where family members work: rural, urban and abroad.

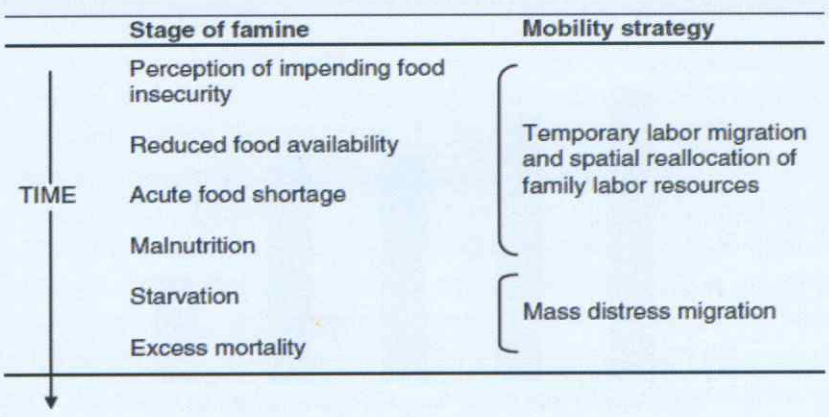
Many household resilience strategies are related to mobility.[32] Where there is a perceived risk of food shortage, for example, households can relocate some family members or they may migrate temporarily or seasonally to rural areas to diversify their incomes. In Niger, two-thirds of the respondents to the World Bank study *Voices of the Poor* in 2000 indicated that to cope with lack of food, clothing or income, they had left their homes to look for livelihoods elsewhere (figure 20.4).

But with immigration laws restrictive across Africa, migrants, whether high- or low-skilled, face numerous constraints before they even enter another country or attempt to find a job. Among them are:

- Outdated or nonexistent information about job offers across borders.
- Onerous visa requirements, high cost of travel documents and long procedures for work permits, which are often temporary. (The high costs of travel documents also hamper movement: 1 in 10 countries still have passport costs exceeding 10% of per capita income.)[33]
- Lack of mutual recognition of qualifications, which means that even where skilled labor is needed, as in education and health, people often find it difficult to exercise their profession in another country.
- Restrictions on GATS Mode 4 transfer of services, even for key sectors with skills gaps, such as engineering, accounting and legal services.
- Restrictions on right to settle, which hinders, for example, Tunisian health professionals from practicing in Algeria even though the latter lacks doctors.

African countries have some the highest visa requirements in the world, even though intra-African destinations are increasing fast as a source of flight arrivals;[34] usually it is easier and cheaper for non-Africans to enter. African Union (AU) citizens need visas for 76% of AU member states. Africans, like other nationalities, require preapproved visas to travel to more than half the continent, with few countries offering visas on arrival. The number of visas on arrival is below the world average in all African subregions except East Africa, which is the second most open subregion in the world. EAC member states are also moving toward sharing

Figure 20.4 Population mobility strategies associated with food insecurity and famine



Source: Hugo 1991, 133.

consular practices. Central Africa is both the least connected and the most insistent on traditional visas of all Africa's subregions (figure 20.5). Only a few African destinations offer electronic visas (e-visas). Such visa policies, combined with restrictive immigration laws, have led to high numbers of irregular migrants.

Trade barriers, regulatory requirements and immigration policy make it hard for foreign professionals to supply services in Africa under the GATS Mode 4 on movement of natural persons. Data suggest that—except for accounting technicians in Kenya—East Africa also has a need for mid-level skills.[35] Failure to harmonize professional qualifications impedes growth. Agreements by the West African Economic and Monetary Union (WAEMU) and ECOWAS include a national-treatment obligation clause that applies to all service activities covered by the agreements, but mutual recognition is not yet in force in ECOWAS. Further, heavily regulated professions, such as engineering, medicine and pharmacy, demand commonly accepted standard examinations before accreditation to practice. Beyond accreditation, those seeking self-employment through the right of establishment also face a host of structural barriers and impediments, such as those of Tunisian doctors in Algeria.

Health care

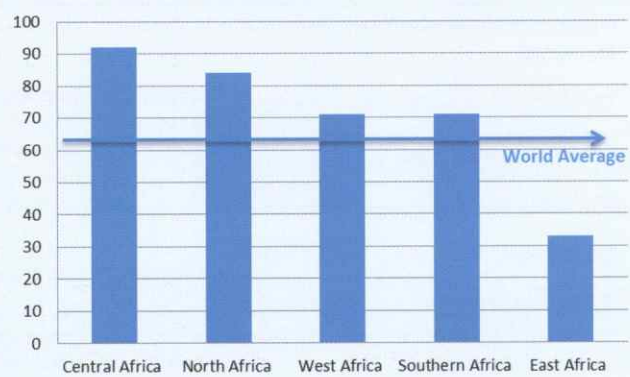
The close link between migration and health underlines the correlation between the mobility of skills and social inclusion. This link has five main correlations:

- There is high mobility of African health workers both in Africa and beyond.
- This mobility affects the quality of the services delivered in countries of origin.
- This in turn stimulates mobility of patients (those who have the means) to medical hubs.
- Migrants have also carried disease and health threats, such as HIV/AIDS, across borders.[36] The effects of migration on tuberculosis and pneumoconiosis have been documented in Lesotho, Mozambique, South Africa and Zambia.
- The health of migrants is also affected by social policies in the destination country.

Rising inequalities within and between countries creates a pull factor. Further, aging populations are creating heavy demand for labor in developed countries. Several scholars have underlined that pull factors have, for example, led to the increasing feminization of African migration both within and beyond the continent, among them demands for domestic workers, teachers, nurses, doctors and other caring professions.[37]

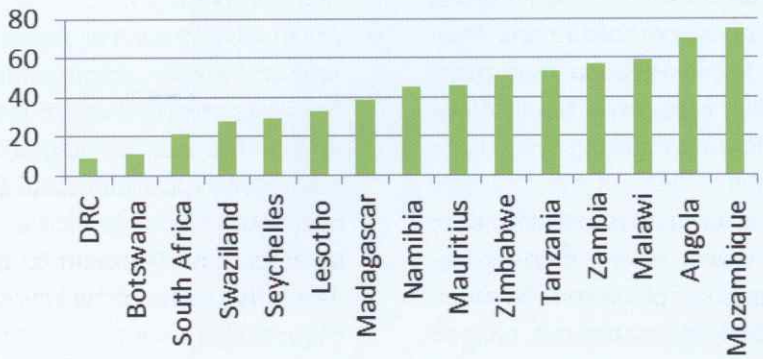
The brain drain of high-skilled workers is particularly grave in the health sector. In 2000 about 20% of African-born physicians and 10% of nurses were working outside Africa (figure 20.6). World Health Organization minimum standards for basic health care are one doctor for every 5,000 people (figure 20.7). In Sub-Saharan Africa 38 countries

Figure 20.5 Numbers of visas required before arrival, Africa and the world average



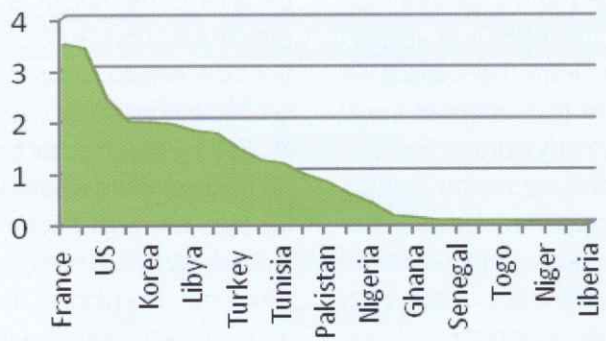
Source: WEF 2013.

Figure 20.6 Doctors working abroad from selected African countries, 2006



Source: Clemens and Pettersson 2006.

Figure 20.7 Physician density per 1,000 people, 2008



Source: Global Health Observatory Data Repository.

fall below this standard. Five African sending countries—South Africa, Nigeria, Sudan, Ghana, and Ethiopia—accounted for the large majority of the doctors working elsewhere, with South Africa alone accounting for 60%. By 2005 some 13,000 South African doctors had relocated to OECD countries, together with more than 5,000 nurses, 1,372 dentists and 724 pharmacists.[38] South Africa, Botswana, Gabon and Namibia are also attracting other high-skilled Africans, such as health professionals from Ghana, Kenya, Swaziland, Zambia and Zimbabwe.

The worst brain drain occurs in the least developed countries. Insufficient pull mechanisms in underserved areas are negatively affecting the human capital development of those left behind. There is a close link between human resource deployment in urban versus rural regions and overall levels of human development: the areas with the lowest staffing allocations are the most poor. Tanzania's *Poverty and Human Development Report 2007* underlined that "ongoing challenges exist in achieving geographic equity in educational outcomes and in meeting the needs of vulnerable children . . . enormous disparities in mortality rates persist between regions."[39] Poor regions are understaffed not only because of the general lack of skilled workers but also because there are too few incentives pulling workers to those areas. In Zimbabwe a large skills exodus, mainly to neighboring countries, reduced the medical workforce from 1,425 in 1991 to 751 in 2004, resulting in vacancy rates of 92% for pharmacists, 56% for doctors and 32% for nurses.[40] In Tanzania in 2007/08, Pwani, the best-served region, had twice the number of health workers per 10,000 persons than Kagera, the worst-off region.[41]

Wealthier people increasingly travel to medical hubs for high-quality treatment. Borders matter, as conversely does regional integration, for accessing health care. People from Burundi and Rwanda may travel to Kenya for health care, while South Africa is the hub for the south. Easing restrictions could offer greater access to medical care and quality education across borders, even for the most vulnerable, while the specialization and concentration of centers of excellence offer opportunities for the reverse mobility of opening branches in countries with poorer health systems.

Social mobility and inclusion

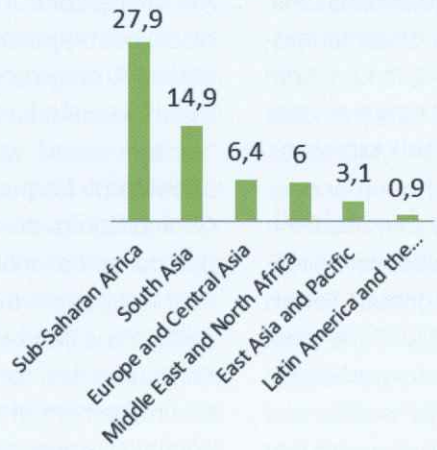
Even within the RECs, social cohesion and inclusion are challenged and migrants face numerous risks. The irregularity of African migrants stems in part from the restrictions on immigration and the high costs of travel documents, exacerbated by porous borders. Sub-Saharan economies are mainly built on informal sectors, and most intra-African labor migrants stay employed in the informal economy, often due to the difficulties of obtaining legal residence status or work permits. Many intra-African migrant workers thus remain trapped in low-income, low-productivity jobs that offer limited opportunities for upward mobility because of such constraints as:

- *Systemic disadvantages due to their often irregular situation.* This is particularly true for seasonal or temporary workers; for example, they often pay the same taxes as local residents but without access to basic services.
- *Risks of deportation; for example, deportations from South Africa are rising.* Migration has high upfront costs and gains take time to accrue. Irregular and involuntary forms of migration can severely dampen the human development capacities of migrants when the migration process is shortened involuntarily.
- *Lack of rights to own land.* Historically, agricultural migrants were given a share of land to cultivate their own crops as compensation for helping out on large farms, as in Côte d'Ivoire.
- *Limited possibilities for dual citizenship, and limited opportunities for family reunification.*
- *Personal risks such as family breakdown, financial losses, fragmentation of their networks, discrimination, insecurity and stress.* The lack of integration efforts in key receiving countries like Côte d'Ivoire and South Africa has allowed xenophobia and social factionalism to gain ground. The social costs of the lack of integration thus include risks to social cohesion and may lead to outbreaks of violence.

Further, in Africa the high costs of sending remittances dilute the potential positive impact of migration on financial inclusion and poverty alleviation, as well as the possible benefits to the health and schooling of children in low-income households. Remittances from the African diaspora amounted to nearly USD40 billion in 2010, 2.6% of the continent's GDP; they provide vital funding for investment and household consumption.[42] Money transfer fees for remittances in Africa are costly indeed (figures 20.8 and 20.9): Sub-Saharan Africa has the highest fees in the world, and intra-African charges are especially high. For example, the cost of sending USD200 between Burkina Faso and Ghana is 16% of GDP per capita, and between Burkina Faso and Côte d'Ivoire 9%.[43] Large amounts are therefore remitted through informal channels. Africa loses an estimated USD15 billion a year because of high fees, burdensome documentation requirements and lack of competition in the money transfer market.[44] Underdeveloped financial infrastructure and poor regulation are other factors. On the statistical front, remittance data fail to show intra-African trends.

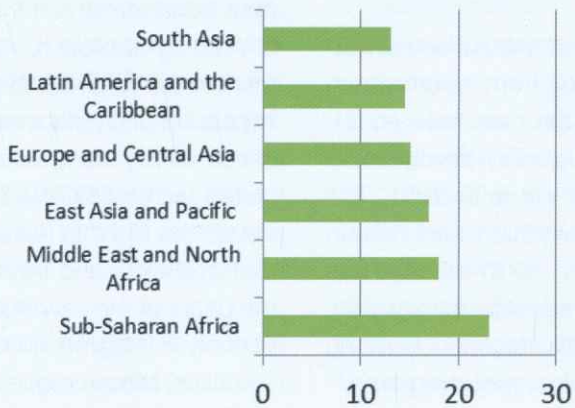
Finally, addressing the gender dimension at all stages of migration can help empower traditionally disadvantaged groups, socially and financially. When migrating, women are especially vulnerable; they are more exposed to risks during migration and in the destination country, and they face disproportionate risks to their safety, such as human trafficking. But migration can provide opportunities for demographic transition and empowerment

Figure 20.8 **Fees to open a savings account (% of GDP per capita)**



Source: Ratha and others 2011.

Figure 20.9 **Cost of sending remittances to developing regions 2010 (% of amount sent)**



Source: Ratha and others 2011.

of women. When fathers migrate, wives have new decisionmaking responsibilities. Male labor migration has thus opened opportunities for women in countries like Lesotho, where female representation in the workforce has gone up. But for those left behind, migration may in some cases also entrench traditional roles and inequalities in the origin countries and have negative social effects on children.

Conclusion: Best practices and policy recommendations

Migration is unevenly distributed globally, both between and within countries. Compared with most Africans, people from the global north enjoy opportunities to migrate legally without heavy visa restrictions. In Africa migration is often a necessity—or even a survival mechanism. This chapter has underlined structural constraints on human development for intra-African migrants, looking at access to employment, health care and social mobility and inclusion. This reduces the potential contributions to development.

If supported by regional policies, migration can enhance the human capital development of migrants, families and communities and contribute to national development. Regional integration can lead to better migration management, protection of migrants' rights and contributions of migrants to African origin and

destination countries. There is a need for a liberal approach to multiple-entry visas, so that people do not end up in irregular situations, and a right to change employer under temporary work permits, to facilitate movement from lower- to higher-wage jobs and thus from less to more productive employment. Moreover, easing people's mobility could open access to medical care and quality education across borders. This would help achieve social, financial and spatial inclusive growth, which depends heavily on the capability of the most disadvantaged social groups to participate in building national and regional wealth, and to receive in return a rewarding share of that growth, thus spurring social mobility.

It should be brought into sharper relief that intra-African migrants face disadvantages from higher restrictions and costly barriers to their mobility. This chapter therefore suggests the following.

First, the same efforts should be put into enhancing development from south-south migration as has been the case with south-north flows since the migration–development nexus moved to center stage in 2001. The relationship between migration and human development in a south-north context has been complex, since a reduction in migration, or return of those who have migrated, has long been a criterion of development programs.[45] Many links between migration and development are indeed contradictory as drawn in the main debates on south-north migration, such as the impact of migration on income and inequality and the contribution of remittances and brain drain.[46] African migrants are increasingly seen as agents of development, though policymakers still seem to be mainly concerned with enabling people to stay at home. Migration has been regarded as a development problem, and there is still a sedentary bias in much of development practice and theory.[47] So while remittances have become "the new development mantra,"[48] there have been few successful attempts to integrate migration concerns into development policy. Leveraging intra-African flows should focus on enhancing the human development gains from the flows that already exist.

Second, many of the legislative and policy building blocks for facilitated mobility of Africans around the continent are already in place, but they lack ratification and implementation. A pragmatic approach would be for like-minded African states to borrow from the "variable speed, variable geometry" approach adopted by European Union member states. Constellations of African states that see the political and economic rationale for deepening their integration (though they may not necessarily share borders or be in the same RECs) can agree on common standards to facilitate movement of their citizens between their countries. Again, being pragmatic, states may opt to give access only to segments of the population—in other words, taking a phased approach to the "free movement" concept and initially allowing in some complementary categories of workers and businesspersons may generate broader support than an all-or-nothing approach. Advancing free movement in the WAEMU, for example, has had an impact on unemployment through better allocation of the work force. The WAEMU, nine states within ECOWAS, proposes visa-free travel, the right to establishment and standardized work and travel documents. One of the pillars of the new Accelerated Program for Economic Integration brings together Malawi, Mauritius, Mozambique, Seychelles and Zambia is to facilitate movement for professionals and businesspeople. If successful, countries elsewhere in the continent may wish to replicate or join it.

Third, this should be a time of productive piloting and rapid prototyping of initiatives to find low-risk and low-cost solutions that can either be abandoned or quickly scaled up. The emphasis should be on learning and scanning the environment for workable solutions already applied in Africa and elsewhere. For instance, in Latin America, Mercosur and the Andean Community have moved from operating narrow schemes that encourage labor mobility for high-skilled workers to reducing the constraints on migration more broadly in an attempt to enhance developmental benefits. Another example worthy of careful study and possible replication could

be EURES, the European Job Mobility Portal that provides information, advice and job-matching services for both workers and employers. Governments collaborate with the private sector on estimating skills demands. One of the countries doing the same thing is South Africa.

Africa itself offers examples from which other countries can borrow. Easing labor mobility in Rwanda has allowed the country to attract skills from Kenya and other countries that were unavailable locally. Rwanda's migration policy stands out in Africa: it has abolished work permit requirements for all EAC citizens and introduced entry visas for all Africans arriving at Rwandan borders, combined with biometric border management and e-visas. Rwanda also has a liberal policy on GATS Mode 4 cross-border services. In the EAC, citizens of member states can move freely without charge for a six-month period, and Kenya and Rwanda have abolished work permit requirements for all EAC citizens. For harmonizing higher education, it will be interesting to follow the progress made by the 19-member African and Malagasy Council for Higher Education, which aims to certify university programs that will then be recognized in all the member states.

And fourth, targeted policies to improve migration are unlikely to succeed without a more general process of structural political and economic reform.[49] Policies to increase people's welfare, create functioning markets and improve social security and public services are likely to enhance the contribution that migration and remittances can make to development. The more restricted the access of the poor to social security, public services and markets in national contexts, the more difficult they find it to access nonexploitive forms of labor migration. de Haas (2012) argued that migration may reinforce inequality where international migration is restricted to wealthy elites. Investments in skills, information and communications technology, health and legal and social protection should thus be part of a comprehensive migration policy.

In the end, this is all about ordinary Africans who simply want to have the choice to cross a border to maximize their options for a better life with dignity and security. Creative and bold use of technology makes it possible for policymakers and practitioners to ensure that citizens are actively involved in the design of new systems and can provide real-time feedback about what works and what does not.

Notes

The authors wish to thank Oliver Bakewell (Oxford University), Caglar Ozden (World Bank) and Ninna Nyberg-Sørensen (Danish Institute for International Studies) for their extensive peer review of an earlier draft.

1. de Haan 1999; Ellis 2000.
2. Ratha and others 2011.
3. UNDP 2009.
4. UNDP 2009.
5. Hampshire and Randall 1999; Wouterse 2006.
6. Adams and Page 2005.
7. Wouterse 2008; de Haas 2009.
8. Shimeles 2010.
9. Hampshire 2002; Black, Natali, and Skinner 2005; Ratha and others 2011.
10. de Haas 2012.
11. Tabarrok 2006.
12. Clemens 2007; Rodrik 2005; Pritchett 2006.
13. Pritchett 2006; Tabarrok 2006.
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PART III
Building Human Capital for an Inclusive Society

CHAPTER 21

Protecting and empowering the poor and vulnerable

Mulle Chikoko, Varatharajan Durairaj, Paul Dougna, Issahaku Budali, Raymond Besong and Rosemond Offei-Awuku

Africa's economic growth of the last decade has not been shared equally. The continent is seeing a new wave of social protection rising on the policy agenda. Many people in Africa are still mired in chronic poverty and are ever more vulnerable to economic and social shocks, often weather-induced. Food insecurity caused by droughts or floods has created huge distress for the majority of Africans, who rely on agriculture. The impact of HIV/AIDS in African countries has also stretched traditional social protection systems, which largely rely on extended families and clans for aid, assistance and reciprocity. Growing urbanization in North Africa and conflict in Central Africa have rendered governments unable to provide adequate social security—or even any. Countries throughout the continent are at risk of losing the ability to protect the poor or enhance their productivity so as to empower them economically.

The new generation of social protection aims to prevent the poor from falling into destitution, move them out of poverty, protect their assets and promote social inclusion. New national programs are having a positive impact on health, education and food security, whether through food subsidies, public works, skill development, conditional and nonconditional cash transfers or school feeding. Some social protection measures help reintegrate ex-combatants so that they can contribute meaningfully to their country's reconstruction agenda.

But African governments have been cautious in scaling up or institutionalizing social protection because such programs need to be permanent, and preferably written into law. In Sub-Saharan Africa especially, programs have largely been donor-funded and short term, with governments preferring to invest in more immediately productive sectors. However, Botswana, Lesotho, Mauritius, South Africa, Senegal and countries in North Africa have been moving in the right direction.

Another problem is that the capacity of African countries to succeed with social protection programs is weak. They need to invest in human capacity and administration and institutional structures in order to set up comprehensive national systems. Further, many programs are fragmented and lack long-term funding allocations—another reason why scaling up is not common.

Today social and financial systems in Africa need special attention. Left unaddressed, underprovision of basic social services (health, education, water), persistent poverty, building of inadequate and inappropriate skills, youth unemployment and lingering conflicts will prevent African countries from reaping the fruits of the demographic dividend. Employed judiciously, social protection and risk mitigation will help countries break out of poverty, cushion the negative impact of health and income shocks and promote social cohesion.

This chapter demonstrates how social protection programs could help build human capital, lift the poor out of poverty, break the intergenerational transmission of poverty, enhance social cohesion and promote inclusive growth. It also examines the environment in which such programs are being implemented and offers policy options for moving the agenda forward.

Dealing with poverty, vulnerability, fragility and inequality

African countries registered notable economic growth since 2003, saw extreme poverty start to decline and made progress on

meeting the Millennium Development Goals (MDGs). Until the global financial crisis, they were experiencing economic growth as high as 5–6%. The increasing demand for Africa's resources, $100 billion in relief from national debt burdens and a 46% increase in aid since 2004 enhanced national investments in health, education and other social sectors.

But in many countries that progress is in danger of being reversed. The global crisis came on the heels of severe food and fuel price shocks that heightened vulnerability and increased the number of poor people: in 2009 about half of all Africans were living on less than USD1.25 a day. Rural poverty is still very high in Sub-Saharan Africa—between 1998 and 2008 it declined only marginally, from 64.9% to 61.6%.[1] During the same period rural poverty in Latin America and the Caribbean dropped by 68.8%, in Southeast Asia by 51.4% and in the Middle East and North Africa by 45.5%. It will take a major effort for Africa, especially Sub-Saharan Africa, to lift the poor out of poverty. African countries still need to deal with the root causes of rural poverty, such as lack of assets and economic opportunities, patchy access to markets, unreliable harvests, poor education and social and political inequalities.

Urban poverty is also increasing, especially in North Africa. Given the current trend of 5–10% annual growth, urbanization throughout Africa, currently about 37%, is likely to reach 52% by 2025. Since urbanization is higher in North Africa, urban areas have a much greater share of total poverty there. Unless there is rapid economic growth in urban centers that benefits the poor, the rise in urban populations is bound to exacerbate the strains of social services, unemployment and crime, which will further erode the quality of life of the poor in cities—many of whom are recent migrants from rural areas who have little education and have only poorly paid informal-sector work where job insecurity and underemployment are rife (see chapters 3 and 4).

Climate change has added a new hurdle in the race to defeat extreme poverty and disease. Throughout the continent, droughts and floods are more frequent, water is becoming scarcer and related health challenges, such as malnutrition, are proliferating. Food insecurity has been worsening for decades, especially among the poor, due to both droughts and rising food prices. Recurrent droughts or floods and the unpredictable impact of climate change are making weather-based livelihoods riskier. All these factors add another layer of vulnerability for those who should benefit from social protection programs, are already ill-equipped to cope and have no insurance of any kind. In poor and vulnerable households up to 80% of total spending goes to basic foodstuffs. North African countries in particular have long been vulnerable to food price fluctuations because they depend heavily on imported agricultural products.

In fragile states poverty is both the cause and the consequence of conflict (see chapter 30). Between 1980 and 2000 as many as 28 countries in Sub-Saharan Africa went to war either externally or internally. Children, young people and women are among the most vulnerable both during and after conflicts. In modern conflicts it is estimated that more than 90% of casualties are civilians, of whom 75% are women and children. Conflict shocks all households because it can disrupt production and provision of basic services and goods. It is therefore a driver of transitory poverty, which over time can become chronic and intergenerational. The inadequate economic conditions in which the poor live also contribute to conflict and war. Rural resentment of urban elites who control economic and political power also flamed conflict in such countries as Angola, Mozambique and Sudan. Competition for limited resources—water and pasturage in the Horn of Africa, for example—is a direct consequence of the conflict in the region.

Inequality in Africa is high: the top 10% earn 22 times more than those in the bottom 10%; globally the average differential is 18 times. Although across the continent economic growth in recent years averaged 5%, the growth has been unequally distributed, mainly benefitting a small, privileged elite. Excluded were the majority, poor and vulnerable, particularly youth and women; thus,

social exclusion along regional, gender and ethnic lines continues. Women have limited access to finance and private or social insurance. Regional disparities in access to basic services in countries like Egypt and Tunisia have considerable potential to undermine social stability.

Youth unemployment is a powerful and growing source of socioeconomic instability on the continent, as seen in North Africa after 2011 (see chapter 19). Youth participation in the African labor market at 46% is low compared with the world average of 51% (55% for Sub-Saharan Africa and 38% for North Africa). Unemployment among youth in Africa is 25–30%. The situation is worse for young women, who tend to participate less in the labor force and have higher unemployment rates than young men (see chapter 20).

The informal sector weighs heavily on African economies. In Sub-Saharan Africa it accounts for almost 42% of African GDP, more than 75% of Africa's labor force (whose workers have little social protection) and 72% of nonagricultural jobs.[2] Youths and women are more likely than adults to work informally and less likely to be wage- or self-employed. Although the informal sector is important in developing countries because it absorbs labor, labor productivity there is extremely low (see chapter 6). Building up this key economic element would be a major step forward in improving working conditions, creating more jobs and raising wages.

A new wave of social protection

Despite a degree of convergence in the last decade, definitions of social protection still vary. Governments and international bodies differ from each other and internally in conceptualizing the objectives of social protection (box 21.1). Adapting a working definition from Devereux and Sabates-Wheeler (2004, 9):

> Social protection is the set of all initiatives, both formal and informal, that provide: social assistance to extremely poor individuals and households; social services to groups who need special care or would otherwise be denied access to basic services; social insurance to protect people against the risks and consequences of livelihood shocks; and social equity to protect people against social risks such as discrimination or abuse.

In Africa social protection has long been embedded in national cultures, religions and traditions. Family institutions and clans have traditionally been the structures that provided

Box 21.1 Examples of social protection safety nets

- Social health assistance to ensure that the vulnerable have access to health services (targeted).
- Weather index insurance for small farmers to promote early recovery from weather disasters.
- Assistance for the elderly (such as noncontributory pensions and basic allowances old-age allowances).
- Health assistance (such as reduced medical fees for vulnerable groups).
- Child protection (such as school feeding, scholarships, school fee waivers, allowances for orphans, feeding underweight children and street children initiatives).
- Family allowances (such as in-kind or cash transfers to help families with young children meet part of their basic needs).
- Welfare and social services targeted to the sick, the poor, the disabled and other vulnerable groups.
- Cash transfers, conditional and unconditional; welfare and other in-kind transfers (such as food stamps and food aid).
- Temporary subsidies to vulnerable groups for utility costs and staple foods.
- Asset transfers (cattle, goats) to promote early recovery from weather shocks.
- Employment guarantee or generation through public works programs (such as food for work, cash for work or input for work program).
- Direct employment generation through loan-based programs; subsidized loans specifically for job creation.
- Skills development and training targeted to vulnerable groups.
- Unemployment benefits.

Source: Freeland 2013.

social and economic support to family members in times of need. These social structures acted as safety nets. But family bonds are eroding because of urbanization (especially among young people), high rates of HIV/AIDS, conflicts and the new economic order of the 1980s. North Africa, though, still practices *zakat* based on Islamic principles, which provides transfers to the poor and vulnerable. Further, many parts of the continent still use such informal mechanisms as credit associations and rotating savings, often through large extended families.

In recent years the need for social protection has gained prominence in many African countries. It takes such forms as social assistance, social transfers, social insurance and labor market interventions. The continent was slow to recognize the role of social protection in the fighting poverty and promoting human development. Social protection was often delayed, reactive and short-term only, usually limited to humanitarian interventions to smooth consumption. In recent years, however, there has been a shift to more proactive, predictable and sustained interventions, as seen in pilot projects to generate evidence on how to reduce chronic poverty, hunger and vulnerability.

Social protection in North Africa mainly takes the form of food and energy subsidies financed through taxes. Egypt, for example, directs about 30% of its social protection spending to food subsidies and the rest to oil and gas subventions. In Algeria school-meal programs reach about 3 million primary school children. In both countries such subsidies have helped reduce poverty, infant mortality and malnutrition and protect the most vulnerable from price fluctuations. However, subsidies tend to be badly targeted, with wealthier households benefiting most.

In Central Africa social protection is directed to demilitarizing, demobilizing and reintegrating former combatants into society. The civil wars and conflicts in the region have destroyed assets (especially infrastructure) and displaced hundreds of thousands of people, especially women, children and the elderly. Most countries have set up conditional cash transfers to respond to conflicts and weather-induced shocks, though the region still practices some informal insurance mechanisms, such as rotating savings, especially among women.

In West Africa approaches include conditional cash transfers and fee waivers to enhance health and education outcomes. Conditional cash transfers in Burkina Faso and Ghana, as well as fee waivers, aim to extend health coverage to the elderly; Senegal has school feeding programs and Ghana community-based health insurance. The experiences in West Africa often show efficiency gains in services provided and decreases in out-of-pocket spending for health services.[3] Programs in postconflict countries like Côte d'Ivoire, Liberia and Sierra Leone often take the form of at least temporary employment on public works, such as roads to improve access to basic services and markets.

The impact of HIV/AIDS and weather-induced shocks in Southern and Eastern Africa has brought about a proliferation in social protection programs. Most have taken the form of cash transfers, targeting the poorest, elderly and orphans and vulnerable children, as has been seen in Botswana, Kenya, Lesotho, Malawi, South Africa, Swaziland, Zambia and Zimbabwe. Among major initiatives in response to food insecurity have been the Productive Safety Net Program in Ethiopia, the Hunger Safety Net Program in Kenya, the Farm Input Subsidy Program in Malawi; old-age pensions in Lesotho; the South Africa Social Security Program and the Vision 2020 Umurenge Program in Rwanda. Ethiopia and Rwanda have introduced community-based health insurance.

Why social protection is important

"Social protection . . . might be among the most productive investments for boosting growth, reducing poverty and accelerating progress toward the MDGs."[4]

"Most social protection interventions are having positive impacts on MDGs—instruments that focus on poverty, the marginalized and vulnerable groups in society."[5]

Social protection improves health and education directly by delivering benefits tied to improvements, as with conditional cash transfers. It also does so indirectly, either by raising household incomes so that beneficiaries spend more of their disposable income on such improvements or by stabilizing household income and preventing the withdrawal of children from school or cutbacks in spending on health care for sick family members. Social protection can also be used to build infrastructure and facilities that promote access to social services. In Ethiopia in 2012, for example, about 4,494 classrooms were constructed. Finally, it has helped countries move toward meeting the MDGs (box 21.2).

Some social protection programs are helping to build human capital. Countries with higher social health protection have better under-five and maternal mortality ratios and antenatal care indicators (box 21.3). In education, social protection initiatives like school feeding and stipends and scholarships for the poor, orphans and vulnerable children have helped increase enrollment, lower dropout rates, reduce child labor and cut gender imbalances. Cash transfers in particular have been seen as complementary to investments in the supply of essential public services by enabling households and individuals who have difficulty accessing services to overcome financial barriers.

Box 21.2 How social protection has supported progress toward meeting the MDGs

MDG 1. The Child Support Grant in South Africa has helped reduce the poverty gap by 47%. The South Africa social security system reduced the poverty headcount by 4.3% and the destitution gap by 45%.

In Nigeria the scheme that targets women has a positive impact on enrollment, school attendance and use of hospital facilities.

In Ethiopia 75% of the beneficiaries of the Productive Safety Net Program consumed more and better food, and 60% avoided selling productive assets to buy food during shortages. The program helped to reduce malnutrition by about 41% between 1990 and 2007.[1] It also improved food security by 11% and livestock holdings by 7%.[2]

In Rwanda social protection helped reduce extreme poverty from 40.6% to 9.0%.[3]

In Lesotho about 50% of old-age pensioners said that they never went hungry after the grant was introduced, compared with 19% previously.[4]

MDGs 2 and 3. Between 1996 and 2003 net primary enrollment of girls in Bangladesh increased from 48% to 86%. Many attribute this in part to the stipend program for girls' education, supported by the European Union.

In Ghana the national health insurance scheme has enhanced access to services, improving infant and maternal health and reducing out-of-pocket expenditure.

MDGs 4, 5 and 6. The *Oportunidades* program in Mexico combined cash transfers and free health services with improvements in the supply of health services, leading to a 17% decline in rural mortality over three years.

Notes

1. Devereux and Coll-Black 2007.
2. EUI 2010.
3. EUI 2010.
4. DFID 2011.

Box 21.3 Social protection pathways

- Promote human development by working for health, education, nutrition and food security.
- Enable the poor to protect themselves and their assets against shocks, defending long-run productive potential.
- Mitigate risk and encourage investment.
- Combat discrimination and unlock economic potential.
- Support labor market participation.
- Stimulate demand for local goods and services.
- Create gains for those disadvantaged by policy reform, and build support for pro-growth strategies.
- Create an effective and secure state—widely accepted social protection builds social cohesion and reduces conflict.

Source: Samson 2009.

For example, Lesotho's school feeding program focuses on improving the education of vulnerable children, thus building human capital and enhancing their lifetime earning potential. In Namibia cash transfers to orphans and vulnerable children have increased enrollment. In North Africa subsidies have helped reduce infant mortality and malnutrition. In Kenya training vouchers have given youth from poor families access to skills training. The Direct Support component of the Productive Safety Net Program in Ethiopia and the Vision 2020 Umurenge Program in Rwanda have reduced food insecurity considerably and supported better nutrition.[6] The Kalomo District Pilot Social Cash Transfer Scheme in Zambia markedly improved the diets and nutritional status of beneficiaries. Food subsidies in North Africa have protected the most vulnerable against price fluctuations.

Adaptive social protection is vital for building disaster- or climate-resilient livelihoods. It has much to offer in helping the poorest reduce their exposure to current and future climate shocks. Because the rural poor rely on the environment and natural resources for food and income, the impact of climate shocks and stresses is extremely likely to harm their food and livelihood security and human capital. Social protection could provide long-term solutions to the underlying causes of vulnerability and help people prepare for climate change. Instruments like microfinance and microcredit can help households invest in livelihoods that are not weather- dependent. Weather index insurance for small farmers, for example, could help them mitigate the impact of weather-induced shocks. Countries like Ethiopia, Kenya and Malawi are piloting such initiatives.

Not investing in social protection may be costly for countries that wish to promote social cohesion and stability. With their many socioeconomic challenges, African countries must invest in the productive potential of their people. Failure to do so carries a clear cost for human health, skills and well-being and is likely to have negative repercussions on investment in future generations. Among the costs for society as a whole are a less productive population and high inequality. Inadequate social protection structures could even undermine the legitimacy of the state, threatening social stability.

Social protection commitments in Africa

Africa has seen a proliferation of social protection programs to address poverty, food insecurity and vulnerability, which have become principal instruments for reducing poverty. Some African countries are crafting their own social protection strategies and incorporating social protection targets into national development and poverty reduction programs. While initially concerned mainly with short-term protection against specific shocks, social protection has evolved to incorporate long-term interventions to reduce vulnerability, promote social cohesion and address inequality. One purpose is to transfer assets and human capital development to vulnerable groups to prevent transmission of poverty between generations by enhancing productive capacity. Social protection is thus proving to be a very effective first line of defense against poverty, whether directly through income transfers or employment programs or indirectly through promotion of human capital, social inclusion and expanded productive capacity.

Political commitment to investing in social protection has been growing through the African Union (AU) Social Policy Framework for Africa; the United Nations Social Protection Floor; the G20 Commitments to strengthen and enhance social protection programs; and the potential for climate funds to support adaptive social protection.

Both nationally and internationally, social protection has gained in importance and scope throughout Africa. The AU, with other partners, has made determined efforts to create awareness of social protection, starting with the Ouagadougou Declaration in 2004, Calls for Action subregional meetings in Livingstone and Yaoundé in 2006 and the 2008 national and subregional consultations. In 2008 the AU published its Social Policy

Framework for Africa, which highlights the role of social protection in poverty reduction and economic growth (box 21.4). The New Partnership for Africa's Development and its Comprehensive Africa Agriculture Development Program recognize that social protection can make an immediate impact on hunger through production-related investments in targeted safety nets. Many development partners now incorporate social protection in their aid programs for Africa.

Effective social protection in Africa

Social protection programs in Africa have been characterized as fragmented, piecemeal and not based on any comprehensive or strategic allocation of resources. This has resulted in very low coverage across the continent and not enough impact on mass chronic poverty. The approach has seen targeted interventions for certain segments of the population—for example, only the ultra-poor in Ghana, Kenya, Malawi, Sierra Leone and Zambia—though in North Africa and a few Sub-Saharan countries like Botswana, Mauritius and South Africa social protection programs are targeting larger populations. Coherent policies and comprehensive national systems are lacking, and government leadership is weak. There is a lack of political will to invest in national programs that affect social protection spending. Social protection is generally viewed as expensive handouts that require long-term spending commitments and that compete with more directly growth-promoting investments. There is a growing body of evidence about how social protection affects welfare, but there is a need to make explicit the link between growth and social protection in order to build political support for and commitment to investments in social protection.

To be successful, programs require governments to invest in the capacity of people, structures, administration, technical expertise and monitoring. In most African countries the institutional framework is insecure. To have significant impact, social protection depends on effective capacity to deliver. When national governments give it priority, they can deliver significant social protection at scale.[7]

Except in North Africa, social protection interventions are largely donor-funded and short-term. This is ineffective unless countries are willing to guarantee the sustainability and ownership of such programs. Government

Box 21.4 The AU Social Policy Framework for Africa

The AU launched its ambitious Social Policy Framework for Africa in 2005. The framework "aims to provide an overarching policy structure to assist AU Member States to strengthen and give increasing priority to their national social policies and hence promote human empowerment and development." It comprises 18 priority policy areas, including social protection, and it promotes the adoption of a minimum package of essential social protection services, covering health care and benefits for children, informal workers, the unemployed, the elderly and handicapped people.

The framework treats social development not as subordinate to economic growth but as a goal in its own right. It acknowledges that though "economic growth is a necessary condition of social development, it is not exclusively or sufficiently able to address the challenges posed by the multifaceted socioeconomic and political forces that together generate the continent's social development challenges." The framework highlights four areas of social policy important for progressive development: social protection, production, reproduction and redistribution.

Of the four policy areas, social protection ensures minimum standards of well-being and enhances human capabilities. Social protection thus includes responses from state and society to protect citizens from risks, vulnerabilities and deprivations—it is viewed as comprehensive and not limited to traditional measures of social security. The productive function of social policy concerns human capital formation and the creation of a climate conducive to investment and economic growth. The reproductive role of social policy creates the conditions for reproduction of an educated and healthy labor force. The redistributive social policy arises from a concern for the redistributive effects of economic policy and an effort to protect people from the volatility of the market and changing circumstances of age, illness and disability.

Source: AU 2006.

economic policies have preferred investments in productive sectors, though Algeria, Botswana, Lesotho, Mauritius, Morocco, Senegal, South Africa and Tunisia offer positive examples of government social protection funding.

Lessons from social protection in Africa

Country ownership is crucial to program success and sustainability. Social protection programs require significant national engagement in addressing the issues poor and vulnerable groups face. Country ownership is crucial to ensure that social protection is made part of the national vision and development strategy. This entails respecting local preferences and priorities and working through and building up country systems and institutions to reinforce domestic accountability.

Country capacity to deliver must be supported and strengthened. One of the most critical success factors in social protection programs is national capacity to deliver program services and, critically, to monitor program impact.

Politics matters. Understanding the political drivers of social protection, the interrelationships between different stakeholders, and government priorities and constraints is necessary to the design of social protection interventions and to ensure their sustainability. Knowing how to build domestic support for social protection is also important. Social protection programs are readily politicized, especially during or just after civil or political turmoil.

Highly visible participation by civil society promotes the success of social protection programs. Because these programs are vulnerable to politicization, their success depends on transparently targeting the vulnerable and monitoring and publicizing program impact. Community involvement in delivering social services is crucial to transparency and sustainability.

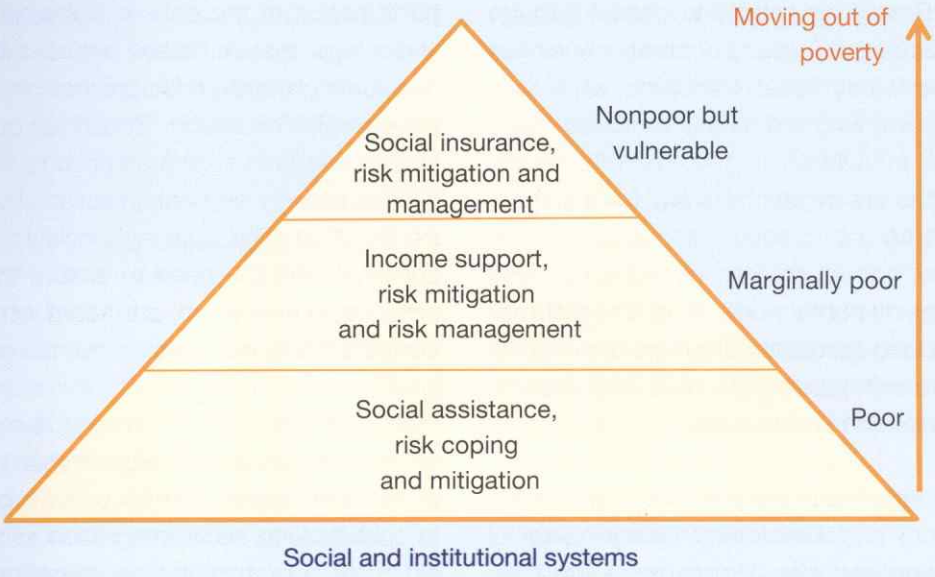
Social protection options are diverse—there is no dominant model. Intervention must be guided by country context with careful understanding of the source and nature of poverty and vulnerability. It is thus critical to tailor initiatives to factors unique to each country and to objectives of social protection rather than mere availability of instruments. It is also necessary to consider carefully how to design coherent and progressive social protection systems with close links to other economic and social policies that contribute to inclusive growth.

Social protection framework

It is vital to properly define social protection objectives within a specific context. Based on experiences throughout the continent, the conceptual framework outlined in figure 21.1 should eventually lead to reducing poverty and building the resilience of the poor and vulnerable. The framework has three themes:

- *Social assistance and risk mitigation for the poor.* The ultimate goal is to lift the extremely poor and the poor out of destitution, smooth consumption and break the intergenerational poverty cycle. The poorest households are often unable to provide labor for productive activities and so cannot earn a living. Interventions targeting the poorest might combine social assistance and risk mitigation programs to build their capacity to participate in economic development and move out of poverty. This will require comprehensive systems.
- *Income support, risk mitigation and risk management programs for the marginally poor.* The target will be poor and vulnerable households that require support to build income and accumulate assets and those with productive capacity, such as labor and assets, that need to be more productive in order to add value to their assets and improve their incomes. Such programs will build household resilience over time by protecting assets from depletion and erosion and by creating a fallback position so that shocks do not compromise their ability to thrive.

Figure 21.1 **The intervention pyramid**



Source: Authors.

- *Risk mitigation and management programs for the nonpoor.* Those vulnerable to shocks like drought, floods and illness also need support in managing and mitigating risks. National insurance, with community-based risk-management, is needed to mainstream them. This requires two-way integration to accommodate both national and community-based channels. Currently, there is too little attention paid to vulnerability. Social insurance schemes like weather-indexed crop insurance, futures markets, warehouse receipts, food-price stabilization measures and social health insurance are still marginal. Building systems that reduce vulnerability and shoring up resilience will be vital.

Policy considerations

This chapter has described some barriers that slow progress on the social protection agenda and what can be done about them. Governments, development partners, civil society and the private sector need to work together on ways to tackle the needs of the poor and vulnerable, who have considerable potential to contribute to economic growth. Some broad proposals for policy discussion might relate to:

Building stronger and more comprehensive national social protection systems. National systems are necessary to promote ownership and sustainability and build local capacity. Also necessary are sound, evidence-based policies and involving all stakeholders in policymaking. Building national systems that ensure tailor-made responses will enhance ownership and sustainability. Since social protection systems should also be results-oriented, monitoring and evaluation must also be robust.

Building sustainable, predictable and budgeted financial support for social protection. Governments should give more attention to protecting and empowering the poor and vulnerable. There is an urgent need for coordinated national policies backed up by adequate provision in national budgets.

Creating economic potential among the poor and vulnerable (especially youth, women and the rural poor) by enhancing skills and employability. Vulnerable groups need more opportunity to participate effectively in economic growth through skills acquisition and entrepreneurship. National systems should promote economic empowerment to realize the hidden potential of the poor and

vulnerable by offering incentives for rural and poor families to invest in skills development. Promoting access to capital through microfinance will also encourage business start-ups and asset transfers, especially for women, who are mostly excluded. Supporting innovation in the informal sector can enhance productivity by, for instance, enhancing job creation especially during lean periods to smooth consumption and undertaking public works programs that may reduce long-term unemployment or providing workers with job-specific skills and predictable long-term employability.

Enhancing diagnostic and analytical studies of poverty and vulnerability. Designing social protection and effective responses to poverty and vulnerability requires assessment of related issues and priorities as part of an analysis of national poverty, which then has to be reflected in country strategies and plans. Countries should pay attention to building knowledge to inform policy and programming, and enhance effective social protection strategies. National statistical systems should be able to collect disaggregated poverty and vulnerability data and make them readily available to policymakers and planners. The data should reveal who is poor, why they are poor and the sources and types of vulnerability.

Promoting accountability and enhancing social inclusion and cohesion. Social inclusion and cohesion are vital for achieving inclusive growth and reducing poverty (box 21.5). Poor management of public finances, low-quality public services, pervasive corruption, lack of participation of the poor in decisionmaking and a legal system biased against poor and neglected groups are factors that perpetuate poverty and exclusion. Social accountability can do much to reduce poverty, improve service delivery and enhance the empowerment—of all. The uprisings in North Africa demonstrated the need to ensure that citizens, especially youth, are heard when services are being delivered.

Promoting postconflict recovery, demobilization and integration. The postconflict period provides an opportunity for social protection to contribute to social integration and cohesion. Social protection in postconflict countries has supported rebuilding the lives especially of the majority—poor, women, children, the elderly and displaced—using quick wins and transitional safety nets and lessening the potential for renewed conflict (box 21.6).

Reducing vulnerability and protecting the assets of the vulnerable. National social protection systems should also look to reducing vulnerability as well as alleviating chronic poverty directly. More tools are needed for managing risk, reducing economic and social vulnerabilities and building resilience. Although there is some experience with social insurance schemes, they remain marginal to the social protection discourse. For instance, offering protection through micro-insurance is a classic way of helping people cope with

Box 21.5 Promoting citizen engagement in Ethiopia

Promoting citizen monitoring of access to basic services with feedback to providers can enhance social inclusion, promote ownership and create sustainability. Ethiopia's Promoting Basic Services program is doing this for local basic service by tightening links between the supply and demand side of accountability, scaling up and formalizing citizen participation in budgetary processes, monitoring basic social services, providing information to citizens on budget planning and expenditures and reinforcing existing subnational grievance redress mechanisms.

The government uses the media to publicize information on budget expenditures and providing budget literacy training to citizens. Through social accountability tools, such as citizen report cards and score cards, citizens are engaging local providers of basic services to ensure that all citizens have access to quality basic services.

Source: AfDB 2012.

Box 21.6 Public works in postconflict transitions

After conflicts, public works can help rebuild the country. In Liberia and in Sierra Leone the governments emphasized youth employment, because providing economic opportunities to marginalized and destitute youth groups, many of whom had been combatants, is key to their reintegration into society and thus to social cohesion and stability. With international support from the AfDB and others, the Sierra Leone National Commission for Social Action (NaCSA) and the Liberia Agency for Community Empowerment have successfully implemented community-based public works projects. AfDB has supported NaCSA since 2003 and supports labor-based public works projects in Liberia.

Source: EUI 2010.

adverse shocks and events that can trigger a spiral downward to persistent poverty. There is growing demand for social insurance, particularly from the informal sector, which is not covered by formal insurance and for which access to health insurance would help protect employees, facilitating their access to the formal labor market. Working with the private sector will be crucial to ensure that it develops products like weather insurance that are responsive to small-scale farmers who make up much of the population throughout Africa.

Building the capacity of microfinance and other financial institutions to promote financial inclusion. Microfinance has been vital to empowering the poor. One area for capacity building could be training microfinance staff, setting up monitoring and evaluation systems, business planning and management, adoption of innovation, development of emerging financial products (such as micro-insurance, microcredit and micro-saving) and financial sector reforms (policy and regulations).

Notes

1. IFAD 2010.
2. ILO 2009.
3. Asante and Aikins 2009.
4. EUI 2010, 13.
5. AfDB and others 2011.
6. Gilligan, Hoddinott and Taffesse 2008.
7. RHVP and others 2010a,b.

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CHAPTER 22

Nourishing young bodies and brains

Maimouna Diop Ly, Borel Foko and Richard Deckelbaum

Sub-Saharan countries have the most nutritionally insecure people in the world. Inadequate infrastructure and limited resources compounded by conflict, HIV and poor access to health services all contribute to staggering levels of malnutrition and food insecurity on the continent.[1] Moreover, nutrition is related to inadequate food production, food shortages to the point of famine, high rates of maternal and child malnutrition[2] and nutrient deficiencies. Progress in improving the nutrition of children and women in the 19th and 20th centuries has been reversed by heavier disease burdens and civil conflicts in parts of the continent, by the HIV/AIDS pandemic and more recently by the drought in the Horn of Africa and the Sahel. Multisector interventions are needed to tackle malnutrition, particularly undernutrition. Micronutrient malnutrition also is a huge obstacle to survival and development in the continent. Deficiencies in vitamin A, iron, iodine and zinc worsen child and maternal mortality, impair growth, produce irreversible mental impairment and greatly reduce economic growth. By compromising economic development, vitamin and mineral deficiency causes the preventable loss of up to 2% of GDP in the region. Action needs to be taken early in the 1,000 days between the onset of pregnancy and the child reaching age 2. These 1,000 days open a window of opportunity to gain the highest rate of return on investment in nutrition.[3] Due to the effects of malnutrition in developing countries, losses in GDP can add up to 2–3% annually.[4]

Reducing inequalities and disparities makes inclusive growth possible. Donors and African countries must engage more directly to reposition nutrition as central to human development. Similarly, breaking the link between the education crisis and nutrition status and hunger should be a concern for donors striving to achieve the Millennium Development Goals (MDGs). Both under- and overnutrition (due to the transition from undernutrition in some low- and middle-income countries) needs consideration.

International and regional summits have raised awareness of nutrition problems, and initiatives have been launched. The most recent, the Scaling Up Nutrition Movement, which is supported by more than 100 organizations and governments, outlines a global strategy to use evidence-based solutions to reduce malnutrition. Other active initiatives are Renewed Efforts Against Child Hunger, the UN Standing Committee on Nutrition and the updated comprehensive framework for action of the High-Level Task Force on the Global Food Security Crisis.

Governments and partners are increasingly mobilizing resources to implement nutrition strategies, fully aware that some MDGs related to nutrition need nutrition-based interventions. But because nutrition interventions depend on a number of sectors, partners have committed to investing in health, food and agriculture to enhance food security and in water, sanitation and social protection activities. Private partners and social enterprises are investing in research and development, producing new products and carving out new distribution channels. Yet despite all these efforts Sub-Saharan Africa is the only region not likely to halve the rate of undernutrition among children under 5 by 2015. This chapter aims to define an African strategy for intervention in early childhood.

Strategic context

The major nutrition problem is malnutrition, specifically among children under 5 and

women. While 24% of children under 5 live in Africa, 30% of the world's malnourished children live there. An estimated 32.4 million African children under 5 are underweight (low weight for age), 9.8 million of whom are severely underweight; 14.3 million have wasting (low weight for height) and 66.1 million are stunted (low height for age). Among children under 5 in Africa, the prevalence of moderate and severe underweight is 17.6%, of moderate and severe wasting 7.8% and of moderate and severe stunting 35.9%. Africa is similar to other developing regions in the prevalence of underweight and stunting but worse off on wasting (table 22.1). Stunting prevents children from reaching their development potential.[5]

Malnutrition affects schooling. Studies across Asia and Africa in the 1980s and 1990s found that stunted children enroll in school later than other children. In Tanzania besides stunted children enrolling late, they are also less likely to enroll at all and more likely to drop out if they do. Stunting is also associated with poorer academic achievement. It delays enrollment of girls more than boys, presumably because parents are less willing either to invest in girls' education or to allow young girls to walk the long distances to school typical of rural areas in developing countries.

Nutrition improves school participation. A school program that offered children in Kenya a cup of porridge for breakfast improved attendance: school participation was 35.9% where meals were provided and 27.4% in non-program schools, an improvement of about a third.

Since the nutritional status of children is typically what is studied, the causes, extent and distribution of malnutrition among adults in developing countries is not well understood.[6] Yet given their economic role, the nutritional status of adults is vital to both the economy and society. Adult undernutrition has critical consequences in terms of lower productivity and greater susceptibility to disease; overnutrition in the form of chronic diseases can have just as far-reaching consequences.

Africa is marked by huge geographical and socioeconomic disparities. Malnutrition is much less prevalent, for instance, in North African countries than in Sub-Saharan countries. At one extreme, in Algeria and Tunisia less than 5% of children under 5 are underweight); at the other, in Chad, Niger and Somalia more than 30% are underweight. Moreover, boys are about 20% more likely than girls to be underweight. (This seems peculiar to Africa as there is almost no gender bias elsewhere.) As in other regions, however, children are less likely to be underweight in urban than in rural households. And children in wealthier families are less likely to be underweight than those in poorer families. In

Table 22.1 **Prevalence of malnutrition among children under 5, 2010 (%)**

Region	Underweight		Wasting	Stunting
	Moderate and severe	Severe	Moderate and severe	Moderate and severe
Africa	*17.6*	*5.4*	*7.8*	*35.9*
Central Africa	20.6	7.4	10.4	36.5
East Africa	18.0	4.6	6.0	42.4
North Africa	9.9	4.0	7.7	23.1
Southern Africa	11.1	2.7	4.8	30.9
West Africa	20.6	6.1	9.2	35.6
Non-African countries	*11.4*	*3.3*	*5.7*	*23.6*
Developing countries	16.1	4.5	7.5	30.8
Other countries	4.9	0.9	3.3	13.4
World	*14.1*	*4.3*	*6.6*	*29.0*

Note: Data are from the most recent year available between 2006 and 2010; unweighted average.
Source: UNICEF 2012.

fact, income-led disparities are the widest. Supply factors (such as access to health facilities) and demand factors (such as household welfare or mother's education) are central to explaining malnutrition at the national level.

These inequalities mean that in many African countries national aggregate nutrition figures have not been much improved by economic growth. Resources need to be redistributed through social protection interventions and investment for growth that will have more impact on vulnerable groups (see chapter 21).

Undernutrition increases the risk of mortality. Among children who survive, about a third suffer from stunting, which depresses school performance and economic productivity. Dying from pregnancy complications is a much higher risk for undernourished than well-nourished women, and they have a higher risk of having low-birth-weight babies. The children of undernourished women are also at higher risk later in life of physical and cognitive impairments and nutrition-related chronic diseases. And undernutrition accounts for 11 percent of total disability-adjusted life years.[7]

Progress on reducing childhood malnutrition has been slow. Between 1990 and 2010 the proportion of children registered as underweight fell only from 27% to 18%. There has also been only minimal progress on stunting, which still affects an estimated 36% of Africa's children. Before children reach school age they must also negotiate direct threats from diseases. More than half of child deaths are caused by pneumonia, diarrhea, malaria, measles, malnutrition and HIV. Yet there is clear evidence that preschool health and nutrition interventions to tackle these conditions can have substantial economic returns; USD1 spent on nutritional supplementation has an estimated return of USD3, and USD1 spent for iron supplementation has an estimated return of USD14.

Low birth weight tends to be more prevalent in countries at early stages of economic development (table 22.2). And the same is true for children under 5 who suffer from underweight, wasting and stunting. Vitamin A deficiency also tends to be higher in these countries. There is, however, virtually no correlation between breastfeeding practices and economic development, which suggests that the practice is somehow viewed as "necessary" in countries irrespective of development.

Risk factors are innumerable. Some reflect the general status of health, sanitation and hygiene in a child's community and household. Micronutrient deficiencies are a determining and an aggravating factor for

Table 22.2 **Nutrition indicators for early childhood, 2010 (%)**

Regions	Infants with low birth weight	Children			Vitamin A supplements (6–59 months), 2010	Households consuming iodized salt
		Exclusively breastfed < 6 months	Introduced to solid food at 6–9 months	Still breast-feeding at 20–23 months		
Africa	*13.3*	*33.0*	*60.5*	*44.6*	*80.8*	*49.5*
Central Africa	n.d.	n.d.	n.d.	n.d.	65.5	n.d.
East Africa	n.d.	37.7	74.5	51.0	76.8	n.d.
North Africa	8.0	21.0	56.8	28.2	n.d.	43.0
Southern Africa	12.7	47.1	56.0	35.3	47.4	67.1
West Africa	16.3	35.0	53.9	50.8	98.0	43.0
Non-African countries	*10.2*	*37.9*	*62.6*	*41.3*	*68.0*	*57.4*
Developing countries	12.1	36.8	63.9	72.8	64.1	57.4
Other countries	8.3	39.0	60.2	40.5	n.d.	n.d.
World	*11.1*	*36.2*	*61.8*	*42.4*	*75.9*	*53.2*

Note: Data rare from the most recent year available between 2006 and 2010; n.d. denotes not enough data to give a representative picture; unweighted average.

Source: UNICEF 2012.

health status and quality of life. Three nutritional problems with serious consequences are deficiencies of iodine, vitamin A and iron.

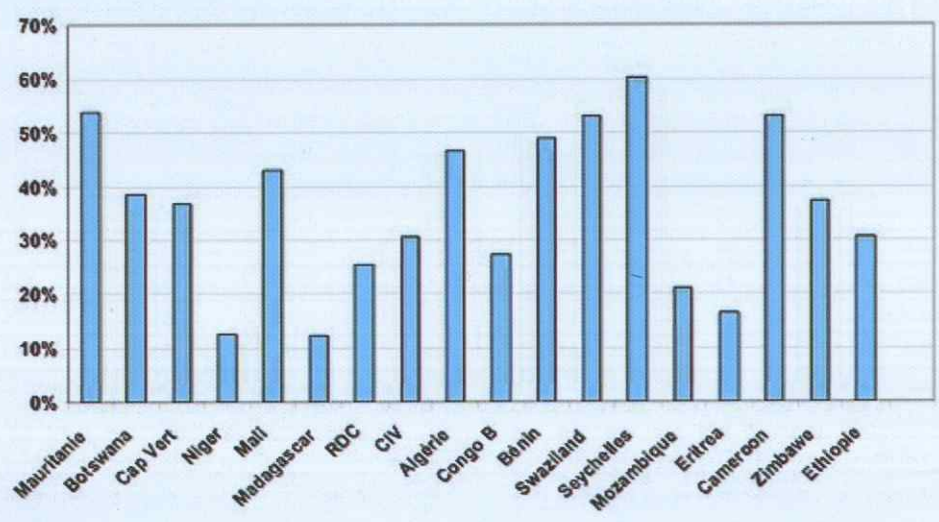
- *Iodine deficiency, which is prevalent in many low-income countries, is the leading cause of preventable mental retardation worldwide.* In Africa iodine deficiency is associated with 10–15% lower average intellectual capacity. Fetal exposure to maternal iodine deficiency during the first two trimesters of pregnancy can damage the developing brain, causing both permanent cognitive disability and motor, hearing and speech disabilities.[8] Only 50% of African households have adequate access to iodized salt, which is lower than the 57% in other developing regions (see table 22.2).
- *Because vitamin A deficiency compromises immune systems, it opens the door to disease because compromised immune systems are the leading cause of childhood deaths.* In addition to direct effects on vision, lack of vitamin A increases the risk of measles and other serious childhood infections that can result in long-term disability. About 81% of children ages 6–59 months receive vitamin A supplements in Africa, which is higher than the 64% in other developing regions (see table 22.2).
- *In West Africa iron deficiency is the most common health problem.* It impairs the normal mental development of 40–60% of infants, debilitates the health and energy of women and leads to thousands of deaths in childbirth every year.

Africa now faces a double burden of diet-related noncommunicable diseases (NCDs) as well as traditional nutritional deficiency-related disorders and communicable diseases. A "nutrition transition,"[9] coupled in some African countries with an increasingly sedentary lifestyle, is heightening the risk of NCDs. Obesity and undernutrition are now appearing together to plague poor countries (figure 22.1). This phenomenon, which affects all socioeconomic groups, compels national health systems to address the high costs of treating NCDs even as they must tackle undernutrition-related and traditional communicable diseases.

Rationale for involvement in this area

Progress toward some of the MDGs has been encouraging. Many countries have registered gains in education, child survival and the fight against diseases like HIV/AIDS and malaria. But in general progress is slow and relatively few people are benefiting. Reducing inequalities and disparities makes possible

Figure 22.1 **Share of population overweight or obese**



Note: Overweight or obese is having a body mass index equal to or greater than 25 kilograms per square meter.
Source: WHO 2007, 2010.

inclusive growth but it will take committed engagement to reposition nutrition as central to human development.

Adequate food production alone is not enough to improve nutrition status. Food security, too, should give priority to nutrition security, and beyond that people need to be made aware of the benefits of consuming a range of high-quality foods. Thus there is a need to incorporate value into food supply chains.

Building capacity in nutrition at higher levels is essential for enhancing multisector nutrition programs in developing countries. Good nutritional policies will require more nutritionists who can operate with the necessary breadth and depth in relation to other sectors. Building capacity in nutrition requires urgent changes to all school and university curricula.

Adequate capacity throughout is critical for carrying out essential nutrition actions and scaling up nutrition programs. Capacity development is needed for frontline health workers, district implementers and tertiary-educated policymakers to incorporate nutrition into health sciences (medicine, nursing, pharmacy, dentistry, public health and allied subjects).

Main challenges

Many countries lack comprehensive programs to address health, nutrition and the care and education of children under 3, a critical period in a child's life. There are far fewer care programs for very young children than for older ones. Worldwide in 2005 only 53% of countries had at least one formal program for children under 3.[10] The figure for Sub-Saharan Africa (42%) was higher than for Arab States and Central and Eastern Europe (35%) but lower than for Asia (52%) and North America and Western Europe (92%).

Education of children under 3 tends to be seen as the responsibility of parents, private bodies or nongovernmental institutions. A review of major policy documents reveals that, though all education plans give some attention to early childhood, most do not have a holistic approach to early childhood care and education (ECCE).[11] Although recent data are unavailable, it is probable that much remains to be done to create more comprehensive ECCE programs for the youngest, covering not only custodial care but also parental education and children's health, physical development and learning potential. The United Nations Educational, Scientific and Cultural Organization, the United Nations Children's Fund, the Association for the Development of Education in Africa and early childhood networks encourage countries to put in place holistic ECCE policies that address every aspect of care, education, health and nutrition for children under 8. Among African countries responding to this challenge are Cape Verde, Eritrea, Ghana, Madagascar, Mali, Mauritius and Namibia. In practice, however, most countries focus on preprimary education from age 3 until the child starts primary school; much less attention is being paid to the noneducational aspects of ECCE or the needs of children under 3.

Throughout Africa a lack of technical capacity in nutrition requires immediate action. This problem was exacerbated by the global financial crisis that pushed up food prices and by climatic events such as the famine in the Horn of Africa and the Sahel; this renders the need for coordinated and effective response more urgent. Nutrition interventions have often been directed to changing behavior or promoting adoption of new products and technologies. These changes are often influenced by factors that are difficult to anticipate or address. One of the main challenges, as noted, is inadequate capacity in nutrition.

Nutrition education in communities will need to be promoted through, among other means, sensitization campaigns and one-on-one communications. Research on applied nutrition should also be considered.

Because nutrition is related to all the MDGs, it needs to be taken into account in the effort to reach them by 2015. Women usually do not have enough access to food or health care, which affects their nutrition status and thus the ability to achieve MDG 3. Improving nutritional status can also significantly reduce

the burden of child and maternal mortality (MDGs 4 and 5). On MDG 6, malnutrition can increase the risk of succumbing to disease or transmitting HIV/AIDs. Achieving the MDGs by 2015 will require enhanced multisector nutrition interventions.

The WHO Global Nutrition review found that less than 50% of African countries are taking action to combat overweight and obesity, so obesity is likely to rise there (figure 22.2). Countries that are addressing the problem are labeling foods with nutrition information, providing nutrition counseling in primary health care settings, using media to promote healthy nutrition, preparing food-based dietary guidelines and encouraging people to eat more fruits and vegetables. In other countries nutrition policies need to be redesigned.

Nutrition links to other sectors

Education

Because poor health and undernutrition can affect education in various ways, the main interventions should give priority to the following:[12] school feeding programs that use affordable local produce, nutrition education (infant feeding, exclusive breastfeeding), hygiene promotion (including water and sanitation programs) and training of nutrition specialists.

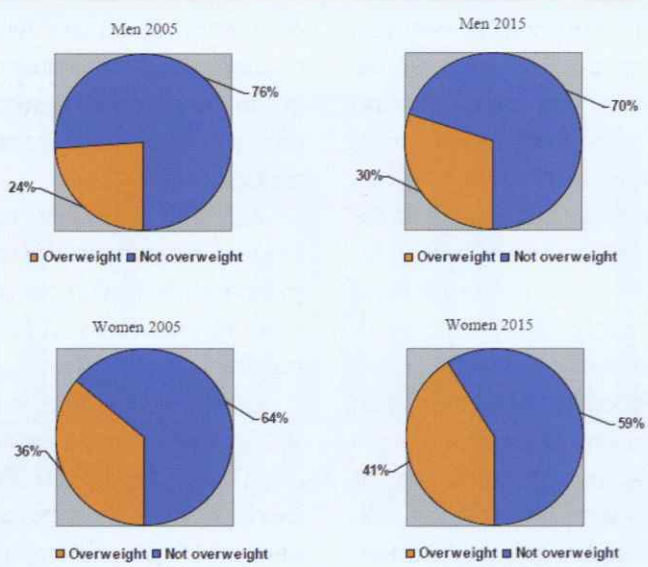
Agriculture

One way to reduce malnutrition is to enhance links with agriculture. Because food insecurity and poor nutritional status are correlated with poverty and social inequity, there is much overlap between initiatives to fight poverty, alleviate malnutrition, ensure food security and promote sustainable livelihoods, especially as economic development alone will not cut hunger in half by 2015. A two-track approach that combines pro-poor economic growth, particularly agriculture-led development, with direct nutritional support for the most vulnerable is generally considered the preferred way to sustainably reduce poverty and hunger as quickly as possible. Agricultural projects should all be evaluated on how they affect nutrition and nutrition security. Agricultural production must seek to both improve quality and scale up quantity (see chapter 9).

The main interventions should include the following:

- Incorporate nutrition interventions into smallholder agriculture and rural livelihoods programs.
- Encourage homegrown production of fruits, vegetables and animal products that are rich in nutrients.

Figure 22.2 **Obesity in Sub-Saharan Africa**



Source: WHO 2012.

- Intensify research on biofortification and yield enhancement of nutrient-rich and staple foods of the poor.
- Promote home gardening and rearing of small ruminants, poultry, rabbits and dairy produce to contribute to food security and dietary diversity.
- Build agricultural skills.

Private sector

The private sector should in particular be active in nutrition research and development. To improve nutrition security, small and medium-size agribusinesses should be promoted, and private entities should be ready to encourage food fortification. It is important to highlight ways to use markets to improve nutrition, such as investing in companies that produce nutritious food. There is also a need for a wide range of incentives to engage the private sector and promote innovation while minimizing the risk of developing new products.

Companies are beginning to invest in and transfer technology in two areas: biofortification to improve the nutritional characteristics of crops; and improvement in postharvest storage and transport to preserve nutrition content. Public–private partnerships have been a useful means to begin to align corporate and social interests in improved nutrition. Innovative financing models should be found, such as social businesses (see chapter 27), social impact bonds and venture philanthropy. Many capabilities for commercializing products and services are also useful for cost-efficient and effective direct nutrition interventions (food fortification, promotion of breastfeeding) and nutrition-sensitive interventions (sustainable farming, microcredit for enterprise development).

Infrastructure

A broader perspective on nutrition recognizes that there is a need to remedy deficiencies in basic infrastructure, especially transport and storage. Infrastructure development, primarily for transport, will boost the food trade and generate income for small producers. In many Sub-Saharan countries the lack of roads retards agricultural development (see chapter 7). Women and children are also affected by their inability to reach health facilities. Feeder roads would help. Inadequate infrastructure prevents efficient distribution of agricultural products and lack of energy and access to sustainable energy sources perpetuates poverty and worsens food insecurity, and development generally. Part of the African Union nutrition strategy should be to enhance regional and continental efforts to integrate infrastructure and sustainable energy resources.

Clean water, sanitation and good hygiene are fundamental to better nutritional outcomes. Any effort to tackle undernutrition must recognize that.

Governance

Forceful leadership of the multisector approach is necessary to design and manage effective nutrition interventions. In many African countries nutrition leadership still comes from the Ministry of Health or Agriculture. Rather, it should be taken on by the president, vice-president or prime minister to ensure complete commitment and better engagement of all ministries.

Support for reforms is also needed in terms of norms, standards, policies and guidelines to improve nutrition and health. Economic growth alone has proved insufficient to address undernutrition, for instance. The challenge is to ensure that governance systems for nutrition interventions are effective and that policies are cost-effective, transparent and targeted appropriately for the long run. With the renewed commitment to end undernutrition epitomized by the Scaling Up Nutrition Movement, it is important to understand how governance can improve nutrition outcomes. One of the main issues is how to build political commitment for nutrition policies.

Operational implications

Skills for competitiveness and employment

The collaboration of sectors is essential to ensure nutrition security. Human capital is

thus an essential factor in enhancing agriculture, private sector, health and governance outcomes. In agriculture there is a need to initiate and reinforce training in biotechnology for agribusiness food production and food fortification. Research is needed on the links among agriculture, food and nutrition-related chronic diseases. Biofortified crops grown with more micronutrients can help provide essential vitamins and minerals—hence the need for research on specific national nutritional needs, cross-disciplinary research by agricultural, nutritional and medical scientists and expanded biofortification and micronutrient options. In addition, dialogue between countries will build support for agribusiness entrepreneurship and the crafting of national and international norms for agricultural and food interventions. Creation of youth employment by agribusiness will be a major plus (see chapter 19).

Value for money, accountability and voice in inclusive service delivery

To ensure that services are efficient and inclusive, nutrition policies must be comprehensive. They should aim for forceful leadership from ministries responsible for realizing nutrition policies and reinforcement of ministry accountability and responsibility. Continuous dialogue will help align health, agriculture and nutrition policies and programs.

It is also important to scale up support for expanding markets and investing in infrastructure through cost-effective, especially cross-sector, collaboration, not only to improve market access but also to encourage healthier food through diversification, market incentives and consumer education. Here behavior change communications can promote hygiene and nutrition, raising awareness of nutritional problems throughout the food chain, using marketing and information campaigns and promoting hygiene (particularly in water and sanitation programs). Another important nutrition intervention is the school feeding program, which will improve both nutrition and education for children.

Through the agriculture sector, services will be better delivered and aim at a healthy environment in projects with water basins or irrigation schemes, to avoid resurgence of neglected tropical diseases, which would worsen the nutrition status of the most vulnerable. Through the health sector the main nutrition-specific interventions will be to improve nutrition behavior, often by scaling up social and behavior change to improve infant and young child feeding practices, including exclusive breastfeeding, complementary feeding, hand washing and micronutrient supplementation.

Another aspect of efficient service delivery is enhanced technical capacity in nutrition. A critical mass of trained and motivated professionals is needed to liaise on policy, planning and programming and to monitor the impact of improved nutrition. To that effect, support is necessary to leverage nutrition training through higher education.

Inclusive financial and social systems

The most nutritionally vulnerable populations should be given priority. Incentives should be built into social insurance and safety net programs that encourage healthy nutrition, including education, school feeding, cash transfers (such as food security cash transfers) and health insurance. Social protection programs can enhance nutrition investments, especially during the critical window from gestation to about 2 years of age (box 22.1).

Box 22.1 Pathways through which social protection programs can impact nutrition

- Improving income.
- Promoting access and delivery of health sanitation services through social protection programs—for example, micronutrient supplements, nutritional counseling, health and hygiene education and other health and sanitation services affecting nutrition.
- Targeting nutritionally vulnerable populations, such as pregnant women and young children.

Source: World Bank 2010.

Recommendations

The most effective way to tackle malnutrition in general and in early childhood specifically will be through a multisector approach. The main challenge is how to identify priority actions to ensure nutrition-sensitive programs in different sectors. Agriculture will be one of the main sectors of interest because it offers a wide range of opportunities to ensure the nutrition security of the most vulnerable, such as the Global Agriculture and Food Security Program. Further opportunities can be explored with the private and governance sectors to ensure more accountable and responsive leadership on nutrition. Specific nutrition programs are also necessary, particularly in countries where malnutrition rates are very high (such as fragile states and countries affected by recurrent drought).

For interventions in the other sectors the main activities include the following:

- Specific nutrition interventions.
- Nutrition-sensitive interventions through the education, health, social protection, agriculture and private sectors (among others).
- Community-based support for behavior change communications, such as promotion of exclusive breastfeeding, complementary feeding based on local and affordable food, micronutrient supplementation (iron, vitamin A) and salt iodization; awareness campaigns; one-on-one communication; culinary demonstrations; deworming; group discussions; training and school feeding programs.

At the national and regional levels the emphasis should be on capacity building by changing school curricula; dialogue with the private sector on, for example, agribusiness interventions; and inclusion of nutrition in the policies of other sectors.

Scaling up nutrition in early childhood is vital to tackling malnutrition, and to be effective it requires a multisector approach. To reposition the agenda in this way, Africa should consider nutrition to be an important cross-cutting issue.

Notes

1. Fanzo 2012.
2. Malnutrition includes under- and overnutrition.
3. World Bank 2010.
4. Save the Children 2013.
5. *The Lancet* 2013.
6. Mendez, Monteiro and Popkin 2005.
7. Disease Control Priorities 2008.
8. Cao and others (1994) quoted by Jukes (2006).
9. The transition is marked by increasing consumption of fats, sweeteners, energy-dense and highly processed foods. Traditional diets have more fibers and cereals.
10. UNESCO 2007.
11. UNESCO-IIEP 2006.
12. Jukes 2006; Hyde and Karibu 2003.

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CHAPTER 23

Transforming lives through financial inclusion in health

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As espoused by the African Ministers of Finance and Health in Tunis in 2012, achieving better performing health systems and wider, more equitable coverage of health services requires a twofold approach (box 23.1). First, existing resources should be utilized more effectively and efficiently; second, additional public and private resources need to be generated to bolster economic growth. Following the 2001 Abuja Declaration[1] and 2003 Maputo Declaration,[2] African Heads of State in the Tunis Declaration committed themselves to ensure that resources are made available for health and efficiently used.[3] Financing mechanisms such as insurance plays an important role in mainstreaming and streamlining national health financing systems. This is necessary to adequately fulfill needs and aspirations of future generations as well as to take advantage of recent economic and technical developments and sociocultural traditions.

Economic progress among successful countries over more than 50 years was achieved by their gradually removing binding constraints to progress.[4] It is necessary to initiate and monitor transformations in economies and people's lives by promoting inclusive growth, correcting market failures, creating financing opportunities and building safety net systems. Inclusion of all groups in development and society requires a renewed and comprehensive focus on poverty, inequality, income distribution and social inclusion. Growth is unlikely to be sustainable unless all sections of society participate—deriving benefits from and developing a stake in the growth process. In 2002 Heads of State and Government declared a new global commitment to collective and coherent action on the interconnected policy challenges that shape financing for development, including access to appropriate financial services for households as well as micro, small and medium enterprises in developing countries.[5]

In Africa rapid economic growth coexists with poverty. African countries have been growing at 6% on average over the past decade and 7 of the world's 10 fastest-growing economies will be in Sub-Saharan Africa by 2015.[6] Economic progress and past development efforts have also brought in improved infrastructure, increased personal income and raised the skill base through better education. Between 1990 and 2010, 24 of 53 countries more than doubled their per capita income. Technological progress has offered better treatment opportunities, financial solutions and connectivity and decreased the cost of service provision. Yet the poverty burden is borne disproportionately by women and rural dwellers; and 6 of the 10 most unequal countries worldwide in 2010 were in Sub-Saharan Africa.[7]

Fragile financing systems primarily based on household out-of-pocket (OOP) payments induce fresh poverty, particularly among lower income quintiles, by limiting cross-subsidization and promoting informal

Box 23.1 Excerpt from the Tunis Declaration

Millions of Africans suffer severe economic consequences due to the need to pay for out-of-pocket health care, which in turn aggravates inequities and impedes sustainable social and economic development, and millions more do not even seek the care they need due to the high costs of accessing and using it, thereby contributing to avoidable morbidity and premature mortality.

Source: AfDB 2012.

lending. They also come in the way of delivering need-based services and mitigating or managing financial risks, making it hard for governments to ensure financial protection and equity among their citizens.[8] In 2005 total health expenditure of USD16.7 billion in Africa was predominantly (around 60%) financed by household resources, primarily OOP, mobilized at time of need.[9] It is a major concern that OOP spending is the predominant source of health financing (more than 50% of total health expenditure) in 16 African countries.[10] Recommendation 202 (on national floors of social protection) of the International Labour Organization emphasizes that all persons in need of health care should not face hardships or increased risk of poverty due to the financial consequences of accessing essential health care.[11] Social protection floors are nationally defined sets of basic social security guarantees that secure protection aimed at preventing or alleviating poverty, vulnerability and social exclusion. Recognizing this, the *World Health Report 2010* states that, "when a population has access to prepayment and pooling mechanisms, the goal of universal health coverage becomes more realistic" (box 23.2).[12]

Building inclusive financing systems offers a route out of poverty and system-traps characterized by persistent poverty, limited economic opportunities and poor health and education (box 23.3). For many poor people, finding that route is limited by their inability to access finance (saving, borrowing or insurance) due to limited infrastructure, constraining regulatory and legal environments, weak understanding and awareness of financial services and perceptions that lending to them is risky and commercially unviable. People, particularly the poor and women, can be economically and socially empowered through enhanced access to well-functioning and efficient financial services, allowing them to better integrate into the country's economic activity and contribute to economic growth. A financial sector that provides access to everyone in each of the main client groups can be called "inclusive" (box 23.4).[13] The efficient and equitable provision of and access to financial services is important to realizing universal health coverage.

Shared values are fundamental features of African identify and culture.[14] Africa's culture is famous for loyalty and inclination to support each other regardless of economic status. Informal insurance mechanisms such as credit associations, rotating savings and extended and large families continue to be practiced in many parts of Africa, especially

Box 23.3 Inclusive financing

Inclusive financing means providing financial access at all times to everyone in each client group, rich or poor, by creating financing opportunities, preparing and empowering people for economic engagement and risk management and mitigating financial risks.

It creates a level-playing field for women and youth to boost their participation in economic activities and productivity, and reduce inequalities.

Box 23.2 Universal health coverage

An important aim of universal health coverage is to "insure" populations—enable them to use health services when needed even while protecting them against financial risks. Already some African countries (such as Ghana and Rwanda) have successfully demonstrated the benefits of reforms that increase the share of health financing flowing through prepaid and pooled mechanisms, improve health care utilization and protect individuals, particularly the poor, against financial risks.

Source: WHO 2010.

Box 23.4 An inclusive system

Health financing systems can be inclusive if:

- Financial contributions are according to ability to pay, not according to needs.
- Funds are prepaid (using taxes and/or insurance contributions) and pooled.
- Everyone is provided with access to health services of sufficient quality when in need.
- Service utilization is according needs, not according to contributions, and does not expose the user to any financial hardship.

Source: UN DESA 2006.

in Central and West Africa. Similarly, North Africa continues to practice Zakat.[15] Solidarity and willingness to pool risks in groups are the core values associated with a good health financing system, and Africa possesses them naturally. Financing systems can be built on this historical sociocultural tradition.

A number of African countries are reforming their national health financing systems with a view to achieving universal health coverage and social protection for all. They are making significant policy shifts from short-term emergency responses to longer-term predictable interventions, and from donor-driven projects to government-led or partnered (government–donor–private–community) programs. These shifts recognize that chronic poverty has structural causes that require systematic rather than ad hoc interventions.[16]

A sustainable domestic health financing system is central to Africa's value for money agenda.[17] Domestic resources constitute an average 82% of total health spending in Africa and about 50% of it comes from African governments.[18] Improving the quality and inclusiveness of growth will require greater accountability in public and private services that offer value for money. Developing health financing systems for individuals and communities to weather financial risks and to move permanently out of poverty is the first step forward.

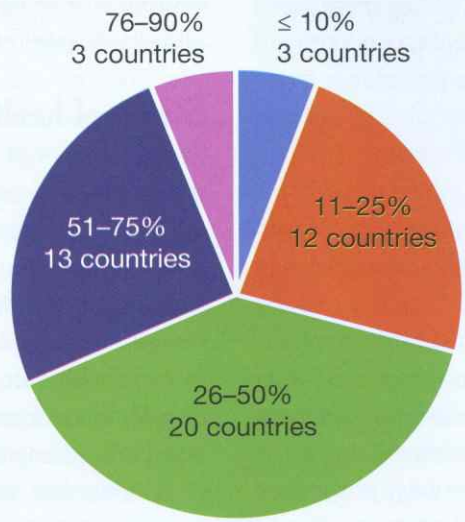
But health financing systems need to be reengineered, given this new reality and other system changes to extract better value for money, as even public resources are not strategically allocated and spent.[19] Efficiency gains are possible in use of resources from all sources. Low-income countries could save up to a quarter of their total health spending annually by freeing resources through efficiency gains.[20] Inefficiencies result from a lack of evidence-based policies and strategies, inadequate resource allocation for high-impact interventions, lack of focus on results, inappropriate procurement and management of equipment and commodities, inappropriate staff mix coupled with a lack of performance incentives, and inadequate hospital investment. Substantial OOP spending acts as a barrier to value for money because governments are not in a position to effectively intervene or predict OOP spending to maximize the impact of their health spending.

Status of health financing systems

Financial risks of health prevent some people from progressing out of poverty even while pushing others into it.[21] Lack of optimal access to health services is mainly triggered by people's inability to raise sufficient financial resources in time and governments' inability to provide adequate financial risk protection. When public resources do not provide adequate financial protection to individuals or households and other financial risk protection mechanisms based on prepayment are underdeveloped, household spending on direct payments for health services at the time of use (OOP spending) exposes people to severe financial risks (costs of illness, treatment and external borrowing) besides forcing health care utilization according to ability to pay, not according to needs. The poorest households often incur catastrophic health expenditures, often financed by high-cost informal borrowing. Worldwide, an estimated 100 million people a year are pushed below the poverty line because of these payments.[22] It is a major concern that household OOP spending is the predominant source of health financing (more than 50% of total health expenditure) in 16 African countries (figure 23.1); in only 3 countries (Seychelles, Namibia and Botswana) is OOP spending less than 10%.[23]

Prepayment accounts for more than 60% of private health spending in Namibia and South Africa (box 23.5). South Africa, Namibia and Zimbabwe have a long history of private health insurance.[24] But population coverage with prepayment is low in these countries (table 23.1). Wider population coverage is achieved in Ghana and Rwanda through sustained development of national health insurance systems. In Ghana health insurance has sharply cut OOP spending and protected households against catastrophic expenditure.[25] In Rwanda the biggest impact of health insurance was felt in the reduction

Figure 23.1 **High reliance on OOP spending and little pooling, 2010**



Source: McCord and Slater 2010.

Box 23.5 **South African prepayments**

In South Africa—even though prepayment accounts for 60% of private resources, and an estimated 67% of the population had a bank account in 2012—only about 20% of the population actually participates in the prepayment process. A big chunk of the population neither contributes (tax or premium) nor receives care. OOP spending can be misleading as it is only less than 20% of total health spending. Given that a portion of OOP spending is spent on copayments by the insured, private resources available for the rest is really insignificant. OOP spending is low for the uninsured either because they receive free care or no care. There is also a possibility that OOP spending is not captured well in estimations.

Source: FinScope 2012.

of catastrophic expenditure: among the poorest households experiencing catastrophic expenditure it decreased by four times in four years (2005–2008); it fell by 1.5 times for all households.[26] The proportion of households incurring such expenditure is in the range of 7–18% for insured households and 29–36% for uninsured households.[27]

In some countries health financing is characterized by small and weak institutions with greater monetary instability. Many health financing initiatives during the past two decades or so have been localized, voluntary, small and community-based,[28] with Senegal offering the longest tradition dating back to the early 1980s.[29] East and West African countries have explored alternatives to OOP spending through community-based health insurance, but are able to pool only less than 7% of the private funds.[30] In Tanzania the share of prepaid resources, though low, is increasing (and see table 23.2).[31] About a fifth of private health resources in Africa flow through prepaid channels; the share is low at 14% in the regions other than the south. When health insurance is not universal, coverage tends to be higher among the richer population groups.[32] In the future, it is possible that the share of prepaid resources in health will increase because there is a positive association between wealth and insurance coverage.[33] Governments will have to work hard to find the fiscal space to subsidize the poor and nationalize risk pooling.

Toward inclusive health financing systems

The current high level of informality and low level of depth in financial access offers great potential for reforming the financial sector in Africa. Access to finance in Africa is characterized by a diverse range of financial technology, organizational structure, regulation,

Table 23.1 Population covered with prepayment schemes, selected African countries (%)

Country	Estimated population coverage[a]		
	Total	Mandatory schemes	Voluntary schemes
Benin	9.1	6.9	2.2
Burkina Faso	3.1	3.0	0.1
Burundi	—	10.0	—
Chad	5.3	3.9	1.4
Côte d'Ivoire	9.1	6.0	3.1
Ghana	33.0	32.0	1.0
Guinea	9.6	8.4	1.2
Kenya	27.0	25.0	2.0
Mali	12.1	11.8	0.3
Mauritania	13.5	13.3	0.2
Namibia	13.0	6.0	7.0
Niger	3.8	3.4	0.4
Nigeria	3.0	2.0	1.0
Rwanda	91.0	91.0	—
Senegal	20.1	16.1	4.0
South Africa	17.0	0.0	17.0
Tanzania	15.5	14.5	1.0
Togo	0.6	—	0.6

a. These are estimates based on certain assumptions, not actual figures. Hence, the population coverage may be slightly overestimated.

Note: — is not available.

Source: Durairaj, D'Almeida and Kirigia 2010b; Dukhan, Preker and Diop 2013.

Table 23.2 Prepaid private health spending in Africa by WHO subregion, 2010

Region	Per capita total health expenditure (USD)	Per capita private expenditure (USD)		
		Total	Prepaid	%
Central Africa	36.5	19.9	2.8	25.7
East Africa	37.3	22.2	4.9	26.8
North Africa	158.4	75.5	4.6	5.7
South Africa	247.0	126.6	84.8	45.4
West Africa	53.9	32.2	2.8	10.6
African average	95.8	50.5	16.8	21.3

Note: Detailed information for each region is in annex 23.1.

Source: WHO 2012.

clientele and degrees of formality.[34] Although the depth of access to formal finance is small (about 20%), an estimated 80% of the population have access to one or other type of formal or informal financial intermediation. Various forms of credit cooperatives and nongovernmental organizations play a dominant role, accounting for about 65% of borrowing (though they hold only about 30% of accounts). Postal banks hold the highest proportion (about 48%) of accounts. The range of financial products varies by type of institutions: savings institutions (postal banks) do not offer credit while credit institutions (microcredit) cater to limited savings. Thus unit operating costs and interest margins tend to be high.

An inclusive health financing system based on prepayment, pooling and strategic spending is a powerful means to achieve the

key health system objectives of governance (organized mobilization and management of resources), value for money (need-based strategic spending)[35] and financial risk protection (risk pooling[36] and cross-subsidy). It can also be employed as a tool to promote social protection by stimulating community-based social dynamics, solidarity and participatory decisionmaking and financial management.[37] Participating individuals and families will benefit from pooling of resources as well as risks across individuals and over time. As the *World Health Report 2010* observes, "The most effective way to deal with the financial risk of paying for health services is to share it, and the more people who share, the better the protection."[38] National health financing systems, with an ideal mix of taxes with insurance premiums, more often bring governments into play to offer top-up subsidies because high dependency ratios in the region limit the potential financial contribution from people.

Financial inclusion—through mechanisms such as provision of free care, health insurance, cash transfers and empowerment—is needed to keep the increasingly large young population healthy, reap the demographic dividend and develop a healthy pool of human capital. Africa is the world's youngest region, and in mid-2011 the top 10 countries with the youngest population were in Africa. By 2040 Africa will have the largest workforce, surpassing those in China and India. In the continent, East and West Africa will be the youngest regions. If the health of this rising youth cohort is harnessed and channeled to the productive sectors of the economy, the opportunities for economic and social development are huge. The region's changing demographic, health and economic landscapes call for flexible and innovative ways of managing and financing health systems suiting these changing local contexts and requirements.

Financial inclusion is an important driver of health service provision and utilization. African health systems are characterized by suboptimal health care provision and utilization; mismatches among means, mortality and morbidity, and health care; and underfunding and fragmentation of services used by the poor and disadvantaged.[39] There are also issues with financing health promotion and disease/disability prevention. While a significant proportion of the population lacks access even to basic essential health services, those with some access do not have service coverage adequate to fulfill their needs. The disadvantaged populations were neglected and discriminated against for many years and did not have fair opportunities either.[40]

Several African countries are now reforming their national health financing systems with a view to achieving universal health coverage and social protection for all. Already some African countries (such as Ghana and Rwanda) have demonstrated the benefits of reforms that increase the share of health financing flowing through prepaid and pooled mechanisms that improve health care utilization and protect individuals, particularly the poor, against financial risks. In Ghana use of formal care increased markedly among insured members: the number of outpatient care visits increased from 12 million to 18 million between 2005 and 2008, while hospital admissions rose from 0.8 million to 0.85 million.[41]

Publicly managed prepayment systems enhance the opportunity for the public sector to mobilize resources. Better organization of resources through a public prepayment mechanism is likely to streamline the flow of household health care spending and release a significant proportion of OOP spending to the government to achieve national health goals and promote risk pooling. Additional household or private resources may also be made available to governments if people witness a performing health financing system. In Ghana a portion of household resources flows through the National Health Insurance Scheme, which accounts for more than 40% of the total public resource envelope (box 23.6).[42]

The main prerequisite for prepayment is the notion of solidarity and the willingness to pool risks in groups organized along

Box 23.6 Solid success in Ghana

Ghana's National Health Insurance Scheme is unique because it combines social and mutual health Insurance concepts. The design has built-in equity in financial contributions based on ability to pay, not on need. Enrollment is mandatory but has faced noncompliance. The National Health Insurance Scheme is funded from a combination of earmarked public revenues (2.5% of value added tax), contributions from civil servants to Social Security Funds (2.5%) and income-adjusted premiums. The benefits package covers 95% of the disease burden. Public and private services are accredited and contracted to deliver services.

Source: Durairaj, D'Almeida and Kirigia 2010a.

Box 23.7 Community-based health insurance in Rwanda

Rwanda has scaled up its coverage of community-based health insurance from around 35% in 2006 to close to 100% of the target population now. It is one of the largest experiments in community-based risk-sharing mechanisms in Sub-Saharan Africa for health related problems. Community-based health insurance enjoys strong administrative and political support for its expansion and functioning. Beneficiaries are covered at all three levels of health service provision. The emphasis is on rural population and the informal sector. The system takes into account the low purchasing power of the great majority of the Rwandan population through subsidies provided by the government and development partners.

societal or employment-based characteristics. Community-based health insurance in East and West Africa, for example, leveraged preexisting social networks based on solidarity (box 23.7).[43] Achievement of national solidarity, however, depends on the political ability to build consensus among key stakeholders, while their size, composition, relative strengths and influence in the political arena differ across countries. Another key precondition is the effective design, functioning, accountability and transparency of the implementing agencies, such that they can act with sufficient autonomy and manage key health financing functions. By contrast, an array of practical and structural constraints limits inclusion of the informal sector and further expansion of coverage.

In an environment where the vast majority of the population is engaged in informal work,[44] risk protection mechanisms are underdeveloped and the public sector functions suboptimally,[45] voluntary prepayment could be established as a transitory step, but with clear plans to integrate or consolidate it nationally. (Mandatory prepayment remains the favored option to achieve universal coverage, however.)[46] In the past, countries with small voluntary health insurance schemes have gradually progressed toward larger pools to achieve greater financial risk protection.

There will also be a possible tradeoff between breadth and depth of coverage in the initial stages. Population coverage will be thin if service and financial coverage are to be deep, or vice versa.[47] Mandatory prepayment methods are not advanced in African countries. In their quest to achieve financial risk protection for all, many are trying to reform their national health financing systems by applying varied strategies to target certain population segments (civil servants, formal sector employees, identifiable groups within the informal sector, the poor) or to cover certain priority services (usually maternal and child health) (box 23.8).[48]

As experienced by Thailand, financial inclusion is attained through sustained efforts over a long period (box 23.9). The framework should be comprehensive enough to cover high-frequency, low and high-cost conditions and low-frequency, high-cost conditions,

Box 23.8 Prepayment for all in Senegal

Senegal wants to bring the entire population under prepayment mechanisms through a policy of decentralization and expansion of mutual health organizations. Currently, only 20% of the population enjoys the benefit of prepayment and the country targets 50% by 2015. A mix of contributory, noncontributory, voluntary and mandatory schemes is prevalent. The current reform measures have three pillars: free care (noncontributory), national health insurance (contributory and mandatory) and mutual health schemes (contributory and voluntary).

Box 23.9 Long-term investment in Thailand

Thailand took nearly three decades to build a fully functional national health financing system. Currently, it mixes universal coverage scheme (74%), social health insurance (13%) and civil servants medical benefit scheme (10%). Factors responsible for its success were:

- Establishment of pro-poor public health care infrastructure.
- Sustained political support with consistent policies.
- Budgetary intervention—capital budgets for urban hospitals were frozen to establish rural facilities.
- Rapid economic growth and reduced internal security spending.
- Investment in human and material resources even when the economic growth was low and during the oil crisis.
- Capacity building facilitating evidence-based policymaking.
- Appropriate provider payment methods and reference mechanisms.
- Harmonization of health financing schemes.

Source: Spaan and others 2012.

and have the governance structures and incentives to facilitate access, minimize OOP spending and eliminate impoverishment on account of treatment cost. It is important to mainstream outpatient care (and health promotion and disease prevention and control) into any health financing system to prevent future financial and health losses.[49] Similarly, a comprehensive health financing system should include protection against illness-induced income losses and maternity benefits.

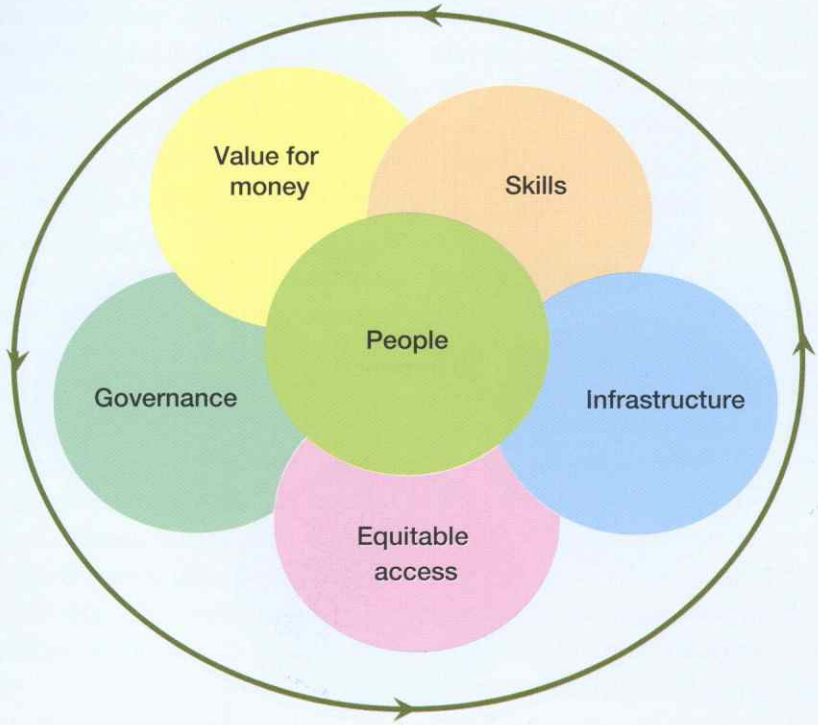
In Thailand utilization of outpatient care, particularly in rural areas, responded well to financing developments with a sharp increase (associated with a relative decline of outpatient care in higher level hospitals). National surveys indicated that the poor benefited from government subsidies. The incidence of catastrophic spending declined from 5.4% to 2.8% in four years and the induced poverty due to OOP spending declined from 3.1% to 0.5%.

A framework for promoting and achieving inclusive financing

A good system works well even when the going is tough. It is achieved by planning and developing comprehensive and partnered health financing systems, not just a few isolated instruments.[50] Such systems will maximize opportunities for financial inclusion and minimize household OOP spending. Prepayment is a necessary but not sufficient condition to improve financial inclusion and the amount and quality of access to services. Other attributes include a strong network of health care providers, well-defined payment and contracting systems, services compatible with basic quality metrics and optimal and affordable benefit packages. The framework aims at creating and sustaining a harmonized, impartial and sustainable environment that maximizes the proportion of population accessing essential health services when and where in need; the share of prepaid private resources; alignment of government, corporate and household spending with national health and health system goals; value for money; private participation and investment in health financing services, human resources and medicines; and the number of skilled people engaged in the health sector (figure 23.2). And it minimizes or eliminates the proportion of individuals, households and communities excluded from receiving essential health services due to financial reasons; the share of the population incurring OOP spending; and impoverishment.

The framework keeps people at the center and advocates a systems approach. It recognizes and addresses all dimensions of health financing. The framework includes five interrelated areas (as shown and now discussed in more detail), which interact to produce desirable outcomes. While governance sets polices, boundaries and processes, infrastructure and skills drive the system to achieve value for money and equitable access. The framework advocates national planning (*think nationally*) and local action (*act locally*); it is important that all the stakeholders

Figure 23.2 **A policy framework for inclusive financing in health**



Source: Authors.

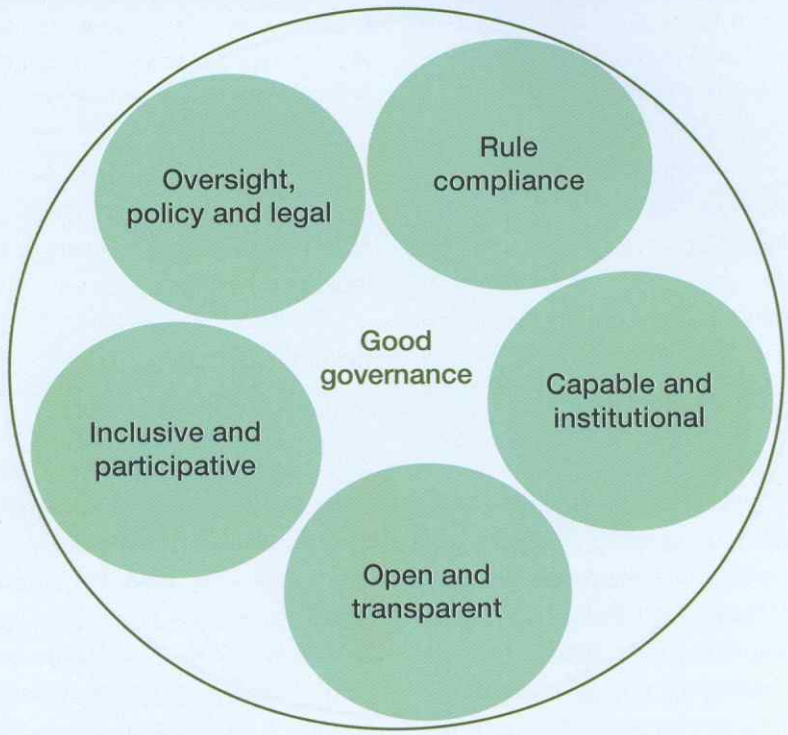
consider potential consequences of their decisions and actions on the other parts of the larger system.

Governance

African countries have made gains in all the five areas of national governance—oversight, inclusiveness, rule compliance, openness and capability (figure 23.3)—but not enough: it is time to move toward building governance systems of specific sectors like health. Management of public, private and household finance requires particular attention. National governance systems fail to deliver desirable outcomes if its various arms are dysfunctional or inefficient. For example, it is not enough to improve management of public finance when private finance is allowed to work informally. While it is necessary to improve public finance management, national governance requires the private sector to operate efficiently and equitably for public finances to perform well. Informality is the state of health financing in many countries, which prevents them from achieving national health goals.

Governance of health financing requires changing the way public resources are managed as well as creating an enabling environment in which the private sector will invest. It means designing, legislating and implementing comprehensive health financing systems (ensuring coverage for all) with appropriate mechanisms for scrutinizing resource generation and utilization (oversight), people's participation (inclusiveness), clarifying and applying rules equitably, independent audit and compliance with good practices (rule compliance), public availability of information on financial and outcome audit (openness), and effective revenue administration and action against unethical practices (capability). Health insurance can be used as a binding factor to harmonize the pluralistic, but uncoordinated and uneven, health financing landscape in Africa. For example, it is possible to bundle health insurance schemes with postal savings and microfinance to form a hybrid combination of savings, credit and insurance. Similarly, health insurance can be used to link all national social protection instruments as well as domestic philanthropy. But poorly

Figure 23.3 **Characteristics of good governance**



Source: Authors.

designed and run health insurance schemes will cause inefficiencies and inequities.

Infrastructure

Considerable opportunities for investment in health financing infrastructure exist in Africa. As demonstrated by Thailand, sustained infrastructure development (health financing and health service provision), where it is lacking, is a prerequisite for the success of health financing and insurance. In Thailand the starting point was rural areas. African countries need to be supported to make health financing operational based on the agreed national policies and laws. Many African countries lack the enabling environment for any health financing mechanism to get established and function optimally. Fresh public investments are needed to establish public infrastructure for overall governance and creation of enabling environment for private investment in health financing infrastructure. In countries where the national policy is to establish public health insurance mechanisms, public investments are also needed to develop and deliver health insurance. Technological solutions (such as ICT) in the form of smart cards need to be carefully deployed to enhance accountability and access and minimize resource wastage.

Microfinance provides a strong platform to build social infrastructure (see chapter 26). Development and grooming of social infrastructure is critical for inclusive financing. Strong social infrastructure particularly helps to link people with finance and services. It is important to enhance and use the community knowledge base to build social systems as applicable to health financing. Community understanding, where necessary, needs to be developed in internalizing the financing and insurance concept, particularly in risk pooling because community members are the potential clients in the first place.

Communities could also be involved in local organization, delivery and management of health financing services so that they are inclusive and locally owned. For this, community leaders need to be sensitized about concepts such as identification of the poor, needs assessment, priority setting, price negotiation, not-for-profit approach, benefit

package, cashless insurance, inclusive coverage, fund management and reinsurance.

The way microfinance is organized and managed allows enough room for community participation. The idea is not to view people as clients or receivers of services, but rather to treat them as partners in service delivery. The *2005 Human Development Report* attributed Bangladesh's achievements in human development to community empowerment through microfinance. Its specific influence was found in the increased use of ante- and postnatal care and contraceptives, improved nutrition and health promotion.[51] Empowered community members (mainly women) were found to be less sick possibly due to health promotion and disease prevention efforts. Similar health and health care benefits and reduction of exclusion rates were observed in Ethiopia and other countries.

Skills

A critical pool of health financing experts is necessary to govern and carry out health financing operations in Africa (see chapter 12). It is important to create a critical skill mass with an emphasis on practical application of the health financing principle. Estimates on the human resources needed to run a health financing system efficiently should reflect the basic functions of the planned system at various levels (national and subnational) and the functions planned to be outsourced (the collection of contributions). The long-term goal will be enough learning opportunities within Africa even for students from other continents to come and learn in and from Africa. The foundation needs to be laid for this in the coming years in collaboration (during the initial phase) with international institutions in BRICS countries. Institutions within Africa and in BRICS countries could be identified to provide sustained knowledge transfer. It is also important to expose students or learners to a mix of health financing approaches and instruments so that they are equipped to deal with a menu of options, not just one.

Besides offering enormous potential and opportunities for skill development, health financing opens up career opportunities for students in Africa. If well developed, health financing systems could employ many young professionals. Their governance and operation require a certain level and mix of skills. Skill development and career opportunities exist in such areas as accreditation, actuarial analysis, claims management, contracting, licensing and certification, performance appraisal, pricing, quality assurance and strategic purchasing.

Equitable access

For a health financing system to operate effectively, it should include appropriate incentives and access to key health care inputs (such as medicines and human resources). Financing opportunities created through a well-developed health financing system produce health benefits only when medicines and human resources are made available on time. Access to these resources is important to make health financing work for the poor because they incur huge OOP spending in meeting their medicines and human resources needs; any reduction in OOP spending can be achieved only when people have affordable access to these resources, particularly outpatient care—the key aspect of primary health care. In Africa large sections of people are prevented from using health services due to the need to pay for medicines and human resources at the time of service use. More often, prepayment schemes leave out medicines and do not provide appropriate incentives for human resources to operate effectively.

Value for money

The term "value for money" is used to assess whether maximum impact is obtained from resources made available to a country, sector, community, institution, network, input or process.[52] It can be viewed in many different ways, but is more than efficiency or simple conversion of inputs into outputs (see chapter 29).[53]

It covers a full range of activities and affects communities in a variety of ways. What constitutes value depends on the purpose for which resources are made available as well as whether resources are allocated

to the right purpose (allocative efficiency and equity). A value system should be defined with clear value targets and performance measures. The system could have six dimensions: efficiency (conversion of inputs into outputs), effectiveness (conversion of outputs into outcomes), economy (cost minimization), equity, sustainability and quality (figure 23.4).

Health investments in Africa are often not cost-effective. Improvements are possible in extracting more value for money; estimates of waste vary depending on the national context and estimation methods used. Prior experiences have shown that it is possible to reduce wastage and inefficiencies if measures are taken to streamline health investments and spending in alignment with national goals and policies. Many African countries are already establishing newer health financing methods such as performance-based financing, fiscal decentralization and insurance. Public financial management reforms also aim at efficiency gains in public spending.

Policy, financial and social instruments for financial inclusion

Supporting financial inclusion and cohesion is key to making the life course more risk-free and predictable, but governments need to develop and employ instruments that are flexible enough to smoothen individual and group variations in needs and vulnerabilities. Protecting the ultra-poor and poor against further hardship is unlikely to be sufficient because their assets, health or human capital have reached critically low levels, so that escaping from poverty through their own efforts is hardly possible, and who risk remaining in persistent poverty. Financial inclusion tools aim to address this problem by preventing the vulnerable from falling into poverty and break the intergeneration poverty cycle; preventing the marginal poor from falling into destitution, enhancing their productivity and graduate the poor out of poverty; and building the resilience of the poor and vulnerable against shocks and risks.

Given the varied levels of health financing development in the continent, governments can intervene during the following three phases to systematically facilitate and mobilize the flow of resources and promote investment in health:

- *Initial:* when financing frameworks, methods or schemes are designed, piloted or scaled up (pillars to be addressed: governance, infrastructure and skills).

Figure 23.4 **The value system**

Source: Durairaj and others 2013.

- *Intermediate:* when governments desire to harmonize many different forms of geographically localized or economically specified health financing schemes (pillars to be addressed: governance, infrastructure and value for money).
- *Mature:* when governments attempt to bridge health service provision gaps (pillars to be addressed: infrastructure, skills and equity in access).

A range of tailored policy, financial and social instruments can be bundled to make the intervention effective from a long-term system-building perspective. Short-term instruments, if used, should have long-term plans for mainstreaming or phasing out. The nature and specific bundling of interventions and instruments will, of course, vary by country. The choice of instruments will depend on the nature and scope of issues addressed by each operation.

Policy instruments

Investment in strategies, reforms and laws will help create a financial inclusion environment in the public and private sectors. It will also improve the quality and effectiveness of the government administrative machinery. Institutionalization of financial inclusion requires establishing or mainstreaming sustainable mechanisms for protecting people, particularly the vulnerable, from financial hardship, risks or loss by offering professional, physical, financial, legal and social security. An all-inclusive or universal financing system—equitable, efficient and predictable—is preferred to a patchy, nontransparent and ad hoc system. A well-established financing system would improve financial risk protection potential of everyone, rich or poor, at all times. It would respond to real needs and be of the scale that is adequate enough to make a difference in people's financial potential, without generating disincentives that exclude them or others from financing. Regulatory frameworks will help develop financial institutions in alignment with the inclusive growth agenda as well as reduce prices of essential commodities and services.

Policy instruments encompass many different forms of public action. The optimal set of coherent and progressive policies would address the needs of all, have strong positive linkages with other economic and social policies and contribute to inclusive growth. It is also the reflection of the political economy as well as social and legal context. Policy instruments should aim at creating adequate institutional, management, technical and human resources necessary for inclusive financing systems that are transparent and accountable with provisions for monitoring and impact evaluation.

Governments need to focus on graduating people out of intergenerational poverty and exclusion. This could be achieved through policies to build capacity for successful planning, designing and deployment of financing systems and instruments, design and implement financial and social systems for skill development, financial risk protection and service provision, provide essential services, link finance, people and services, and build capacity to carry out vulnerability analysis and assessment.

Policies can be shaped using a variety of instruments. Periodic status and evaluation reports identify support needs and guide national policy dialogue and development, and are powerful and cost-effective if produced with key stakeholders. Evidence and processes concerning positive (and negative) practices can be learned through knowledge exchange events and visits, but they need to be structured. E-platforms and community mechanisms can be used to discuss and build scientific evidence for better governance and system building—community-to-community learning using the existing platforms such as microfinance or social groups is an effective way to communicate with the community. Results frameworks need to be developed to specifically capture short-term markers for long-term goals. Outcomes of long-term system-building efforts, however, are less visible in the short run. This is all the more important for health financing given that is underdeveloped or fragile in many African countries.

Countries could develop systems, policies and strategies to effectively use opportunities

(corporate social responsibility and public–private partnership) and finance (philanthropic resources) for financial inclusion provided by the private sector. Existing or new financing mechanisms need to be supported to extend financial coverage to the economically and socially disadvantaged. Government support will be necessary to build systems to effectively use domestic philanthropic resources (such as creation of trust funds). Such resources have some advantages on flexibility tailored to needs, and their potential could be mainstreamed through multilateral partnerships and dialogue. Different forms of domestic philanthropy appear to exist in many countries, and it is important to maximize synergy between them and the other sources of health financing through proper coordination and guidance without diminishing their comparative advantages. Separate windows with adequate flexibility can be provided within the national financing framework to accommodate philanthropic resources. Some experiences on this can be learned from other countries, such as India.

Governments also could develop an institutional framework and operating environment for promoting synergy between the various financing sources (government, corporate and households) and financial instruments (saving, credit, insurance, microfinance, safety nets and so on). Efforts need to be directed toward developing systems and processes for effective use of all resources, not just government resources. Waste occurs in all health financing sources and can be avoided or minimized by streamlining the resource flow through a national framework supported by well-coordinated and integrated actions.

Financial instruments

Additional finance may be necessary to build infrastructure and capacity in ICT, resource allocation, priority setting and financial management. Reprioritization and effective channeling of existing resources to achieve value for money are other options. Fresh financial instruments may have to be developed to streamline the flow of resources. Universal health coverage efforts will be strengthened if national system-building efforts, where feasible, are synchronized with regional or intercountry efforts. The novelty or challenge, however, lies in designing financial instruments applicable beyond national boundaries.

Priority setting has been a challenge in many countries given the huge mismatch between resource availability and competing unmet needs. Compromises often lead to piecemeal approaches keeping alive all unresolved problems.

Training of senior policy development staff in needs assessment, priority setting, strategic purchasing, financial planning and financial management may be necessary. For example, implementation of health insurance requires certain prerequisites, namely an enabling environment and a skill base. It is necessary that governments create such an environment with the appropriate regulatory and managerial framework, skill base and performance incentives. Instruments such as health insurance or microfinance also change the way institutions operate (including community-based institutions). National autonomous institutions could be created or strengthened to technically support governments in their policymaking and system-building efforts; it could mean grooming of existing institutions or creation of new institutions depending on the country context. It means fresh investments in infrastructure for research and evidence generation, policy development and analysis, community development, technology transfer and monitoring and evaluation. It is important that countries reconceptualize the aims of the health care "business," providers and financial institutions to ensure inclusion of the poor in the provision and financing of health care.

Microfinance has been a key instrument to reach and empower the poor, especially women and the rural poor. Promoting access to financial capital and services (savings, credit) could facilitate resource mobilization for small investments and encourage risk taking. It is being explored as an option to manage financial risk and protect people against

the financial consequences of seeking health care in several countries.[54] (Microfinance is discussed further in chapter 26.)

In a context of deep and structural unemployment and where addressing the educational shortcomings cannot be accomplished in the short run, cash transfers could act as a temporary means to include the poor and bring them out of poverty. Cash transfers essentially mean artificial income correction enabling the beneficiaries to consume items that they may not consume otherwise. Started in the late 1990s predominantly in Latin America, including in Mexico, Brazil, Colombia, Honduras, Nicaragua and Ecuador, they vary much in size and scope.[55] The main objective of cash transfers, to those households who face a probable financial risk of falling into or remaining in poverty, is to increase their real income. In countries where this instrument is used, the amount transferred varies between 4% and 20% of the average household consumption expenditure. They operate outside the labor market because it is far quicker to channel money to poor households through the grant system. The results have shown that the cash transfers increased consumption by poor households, and the actual impact depends on the number of beneficiaries and the amount of the transfer. In Rwanda the Ubudehe program is found to have doubled the household income among beneficiaries.[56]

Financing-free services provide poor people with the financial resources to use public services such as education and health services. In Brazil, for example, the transformation of education started with the equalization of funding across regions, states and municipalities.[57] Providing free or affordable basic services will particularly ease the burden on women, children and elderly and maximize women's healthy time for more productive activities. Rwanda provided cash incentives to health care providers to boost their performance and make health care affordable to rural people.

It is crucial to provide financing to meet start-up, infrastructure and skill-development costs. Many countries are trying to reform health financing systems either by harmonizing various measures or starting new initiatives. It is necessary to invest in certain architectural correction and health financing infrastructure essential to expand coverage so as to link health care services with health financing mechanisms such as health insurance, banking or microfinance. Facilities and technology necessary for day-to-day health financing operations including harmonization processes need to be financed. This means developing governance structures appropriate for implementing the health financing system.

One design principle should be to have a balanced mix of different instruments such as cash transfers, subsidies, waivers, insurance and microfinance. Direct cash transfers should be transitory and targeted, as they eventually suffer budgetary constraints. The approach should be to build sustainable systems that focus on raising equitable investment and participative financing. Providing aids and subsidies for shaping institutions (microfinance and insurance) will particularly help rural communities build their financial infrastructure and social cohesion.

Social instruments

Social accountability has strong potential to contribute to poverty reduction, improve service delivery and enhance empowerment especially for the poor and marginalized. Lack of participation of the poor in decisionmaking as well as a legal system biased against poor and neglected groups are factors that perpetuate poverty and exclusion. Governments could support social infrastructure required for building social capital and people's participation. The initial emphasis could be on promoting social systems and synergize them effectively to maximize health financing outcomes.

Partnership among the government, financial institutions, health care providers, communities and knowledge centers is a useful way to expand financial inclusion and health care coverage. Interministerial and multilateral roundtable consultations similar to the 2012 ministerial conference in Tunis can be organized to guide and harmonize

financial inclusion efforts of the different actors. Many actions pertaining to financial inclusion require interministerial coordination and interventions. These roundtables could, for example, discuss architectural (systemic) issues requiring joint correction as well as building blocks for establishing a national or regional system or fund for financial risk protection based on the findings and options outlined in status reports. Similarly, governments could hold knowledge events in partnership with development partners to learn more about new concepts and international financial inclusion experience and models.

Community-to-community learning in which community members act as trainers in transferring knowledge is another way to extend financial services to the poor. As observed for microfinance, new knowledge and best practices can be effectively imparted through community members. This could be done under direct supervision of experts so that correct knowledge is passed on even while experiences are shared.

Governments could also develop social instruments to leverage private sector funds for providing health financing services to the poor. Strategies to foster capacity-building programs for microfinance institutions is an example. These institutions could be supported with staff training, development of monitoring and evaluation systems, business planning and management, instruments to adopt innovation, technical assistance in the development of emerging financial products such as micro-insurance, microcredit and microsaving, and financial sector reforms (policy and regulatory).

Annex 23.1 Prepaid private health resources, by region and country

Central Africa

Country	Per capita total health expenditure (USD)	Per capita private expenditure (USD)		
		Total	Prepaid	%
Cameroon	61	43	2.4	5.5
Central African Republic	18	12	0.6	5.0
Chad	31	23	0.8	3.3
Congo, Dem. Rep.	16	9	3.4	37.5
Congo, Rep.	72	38	0.0	0.0
Equatorial Guinea	896	216	17.1	7.9
Gabon	302	140	0.0	0.0
Regional average	**36.5**	**19.9**	**2.8**	**25.7**

East Africa

Country	Per capita total health expenditure (USD)	Per capita private expenditure (USD)		
		Total	Prepaid	%
Burundi	21	13	5.0	38.6
Comoros	33	11	0.0	0.0
Djibouti	92	32	0.3	0.9
Eritrea	12	6	0.0	0.0
Ethiopia	16	8	1.6	19.9
Kenya	37	21	4.9	23.3
Rwanda	56	28	15.6	55.6
Seychelles	368	29	9.4	32.3
Somalia	NA	NA	NA	NA
Sudan	85	60	2.6	4.3
Tanzania	31	10	5.8	58.3
Uganda	47	37	13.5	36.4
Regional average	**37.3**	**22.2**	**4.9**	**26.8**

North Africa

Country	Per capita total health expenditure (USD)	Per capita private expenditure (USD)		
		Total	Prepaid	%
Algeria	178	39	2.1	5.3
Egypt	123	77	1.8	2.3
Libya	484	151	0	0.0
Mauritania	43	20	1.1	5.5
Morocco	148	92	12.6	13.7
Tunisia	238	109	14.2	13.0
Regional average	**158.4**	**75.5**	**4.6**	**5.7**

Southern Africa

Country	Per capita total health expenditure (USD)	Per capita private expenditure (USD)		
		Total	Prepaid	%
Angola	123	21	0.0	0.0
Botswana	615	169	119.1	70.5
Lesotho	109	26	8.1	31.0
Madagascar	18	8	2.5	31.7
Malawi	26	11	7.9	72.1
Mauritius	449	262	29.3	11.2
Mozambique	21	6	3.1	51.7
Namibia	361	150	123.1	82.1
South Africa	649	363	255.6	70.4
Swaziland	203	74	42.6	57.5
Zambia	73	29	9.7	33.3
Zimbabwe	NA	NA	NA	NA
Regional average	**247.0**	**126.6**	**84.8**	**45.4**

West Africa

Country	Per capita total health expenditure (USD)	Per capita private expenditure (USD)		
		Total	Prepaid	%
Benin	31	16	1.2	7.3
Burkina Faso	40	20	5.2	26.2
Cape Verde	155	39	0.1	0.3
Côte d'Ivoire	60	47	0.6	1.2
Gambia	26	13	6.7	51.6
Ghana	67	27	9.1	33.6
Guinea	23	20	0.1	0.6
Guinea-Bissau	47	42	11.0	26.2
Liberia	29	20	9.6	47.8
Mali	32	17	0.1	0.5
Niger	18	9	1.4	15.9
Nigeria	63	39	1.8	4.7
São Tomé and Príncipe	90	56	7.5	13.3
Senegal	59	27	5.8	21.5
Sierra Leone	43	38	4.0	10.5
Togo	41	23	3.6	15.8
Regional average	**53.9**	**32.2**	**2.8**	**10.6**

Note: — is not available.

Source: WHO 2012.

Notes

The authors wish to thank Dr. Agnes Soucat and Dr. Feng Zhao for their overall guidance and support. The paper greatly benefited from crucial inputs and support from Dr. Rüdiger Krech (Director, Department of Ethics and Social Determinants of Health, WHO, Switzerland), Mr. Jacques Mader (Regional Health Adviser, Swiss Agency for Development and Cooperation, Federal Department of Foreign Affairs, Tanzania), Ms. Mwihaki Kimura Muraguri (Associate Director, The Rockefeller Foundation, Kenya), Mr. Jean-Olivier Schmidt (Project Coordinator, GIZ, Germany), Mr. Jack Castle (Health Financing Expert, Clinton Health Access Initiative, Zambia), Mr. El Bashier Sallam (Manager, Islamic Development Bank, Saudi Arabia), Dr. Robert Hecht (Managing Director, Results for Development Institute, United States), Ms. Juliet Nabyonga (Health Economist, WHO, Uganda), Ms. Danielle Kuczynski (Global Program Manager, Clinton Health Access Initiative, United States), Mr. Meredith Kimball (Results for Development Institute, United States), Prof. Adel Ben Youssef (Professor, Université de Nice, France), Mr. Nikhil Desai (Independent Consultant, USA), Mr. Kennedy K. Mbekeani (Regional Economist, Southern Africa Resource Center, AfDB, South Africa), Mr. Chuka Aduba (Lead IT Expert, OSHD, AfDB, Tunisia), Mr. Carlos Mollinedo (Chief Strategist, Strategy Department, AfDB, Tunisia), Mr. Justin Murara (Chief Poverty Reduction Officer, OSHD, AfDB, Tunisia), Ms. Bineta Ba-Diagne, Chief Health Economist, AfDB, Burkina Faso), Mr. Kalayu Gebre-Selassie (Principal Governance Expert, Governance, Economic and Financial Management Department, AfDB, Tunisia), Mr. Ibrahim Sanogo (Principal Health Analyst, AfDB, Côte d'Ivoire) and Ms. Emily Carter (Intern, OSHD, AfDB, Tunisia). The authors thankfully acknowledge their help and support.

1. Organization of African Unity 2001.
2. AU 2003.
3. They agreed in Abuja to allocate at least 15% of their national annual budgets to health.
4. UNDP 2013.
5. UNCDF 2005.
6. AfDB and others 2012.
7. World Bank 2010.
8. Elimination or minimization of harmful financing practices and coping strategies, and provision of insurance.
9. IFC 2007.
10. According to the Global Health Observatory, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Egypt, Eritrea, Guinea, Guinea-Bissau, Mali, Mauritius, Morocco, Nigeria, São Tomé & Príncipe, Sierra Leone and Sudan have reported OOP spending in excess of 50% of total health expenditure.
11. ILO 2012.
12. WHO 2010.
13. UN DESA 2006.
14. Lassiter 1999.
15. A practice based on Islamic principles that provides transfers to the poor and vulnerable.
16. McCord and Slater 2010.
17. AfDB and others 2012.
18. WHO 2012.
19. WHO 2010; Durairaj and Evans 2010; Preker 2005.
20. WHO 2010.
21. Financial risk exists in all spheres of health activities such as health promotion, maternal health, disease prevention and control, treatment, care and support, disability management and rehabilitation.
22. AfDB others 2012.
23. Data for Somalia and Zimbabwe are unavailable.
24. Spaan and others 2012.
25. Durairaj, D'Almeida and Kirigia 2010a,b; Dukhan, Preker and Diop 2013.
26. Government of Rwanda 2010.
27. Soucat 2012.
28. WHO 2012.
29. Government of Senegal; Tabor 2005.
30. WHO 2012.
31. Tabor 2005.
32. Bultman and others 2012.
33. Ifakara Health Institute 2012.
34. World Bank 2007.
35. Strategic purchasing is the streamlined process of paying for health services.
36. Risk pooling is the accumulation and management of resources in such a way that the financial risk of paying for health services is borne by jointly all members of the pool, not only by the needy.
37. Soors and others 2010.
38. WHO 2010.
39. WHO 2006.
40. The actual size of health care inequities of the less developed regions and countries, however, is either unknown or understated due to paucity of data, as many are not connected with formal health care systems and their health and illness status may not be entirely known.

41. Durairaj, D'Almeida and Kirigia 2010b.
42. Durairaj, D'Almeida and Kirigia 2010a.
43. Soors and others 2010.
44. Creese and Bennett 1997.
45. Weinberger and Jütting 2000.
46. WHO 2010.
47. As in the case of insurance arrangements mainly targeting the better-off, the formal sector or civil servants.
48. Ly and others 2013.
49. Financing of outpatient care is crucial to expand population coverage and reducing OOP spending, particularly for the poor who often require high-frequency, low-cost conditions (antenatal/postnatal care, common ailments and minor injuries) but timely interventions (consultation, basic diagnostics and medicines). Outpatient care is also relevant for high-frequency, high-cost conditions (management of chronic diseases). These conditions, left untreated, become high-cost catastrophes. If health insurance ignores this aspect, it results in more and expensive claims and high premiums. Untreated minor ailments also come in the way of Millennium Development Goal attainment.
50. This is not to deny the specific role of short-term instruments. Short-term or transitory instruments like financial transfers or community-based health insurance may have to be developed in areas where it will take longer to develop lasting measures. However, support to such mechanisms should be within the context of the national vision to ensure universal health coverage.
51. Durairaj and others 2010.
52. Durairaj and others 2013.
53. DFID 2011.
54. Durairaj and others 2010.
55. Doetinchem, Xu and Carrin 2008.
56. Niringiye and Ayebale 2012.
57. UNDP 2013.

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CHAPTER 24

Partnering for better hospitals

Caroline Jehu-Appiah and Eric de Roodenbeke

In recent years Africa has undergone an economic transformation characterized by continuous growth, an emerging middle class, a demographic dividend, technology take-off and prospects of prosperity and innovation.[1] With rising urbanization, an epidemiological transition and an aging population, demand for hospital care will rise. Hospitals must evolve to meet the needs of the new Africa.

Yet health systems are in crisis, and Africa lacks the health infrastructure to provide adequate health care services, which in most of Africa are the worst in the world (see chapter 12).[2] Public sector managerial capacities are generally inadequate, and the institutional and organizational arrangements do not promote good hospital performance. Measures of access to and quality of health systems trail those in other regions, and the poor suffer disproportionately. Between 2010 and 2020 African countries will need to invest an estimated USD25 billion–30 billion in health care assets, including hospitals and clinics, to meet the region's health care demands.[3] Because these investments cannot be met by the public sector alone, the private sector must be an integral partner in closing the resource gap.

African countries also need to leverage the opportunities from information and communications technology (ICT) in terms of e-health to transform hospital service delivery; the results so far have not lived up to earlier expectations. Mobilizing e-health could give African countries an opportunity to improve governance, empower clients and overcome challenges in access and human resources so as to deliver higher-quality services (see chapter 28).

Recognizing these challenges and opportunities, a New Hospital Model for Africa is being proposed that would promote deployment of modern technology to transform services, support private sector engagement and participation and improve the quality of hospital services. These priority interventions will help ensure that investments will indeed improve the performance of hospitals across the region to fully support national public health priorities.

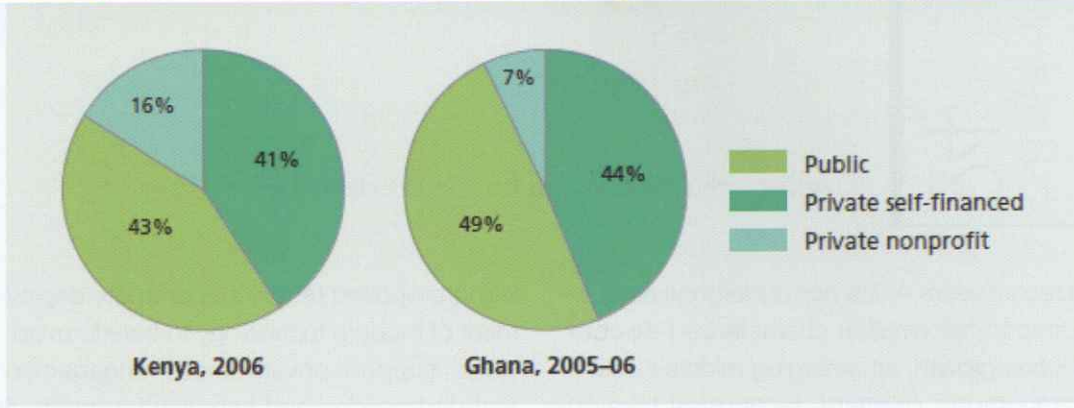
Some facts about Africa's hospitals

Hospitals in Africa vary in size, functions and ownership. In most African countries district hospitals are the first referral point for primary care centers. Regional or provincial hospitals are the second referral level, responding to the health needs of patients not treatable in frontline hospitals. Tertiary hospitals, which offer the most sophisticated care, are often linked to universities where doctors are trained. Hospitals provide largely curative and rehabilitative services. Their prevention and promotion activities are low to moderate, with great variation between hospitals and between countries.

Public hospitals are owned and run by governments, private not-for-profit hospitals by faith-based organizations, and private for-profit hospitals by commercial enterprises. How the three types are distributed within a country varies considerably. Generally, however, large proportions of hospitals provide free or subsidized care. Ghana and Kenya fall fairly close to the regional average (figure 24.1).[4]

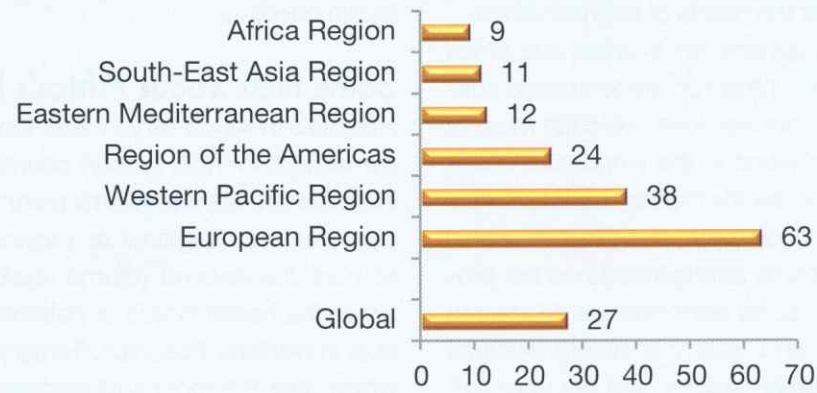
In Africa huge hospital infrastructure deficits are typical. The continent has the world's highest mortality and highest disease burden—but the lowest bed population ratio, with only nine beds for every 10,000 people (figure 24.2).[5] Although bed numbers vary

Figure 24.1 **Distribution of hospitals by ownership type, Ghana and Kenya**



Source: Barnes and others 2010.

Figure 24.2 **Hospital beds per 10,000 people, by region, 2000–2009**



Source: WHO 2012.

considerably by countries, they are insufficient everywhere, especially in view of rising demand.

Africa also has fewer qualified medical personnel than anywhere else. Sub-Saharan Africa has just 3% of the world's health workers[6] and the lowest doctor ratio in the world: only two physicians for every 10,000 people (figure 24.3). Recent decades have seen little progress, although countries in other regions—India and Morocco, for example—have seen physician and nurse densities increase by 200–400% over the past 40 years. Africa's situation remains bleak by contrast, with a dire need for highly qualified health professionals.

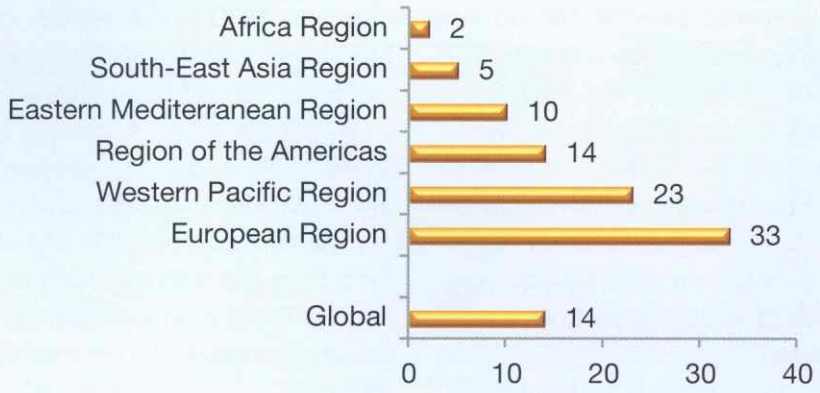
Although substandard care is common throughout the continent, the quality of care varies within and between countries. For example, Tanzanian women in the richest quintile are four times more likely than those in the poorest quintile to receive all five prenatal care services.[7] Similar large gaps persist elsewhere (figure 24.4). Some reasons for these disparities are that oversight is poor and regulations not well enforced. Improving maternal and child care outcomes in Africa will require improvements to hospital-based care—and to hospital performance.

Why give more attention to hospitals?

Economic growth is on track in many African countries. That growth—along with extended health coverage through insurance—will boost demand for diagnosis and care, triggering new public and private investments in hospitals and health care service delivery.

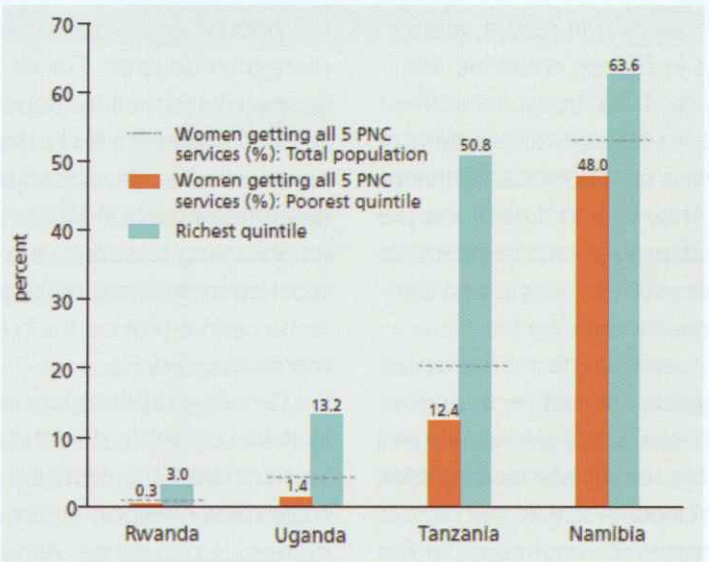
These new investments in Africa's hospitals will be crucial to achieving universal health

Figure 24.3 **Physicians per 10,000 people, by region, 2000–2009**



Source: WHO 2012.

Figure 24.4 **Prenatal care, within-country disparities**



Source: IFC 2011.

coverage. Such coverage requires that all people obtain the health services they need without the risk of severe financial problems from paying for them.[8] To advance universal health coverage, many African countries are increasingly using health insurance, which has boosted demand for hospital care as in, for example, Ghana and Rwanda (box 24.1). Investing in hospitals to provide access to quality health services is a prerequisite for universal health coverage.

With proper financing mechanisms, hospital costs can be less impoverishing. Some studies have shown that hospital inpatient and outpatient care usually benefits the richest

Box 24.1 **Hospitals work for the poor, Ghana and Rwanda**

In Ghana health insurance enrollment reduced out-of-pocket spending by 86% and helped protect households against catastrophic health spending. The proportion of outpatient visits increased from 56% in 2010 to 82% in 2011.

In Rwanda 29–36% of uninsured households incurred catastrophic expenditure versus 7–18% of insured households.

Source: Ghana Health Service 2011; Makaka, Breen and Binagwaho 2012.

quintile of the population.[9] The issue of inequity is not related to the hospitals themselves, but to financing mechanisms that do not cover hospital expenses in low-income countries. To make hospitals work for the poor, it is necessary to establish proper financing mechanisms, especially for inpatient care, as there is less risk of abuse than with outpatient care. In countries where health care is funded by mandatory health insurance, hospitals can become pro-poor, as seen in some Asian and African countries.[10]

As a major input into the health industry, hospitals can contribute to the investment climate and industrialization. Investments in hospitals can foster economic growth and job creation. The BRICS, such as China, have recognized this, investing in recent years in building hospitals in African countries. Similarly, the Japanese Tokushukai investment firm is proposing to finance 20 "centers of excellence" hospitals across Africa, for teaching and training. They should create new job opportunities and profiles, make hospitals more attractive for youth to work in and stimulate yet further investments.

To neglect hospitals—the flagship of health service delivery—would be to neglect a major factor in sustained economic and social development, especially for countries moving to middle- income status.

After heavy hospital investments in the 1980s and 1990s, most development agencies turned away from hospitals and toward primary health care, with a focus on major diseases and causes of mortality. Despite measurable results, continuing along this path will not put Africa on track to meet the Millennium Development Goals (MDGs).

Africa now faces a double burden, from communicable and from noncommunicable diseases (NCDs), but will see demand for hospital care surge mainly because of major NCDs.[11] One cause of this rise is epidemiological transition. Another is the growing share of the population represented by the aging, who require more chronic care: the number of people over 75 in the continent will jump from 17.6 million in 2015 to 67.9 million in 2050. Preventive measures and health policies by themselves will not meet the needs of the aging.

More generally, Sub-Saharan Africa's hospital network has not grown with its population: countries still rely on referral hospitals built more than 20 years ago, though the population in many countries has since more than doubled. For all the wide disparities between countries (table 24.1), Africa as a whole suffers from a shortage of beds compared with the developed world—especially given the increase in NCDs. Constructing and rehabilitating hospitals is a high priority for most countries, and national public budgets alone cannot provide the huge capital investments required.

Growing urbanization is another factor in the continent's demand for hospital services (figure 24.5). Hospital care is often the most efficient option for serving a dense and numerous population. Although Africa is still the least urbanized continent, it is expected to be 60% urban by 2050 (see chapter 3).[12]

Investing in hospitals requires planning ahead to guarantee that the infrastructure will meet the population's future needs. For most of the last decade African health care investments have addressed major access

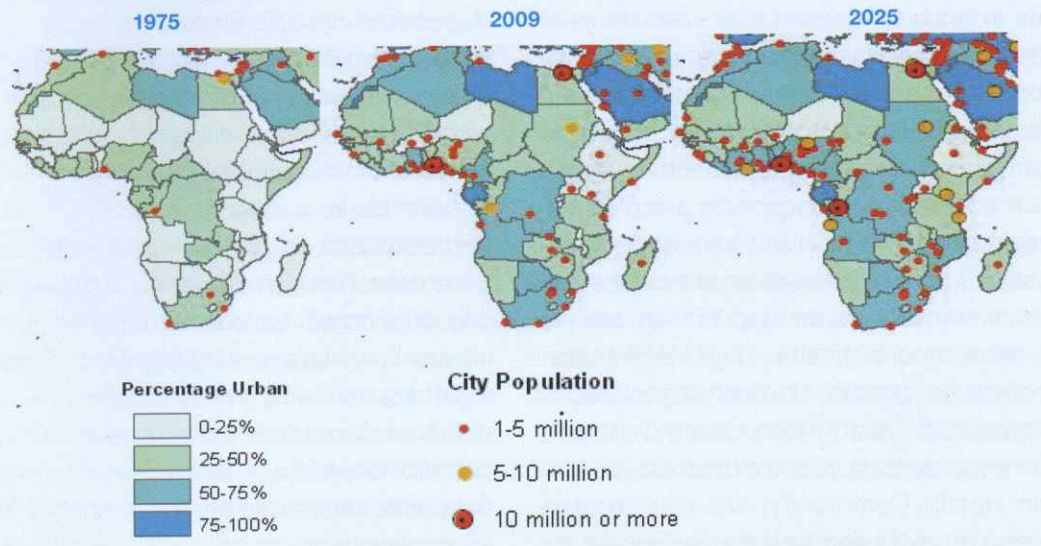
Table 24.1 **Hospital beds, developing and developed countries and regions**

	Region	Hospital beds for every 10,000 people
Developing world	Central Africa	43
	Southeastern Africa	13
Developed world	Western Europe	69

Note: Hospital beds are defined as inpatient beds in public, private, general and specialized hospitals and rehabilitation centers.

Source: Norris and Marano 2011.

Figure 24.5 Urbanization in Africa: 1975, 2009 and 2025



Source: UN-DESA 2009.

disparities, with a special concern for remote areas. Urbanization will require a shift in emphasis. Hospital investments must be evaluated not only by their immediate benefits to health but also as part of a geographical development strategy supporting harmonious national growth.

To stay on track for economic growth and social development, countries need to invest in making the health sector more efficient. Whereas health and other social services account for about 50% of public spending,[13] inefficiencies account for as much as 40% of all public health spending;[14] and of recurrent public health spending, 50–80% goes to hospitals.

Hospital investments should also focus on coordinating health services to ensure that vertical programs are well implemented and that stakeholders are fulfilling their roles. Because coordination of health services is now linked to the future of electronic medical records, ICT infrastructure will need to ensure long-term interoperability—consolidating all patient health information for access through a single portal. Hospitals will be at the center of this information exchange. Supervision of lower-tier facilities should raise the quality of care and improve the orientation of patients through the referral system.

Public safety is another consideration: hospitals are the first line of defense in a mass casualty catastrophe or a major disease outbreak. The United Nations has launched a hospital emergency preparedness program,[15] and the Katmandu declaration sets terms for government engagement in making hospitals more resilient to disasters.

Health workforce training, though traditionally often a function of university hospitals, can take place in hospitals at all levels. Mentorship is the best way to learn clinical skills, and a hospital is a reservoir of highly skilled health professionals. Accordingly, hospitals should be mobilized for updating training curricula and disseminating best practices.

The globalization of health care will also affect Africa. Globally, medical tourism has burgeoned over the past decade into a USD60 billion industry.[16] Africa has a claim to a share of this very exclusive niche market—after all, labor-intensive treatments are less expensive in low- and middle-income countries than in high-income ones. Today Africa's medical tourism industry is led by South Africa and countries in North Africa: hospitals and clinics in those countries are already vying to attract patients from around the world.[17]

Hospitals will remain a major industry for the foreseeable future, with a vital role

in the health system as a whole—and influence on patterns of medical and social care that extends far beyond their walls. In most countries hospitals employ about half of all physicians and two-thirds of all nurses.[18] As the principal setting for the education of doctors, nurses and other health care professionals, hospitals are also the main base for specialized care and clinical research. Tertiary hospitals will be the pillars of any effort to develop African centers of excellence in health. Regional integration and cooperation (through organizations such as the West African Health Organization and the East, Central and South African Health Community) will help in sustaining growth and setting objectives for national projects.

How to improve hospital performance in Africa?

To bridge the gap between current trends and future needs and to build a vibrant, well- performing hospital sector, a New Hospital Model for Africa is being proposed that focuses on promoting the deployment of modern technology (e-health) to transform service delivery; supporting private sector engagement and participation; and improving the quality of care and hospital performance.

Deploy modern technology

Medical practice has become increasingly dependent on ICT. E-health is in its initial stages and may reconfigure health service delivery; it will enhance access to services without the need for so many frontline health workers. No doubt it will also rely on strong hospital-based support.

In addition to poor hospital regulation, governance and infrastructure, most African countries do not have state-of-the-art health information management systems. Despite legal requirements, private sector data are poorly captured and in most countries registration of private providers is poor. As a result, the public and private sectors exchange little information—it is not easy to know who does what. Moreover, most staff members, especially at lower levels, lack the skills to interpret and use data for decisionmaking.[19]

By allowing health systems to capture, transmit, store and retrieve information accurately and timely, ICT expands the possibilities for evidence-based health care, training and research (see chapter 17). It also supports mobile phone applications—m-health, telehealth or telemedecine—that already cover a wide range of activities, at present mostly in East and South Africa (figure 24.6). South Africa's Tsilitwa Telehealth Project illustrates the use of m-health to make up for the lack of

Figure 24.6 **M-health programs in developing countries**

Source: United Nations Foundation and Vodafone Foundation 2009.

doctors in rural areas (box 24.2). Future infrastructure expansions will enable Africa's hospitals to practice telemedicine in other ways, even allowing physicians in different hospitals and around the world to participate virtually in surgical operations.

As ICT and e-health reconfigure service delivery, hospital infrastructure will need to be transformed. To be sure, one purpose of e-health is to enhance access to care without requiring many more frontline health workers. Yet e-health must also rely on hospital-based support, which means that it will concentrate health workers around platforms offering access to medical devices and to knowledge management. Such platforms are best placed in hospitals, where they can benefit the patients who need them most—those requiring multiple competencies and relying on sophisticated medical devices.

Managing the technological transformation of hospital management databases—particularly in finance, staffing, patient information and client services—will require national ICT policies and plans. Improvisation is not an option. Prospective users of new technologies must be consulted early in planning to ensure that new technology and current processes can be aligned and will be financially sustainable. Accordingly, countries will need support if they are to establish sturdy hospital ICT infrastructures.

Hospitals will also need technical assistance to use electronic medical records to coordinate information. Such systems will be central to managing both health and administrative data. Their adoption will require change management, with identified champions.

Much as all hospitals will need to adopt new technologies and management processes, so all can be involved in research and innovation. Research should not be regarded as the domain of university hospitals. In fact, various types of hospitals participate in research, in both developed and developing countries. Drug trials, needed to license new drugs, often rely on the large numbers of patients available in hospitals. But the high degrees of competence clinical trials require can usually be found only in large, advanced hospitals.

African countries will need to build human capacity for e-health. Systematic education for health personnel must be at the heart of any strategy designed to facilitate e-health (see chapter 11). ICT curricula should be introduced into all health training institutions, and e-health training should be part of continuing education programs for health workers. Local academics and researchers as well as external technical experts should be active in these efforts. Countries should consider establishing centers of excellence to train e-health professionals so as to reach a critical mass of expertise for service, training and research.

Engage the private sector

As rising costs and budget constraints bring Africa's public hospitals to a point of financial crisis, how can countries make hospitals viable while improving the care they

Box 24.2 Tsilitwa Telehealth Project, South Africa

This government-sponsored program allows rural nurses to consult remotely with doctors by speaking and sending pictures through wireless telephony. Some development impacts:

- The project serves 10,000 people in the rural Eastern Cape.
- There is no doctor at the one clinic in Tsilitwa, so this service gives patients access to doctors for which they would otherwise have to travel at least 10 miles.
- This model makes health care cheaper by avoiding additional transport and consultation costs.
- It makes health care more responsive because patients do not have to waste time traveling or in waiting rooms.
- It improves health care quality because it enables nurses to more easily consult a doctor.

And there is potential for growth such as expanding the network to other rural areas as possible given growth in rural teleconnectivity across the continent.

Source: IFC 2007.

give? One solution is public-private partnerships (PPPs).[20] The private sector already provides a large share of health services in all African countries—as much as 50%—and it is still growing.[21] While its importance varies by country, it is too large to ignore. Of the roughly USD55 billion spent on health care in Africa in 2007, 55% came from private parties, mostly individuals.[22]

Although the private sector is often perceived as catering to the rich, studies consistently show that it serves all income groups (figure 24.7).[23] It provides services and products that might not otherwise be available, such as advanced medical equipment and procedures. And in many cases its services are of higher quality than those in the public sector.

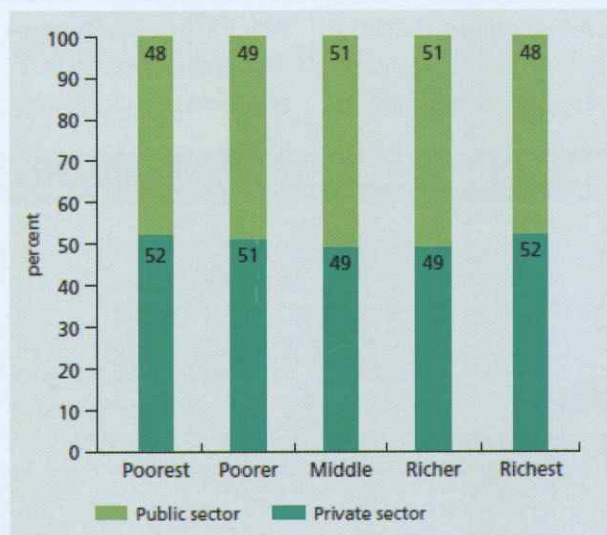
But national regulatory systems have not evolved with the growth of the private sector. Little is known about the services the private sector provides, the resources used, the volume of its activities or the types. The private sector is often not fully covered in national statistics on health service delivery.

PPPs show promise for improving hospital care in Africa. Hospitals directly managed by the government perform poorly in many developing countries, and attempts to improve them through reforms of internal management have failed. Yet PPPs have proved difficult to implement in many countries, mainly because institutions, processes and procedures for delivering these types of projects are inadequate. PPP projects rely on a public sector that can readily adapt to new roles. Their managers must be skilled at making partnerships work through negotiation, contract management and risk analysis, and should be able to manage networks of different partners.[24]

Two promising uses of PPPs are for outsourcing and for contracting out.

- *Outsourcing.*[25] Used by health managers to save on costs, outsourcing can save about 6–12% after accounting for the cost of the contracting process, usually about 2%.[26] In health care the most widely outsourced functions are information technology (29%), finance (20%) and support services (19%).[27] Public hospitals in particular can fill human resource gaps through outsourcing,[28] providing health care services quickly and easily without capital investment or additional staffing.[29] The proper management of outsourcing requires understanding outsourcing strategy, the benefits and risks, the evaluation process and the methods of managing outsourcing providers.[30]
- *Contracting out.* Another approach to cost savings, contracting out is credited

Figure 24.7 Source of health care in Sub-Saharan Africa, by wealth quintile and sector



Source: IFC 2011.

with reducing Africa's total disease prevention budget by an estimated 13–17%[31] even as it improved access to services.[32] A systematic review of studies in developing countries showed that contractors were more effective than government providers in both coverage and quality of care.[33] An evaluation of Rwanda's pay-for-performance scheme for prenatal care found statistically significant improvements in maternal and neonatal health indicators—though it cautioned that efficiency gains from contracting are contingent on the government's efficiency as a purchaser in designing efficient contracts, effectively monitoring contractor compliance and making appropriate decisions about contracts.[34]

Able to assume many forms, PPPs can entail various degrees of private sector responsibility and risk. One example is Lesotho's PPP structure (box 24.3).

If the business community is to invest in hospital infrastructure and managed health care, African countries need policies and regulations that enable and encourage such investments and promote institutions, processes and procedures for delivering PPP projects. The challenge is not just to create new institutions: it is also to build public expertise in administering them. The first need, then, is for public and private capacity to manage contracts.

Improve quality of care and hospital performance

Strengthening national health systems is a priority for major development donors. Improving hospital performance will mean improving health systems generally.

In Sub-Saharan Africa hospitals generally perform poorly. Estimates of their technical efficiency in five countries showed that most were inefficient, with room for performance improvements.[35] Hospitals are also plagued by chronic underfunding, poor human resource management, disconnect from national health systems and a predominantly curative orientation, with little preventive and health-promoting care.

In many countries hospital regulations are not followed because of problems with governance. Poor hospital management is exacerbated by a lack absence of incentive and reward systems and comprehensive appraisal systems.[36] The health sector

Box 24.3 The Lesotho PPP experience

The Lesotho health care PPP is a first for Africa. It has demonstrated that it is possible for a low-income country to embark on a very ambitious project that is affordable for the country and patients, is attractive to top-quality private investors, expands services to more people and has the potential to deliver high-quality health services that address the Millennium Development Goals and the critical shortage of health professionals.

The Lesotho PPP differs in that the private operator, the Tsepong consortium, in addition to designing, building and fully operating the hospital, will deliver all clinical services for providing vastly improved high quality health care services at an affordable cost. Specifically, the project differs in the following:

Complete service delivery. Tsepong is responsible for all clinical service, including recruiting doctors, nurses and other health care professionals and providing all medical equipment and pharmaceuticals necessary for clinical service delivery.

Service payment. The private operator delivers budget certainty as well as patient centered care, assuming full patient risk from project inception aging to treat all patients regardless of condition up to maximum of 20,000 inpatients and 310,000 outpatients a year. The government provides Tsepong with an annual fixed service payment for the delivery of all services factoring annual inflation.

Performance monitoring. The Lesotho PPP has an independent evaluator who performs quarterly audits of the private operator. This includes a typical performance monitoring such as payment and penalty mechanisms related to facilities management, equipment and other nonclinical services outcomes. Monitoring is done using a detailed list of both clinical and nonclinical indicators that the private operator must meet to receive full payment from the government. In addition the private operator is required to obtain and maintain accreditation from the Council of Health Services Accreditation of Southern Africa.

needs not only to train competent managers but also to streamline its policies, procedures and clinical governance systems, introduce costing and a cost analysis culture and generally modernize its financial management and human resources management. Both national health ministries and local authorities need greater capacity for stewardship of hospitals.

Health systems can be strengthened, and health institutions reformed only in countries with the political will to reform the public sector and improve hospital services. Comprehensive hospital governance reforms should address information, strategic planning, finance and budgeting, human resources and labor relations, service delivery and medicine and technologies—and ensure accountability. In addition, good governance criteria should be integrated into the PPP process.

Reforms should introduce modern procedures in hospital management and give hospitals more autonomy so that managers can be more flexible and hospitals more efficient. Such reforms will require greater managerial capacity. While management capacity must be improved throughout health systems, it is especially urgent to build national hospital management capacity. Developing countries have few of their own hospital management programs. An innovative Master of Hospital and Healthcare Administration program in Ethiopia demonstrates an approach that can be helpful in other countries with similar challenges and constraints.[37]

Still, management and leadership training alone will not significantly improve public hospitals. Only substantial structural reform can avert long-term decline.[38] Beyond skills training, hospitals need changes in their social and organizational structures.[39] With technical and financial support from bilateral donor agencies, programs in Ethiopia and Senegal have addressed this concern by mobilizing hospital management teams to show that hospital performance can be enhanced and the quality of care improved.[40] Clinical governance can bridge the gap between managerial and clinical cultures, bringing together the often separate tasks of management and quality assurance.[41] Communities should also be involved in the health system and hospital management. Here, too, Ethiopia offers lessons about the benefits of accountability and giving citizens a voice to improve hospital performance.

Regulations are often inappropriate or outdated, and enforcement is poor across the region. (A notable exception is South Africa, where the private health sector—one of the best in the world—is highly regulated, and the regulations are strictly enforced.) Regulatory compliance can be encouraged with such incentive systems as performance-based payment, provider payment mechanisms, quality improvement, leadership and management development, e-health, telemedicine and capital productivity improvement. Specific interventions can be developed with technical assistance from donors and other African countries. Because many development agencies already support such interventions, dialogue is needed early on to avoid duplication and competition with existing initiatives.

Capacity needs to be built for measuring hospital performance. Measurement is central to quality improvement because it provides a means to define what institutions actually do and to identify opportunities for improvement by comparing actual performance with set targets. Communities can contribute to some aspects of performance measurement.

Similarly, support is needed to build hospital accreditation systems. African countries are behind the rest of the world in developing quality assurance programs and accrediting hospitals, which contributes to the poor quality of their hospital care. Such systems should use performance measurement to evaluate hospital compliance with organizational—and, increasingly, clinical—standards. One option is an accreditation system under the authority of a national or regional organization. The embrace of social health insurance by many African countries is likely to drive improvement in hospital accreditation: if accreditation is made a condition of insurance reimbursements to hospitals, mediation

by the providers could make up for gaps in the government's ability to enforce regulations. The intermediation of the insurance system may thus alleviate government capacity limitations in enforcing regulations.

In turn, health insurance providers must increase their capacity for universal health coverage. Expertise should be sought from countries known for their success in this area and for providing high-quality health services, such as South Africa.

There is a need for more investment in hospital infrastructure as part of national hospital development plans. Creating the health care assets necessary to meet growing demand over the next decade—will require an estimated USD25 billion–30 billion in new investment.[42] A study based on 42 African countries estimated that the continent's total need for hospital beds would rise by 12,250 annually after the year 2000: in other words, with each passing year the region requires 160–240 new hospitals.[43] Meanwhile, Africa's current hospital network is in dire need of rehabilitation.

A new strategic approach to hospital infrastructure investment is needed—one that ensures value for money and imposes accountability for efficient, inclusive service delivery. National infrastructure development plans should set out clear strategic priorities for hospitals, periodically updated, with definite guidance for external public and private donors. These steps would facilitate the mobilization of development funds for hospitals.

Creating regional centers of hospital excellence is a controversial topic in the sector. Countries are becoming less content to look abroad for tertiary health services and more determined to acquire their own expertise. In the choice between obtaining services abroad and developing domestic capacity, questions about appropriateness and efficiency arise. Even so, the emergence of medical tourism suggests that centers of excellence might prove sustainable.[44]

Finally, analytical work is needed to inform decisionmakers and allow fine-tuning of interventions. Africa's hospital sector is poorly documented and lacks a platform for knowledge sharing (though the World Health Organization and International Hospital Federation are conducting an African hospital census). Development partners working toward harmonization and alignment should consult with each other to ensure that hospital systems are on board. Universities and professional organizations should inventory practices in public and private hospitals, where many best practices remain to be found and shared. Countries that pilot initiatives and innovations in e-health, telemedicine, PPPs and results-based financing will provide the evidence base to trigger reforms in the hospital sector.

Notes

1. AfDB 2012.
2. WHO 2010.
3. WHO 2010.
4. IFC 2011.
5. WHO 2010.
6. WHO 2006.
7. IFC 2008.
8. WHO 2010.
9. McIntyre and Ataguba 2010.
10. Meessen and others 2008; Akazili and others 2012.
11. de-Graft Aikins and others 2010; Enwonwu 2008.
12. AfDB 2013.
13. Van Lerberghe, Bethune and De Brouwere 1997.
14. WHO 2010.
15. http://safehospitals.info/index.php accessed July 2010. The program also includes schools.
16. MacReady 2007; Crone 2008; Keckley and Underwood 2008.
17. According to the South Africa Medical Tourism Magazine of 9.5 million foreign tourist arrivals in South Africa last year, 410,000 were medical tourists.
18. WHO 2006.
19. Loevinsohn 1993.
20. UNECE 2008.
21. IFC 2011.
22. World Bank 2010.
23. Marek and others 2005.
24. Taylor and Blair 2002.
25. Outsourcing is contracting with another company or person to do a particular function while off-shoring simply means having the outsourced business

functions done in another country. Off-shoring is another type of outsourcing.

26. Hodge 2000.
27. Shinkman 2000.
28. Hsiao, Pai and Chiu 2009.
29. Haley 2004.
30. Roberts 2001; Quinn 2000; Jennings 1998.
31. Marek and others 1999.
32. Liu, Hotchkiss and Bose 2008.
33. UNECE 2008.
34. Basinga and others 2010.
35. South Africa (Zere 2000); Benin (Kirigia and others 2010); Ghana (Osei and others 2005); Kenya (Kirigia, Emrouznejad and Sambo 2002); Namibia (Zere and others 2006).
36. Increasing hospital autonomy alone is not enough: http://www.ihf-fih.org/en/Resources#toc_460, accessed April 12, 2013.
37. de Roodenbeke 2011.
38. von Holdt and Murphy 2007.
39. Puoane and others 2008.
40. Bradley and others 2008; http://info.worldbank.org/etools/docs/library/233097/Reform%20Hospitaliere/htm/143_Domaines.htm, accessed January 2011.
41. Clinical governance is defined as a framework through which national health system organizations are accountable for continuously improving the quality of their services and safeguarding high standards of care by creating an environment in which excellence in clinical care will flourish (Freeman and Walshe 2004).
42. Van Lerberghe, de Bethune and De Brouwere 1997.
43. The estimated evolution of the number of beds in 42 African countries assumes the 1990 median population/bed ratio is kept constant up to 2025. Population estimates for 2000 and 2025 are based on a medium fertility decline scenario.
44. Feasibility studies are under way for the Tokushukai hospital group, which aims to develop hospital centers of excellence across Africa.

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CHAPTER 25

Engendering development

María José Moreno Ruiz, Mona Sharan and Loubna Bourkane

Gender equality is integral to sustainable development and an essential ingredient for economic progress. When women and girls have the means to fully participate in and contribute to socioeconomic development, societies and nation states benefit. Increasingly, gender equality is recognized not only as a rights issue but also as "smart economics": it enhances individual lives, social cohesion and economic efficiency—and boosts development.

Increasing gender equality contributes to inclusive growth. The review of the literature demonstrates a correlation between economic development and gender equality, women empowerment and the protection of women rights. Duflo (2011) found that growth will not be enough to overcome discrimination in the home and in a number of domains and that the connections between the two spheres are complex. Kabeer and Natali (2013) found in research carried out in Egypt, Ghana and Bangladesh that increased gender equality, especially in education and employment status, contributes significantly to economic growth. However, their research also found that the impact of economic growth on gender equality is less consistent, and that reduction of gender gaps even in the context of growth needs specific action addressed to this goal.

Gender diversity, the inclusion of women, increases the productivity of companies. Productivity gains from women's inclusion in the labor market, and in the board rooms, come from the variety of ways women bring added value to their workplaces, such as high education levels and alternative labor practices. A 2013 report by the International Financial Corporation shows that for male-dominated industries, removing obstacles for women to enter these occupations could trigger productivity increases by up to 13–25%.[1]

Gender inequalities and the exclusion of women shape the construction of identities of men and women, and are therefore reflected in the different spheres of social organization, including the economy, a major pillar of society. But gender hierarchies limit, in particular, women's options. Gender inequality affects both men and women, but is considered a women's human rights issue as its common expression in patriarchal societies is the reduction of women's access to education, autonomy, decisionmaking, political representation and decent employment and income. Gender discrimination is also often expressed and maintained through violence. Domestic violence, harassment, postponement of women's reproductive health needs, and customs and laws that enforce an inferior status for women damage individuals, societies and countries. Gender discrimination prevents half the population from fulfilling their contribution to their countries' development. The data in this chapter show the enormous unleashed development potential that could be realized by investing in women and girls and advancing gender equality.

Gender hierarchies also take a toll on men, who are often socialized to comply with hegemonic masculinity values that define them as competitive, aggressive, risk-seeking and able to provide economically. These values result in men's more frequent involvement in fatal violence, either as perpetrators or victims; addiction to alcohol, tobacco and other substances; and dangerous behaviors such as unprotected sex or drinking and driving. In conflict-ridden countries such as Sierra Leone, Somalia and Uganda, boys are more likely to be used as child soldiers.[2] In

some countries such as Lesotho, Namibia and Swaziland, boys are underperforming in school;[3] underachievement and higher dropout rates of boys have been linked to the transmission of masculine values.[4] Finally, unemployed or poor men not able to fulfil the traditional male role of provider are more vulnerable to feelings of inadequacy and even vulnerability to suicide.

Gender equality is intrinsic to human development. Societies that have made the greatest progress in human development and the respect of rights are generally the ones that have been the most successful in empowering women. Gender equality indicators, including women's mobility, economic autonomy and political and social empowerment, are inherent human rights and essential not only to women's well-being but also to the well-being of their children, communities and countries. A conceptual framework links investments in health, education and economic opportunities to improvements in women's labor force participation and productivity and in women's societal voice and empowerment (figure 25.1). These improvements will advance the three pillars of the human capital development strategy.

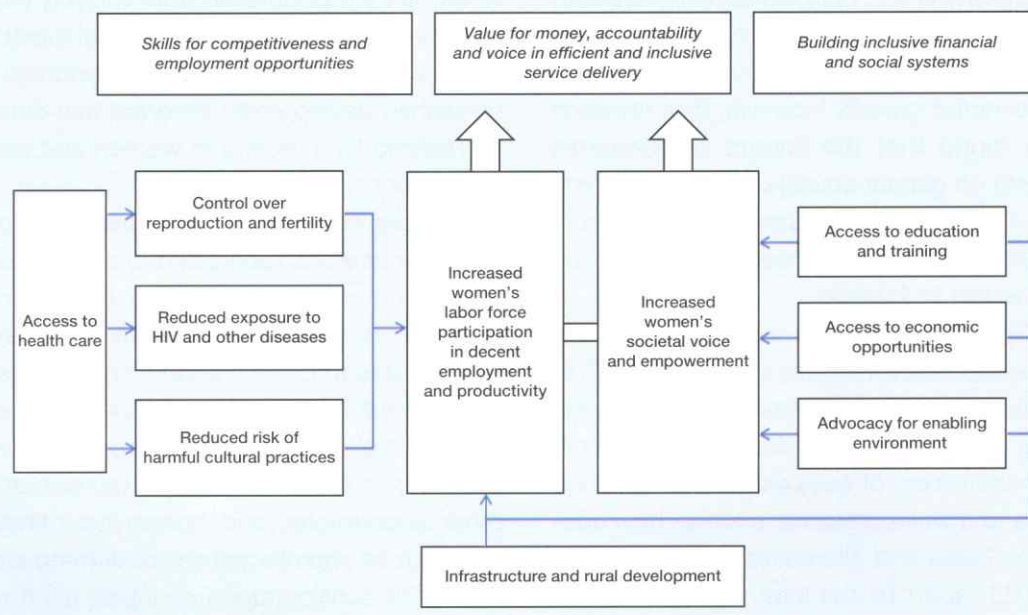
Gender inequalities in Africa

Research on gender in Africa has highlighted the detrimental impact of gender disparities on women's quality of life and on development. Because gender inequalities take different forms in different places, they must be measured in ways that capture specific social conditions. Various gender inequality indexes have been developed (see annex 25.1); their diverse quantitative and qualitative indicators reflect the multiple dimensions by which gender disparities can be measured and monitored.

Some African countries, such as Niger, Somalia and Yemen, severely restrict women's freedom and access to resources, opportunities and equal representation in social institutions, while others, such as South Africa, have made considerable progress in closing gender gaps. Insufficient availability of international data causes concern: "In 2009 only 13 African countries were included in the Gender Empowerment Measure (GEM). For all other African countries there were not sufficient international data available to compute to the GEM."[5]

Key domains of gender inequality include employment; legal status, rights and

Figure 25.1 **Conceptual framework**



Source: Authors.

practices; human development, including reproductive health and education; and political participation. Inequalities in these sectors reinforce each other—for example, a woman denied access to education is likely to experience more obstacles to favorable labor market conditions later in life. Gender must thus be addressed both within and across sectors.

Employment

Female labor force participation rates are high except in North Africa and a few Sub-Saharan countries. The labor for participation rate in Sub-Saharan Africa is 64.3% for women, compared with 76.7% for men. The highest rates are 90.7% in Burundi, 87.5% in Rwanda and 86.7% in Tanzania. The disparity is greater in North Africa (figure 25.2). The ratio of female to male labor force participation ranges around 0.3 in Egypt, Libya, Morocco and Tunisia. In almost all countries a higher share of women than men are engaged in vulnerable employment.[6] In Egypt and South Africa raising female employment to male levels could have a direct net impact on GDP of 34% and 10%, respectively.[7] Women's higher labor force participation does not translate into lower poverty rates, however, as average income and socioeconomic status indicate.

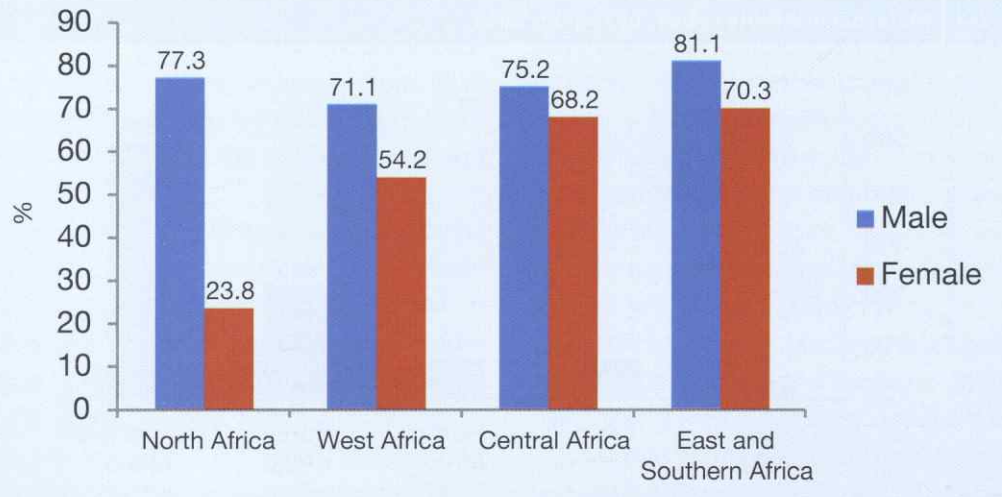
Most Sub-Saharan women are employed in agricultural production, services and industry (figure 25.3). Women are often employed in the informal sector or as family "helpers"; they are more likely to be unpaid workers vulnerable to harassment and abuse and lacking access to collateral and safety nets. Rising female labor force participation has not been accompanied by higher job quality and thus has not led to true socioeconomic empowerment.

Legal status, practices and rights

In most African countries family codes and customary practices give men greater access to property. Many countries continue to impose harmful practices on women, including forced polygamy, early marriage and female genital mutilation. About 3 million girls in the region a year are at risk for female genital mutilation, and about 92 million girls ages 10 and older have undergone female genital mutilation.[8] This practice—in addition to violating women's physical integrity and threatening their capacity to develop egalitarian, fulfilled relationships as adults—has serious health risks, such as "bleeding and infection, urinary incontinence, difficulties with childbirth and death."[9] And this practice exerts a substantial toll on health services, the justice system and productivity.

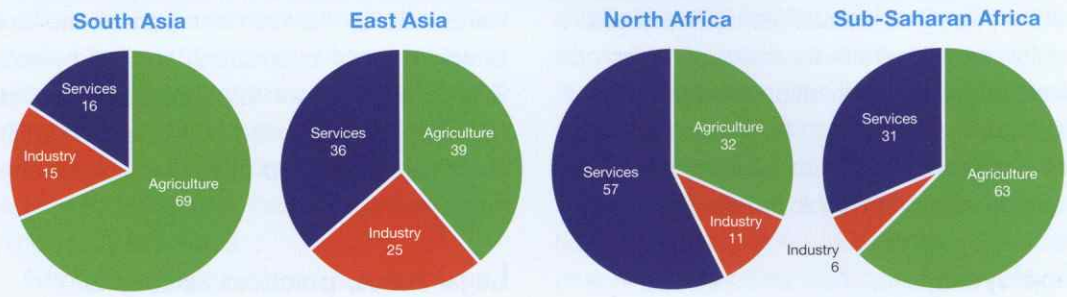
Appropriate legislation to address gender-based violence does not exist or is not enforced in most countries. A UNECA (2009) study of 12 African countries showed that

Figure 25.2 **Labor force participation rates, by sex and African region**



Source: World Development Indicators.

Figure 25.3 **Employment shares of women, by region and sector (%)**



Source: ILO 2012.

although 11 of the countries had enacted laws against domestic violence, all but one possessed insufficient human and financial resources to put the laws into practice.[10]

Women, particularly in Sub-Saharan Africa, have less available time than men, as their increased labor participation has not been matched by men taking greater responsibility for reproductive tasks taking care of dependents, and cooking or fetching water.

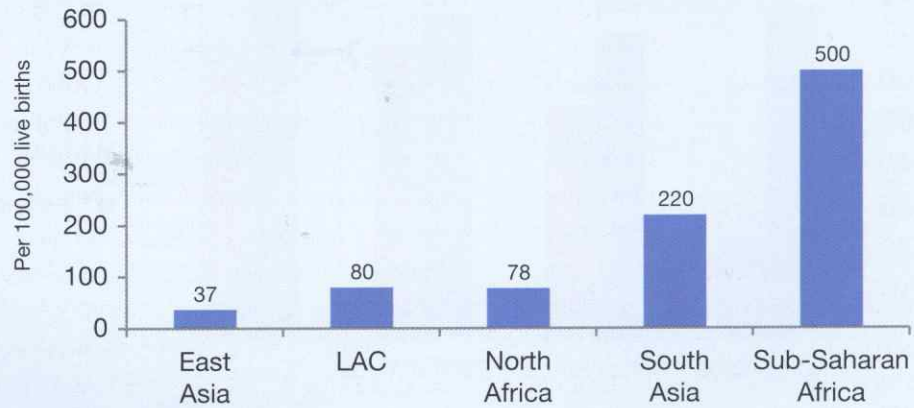
Human development

Human development gender disparities exist in education, reproductive health and access to political decisionmaking.[11]

Reproductive health. Africa has the highest level of maternal mortality compared with other regions, ranging from 36 deaths per 100,000 live births in Mauritius to 1,200 in Chad or Somalia (figure 25.4). Of the estimated 287,000 maternal deaths worldwide in 2010, Sub-Saharan Africa accounted for 56%.[12] African women are increasingly seeking care from health facilities, but they are more likely to seek care when they are not constrained by cultural restrictions. Access to health services ranges from 24% in Angola to 99% in Mauritius or Seychelles. The discrepancy between rising health care utilization rates and steady maternal mortality rates suggests poor health care quality. Further research is needed to explore health system characteristics that may undermine maternal health outcomes, especially in countries where maternal mortality rates remain high.

One of the biggest risks to African women's health is the prospect of repeated and unwanted childbearing. Women are more likely to die when they have many children and at a young age. Lack of control over fertility also makes women more likely to seek

Figure 25.4 **Maternal mortality ratios, by region, 2010**



Source: WHO and others 2012.

unsafe abortions, which raise the risk of maternal death.

Sub-Saharan Africa has the highest fertility rate in the world; its unmet need for family planning services is also very high, with contraceptive prevalence ranging from 4.3% in Sierra Leone and 5.4% in Chad to 60.3% in Algeria. The number of births per woman in African countries varies widely, from 1.8 in Mauritius and Tunisia to more than 6.0 in Uganda, Chad, Niger and Somalia. In the past 40 years the average number of births per woman in the continent has fallen only modestly—from 6.8 in 1967 to 5.1 in 2007—and the rate of increase of contraceptive prevalence is only about 0.5 percentage points a year.

Health risks for African women are compounded by the prevalence of infectious diseases. Sub-Saharan Africa is particularly severely affected by HIV/AIDS and women are at greater risk of infection than men: in 2009 about 12 million Sub-Saharan African women were living with HIV/AIDS, compared with about 8 million men. Three-quarters of all women with HIV live in Sub-Saharan Africa—young women ages 15–24 are worst affected, as they are as much as eight times more likely than men to be HIV-positive.[13]

Education. Africa has made substantial progress toward universal access to education, but quality issues remain. Primary completion ratio (females per 100 males) ranges from 43 in Chad, 54 in Benin and 56 in Central African Republic to 145 in Lesotho and about 110 in Botswana and Namibia. In secondary education the female ratio also varies—from 51 in Chad and 55 in Mali to 84 in Burundi or Mauritania, 108 in Egypt, 109 in Cape Verde and 115 in Mauritius.

This gender disparity has been attributed to the fact "that relatively few students are able to pursue higher education. When educational opportunity and resources are scarce, it seems that women are less likely to get them. Across Sub-Saharan Africa there are only about 62 female students for every 100 male students. In South and West Asia there are 74 women enrolled in tertiary education for every 100 male students.[14] The tertiary gross enrollment rate in Sub-Saharan Africa is 7.3% for men, compared with 4.8% for women.[15] Although women have pursued tertiary education and in some fields constitute large numbers, they continue to be a minority, especially in math, science and engineering.

Voice and political decisionmaking

African countries have among the lowest and highest levels worldwide of women's political representation. Representation rates in parliament range from 2% in Egypt and 3% in Comoros to more than 60% in Rwanda. Average percentages of women parliamentarians vary widely across world regions: "As of 1 July 2013, these [percentages] were: Sub-Saharan Africa, 20.9%; the Middle East and North Africa, 13.8%; Asia, 18.3%; the Pacific, 15.4%; Americas, 24.8%; Nordic countries, 42%; and Europe excluding Nordic countries, 22.7%."[16] At the local level, customs often discriminate against women: "women and young adults, for example, though not formally prohibited by rule, are often presumed to be represented by their husbands and fathers, respectively, and are customarily excluded from participation in the decisionmaking assemblies."[17]

These trends not only challenge women's human rights but also thwart opportunities for human development. Although African women are enrolling in schools, seeking health care and joining the labor market, they are not receiving optimal returns on their investment: autonomy, resources and opportunities continue to be distributed unevenly between women and men. Standard linear relationships between legal and political empowerment and human development outcomes—such as higher life expectancy, reduced maternal mortality, access to paid work and overcoming poverty and dependence—do not hold in all African countries. So a battery of indicators, together with qualitative research, is needed to categorize and change socioeconomic inequalities, gender hierarchies and obstacles to development. Limited availability and quality

of public goods and services, such as education, health care and economic opportunities, may entrench women's subordinate positions.

Rising female labor force participation rates could be perceived as an encouraging trend, but women are more likely to be employed in low-skilled, low-productivity jobs with wage gaps and glass ceilings, and have more difficulty accessing secure land tenure and credit. Women's participation in the labor market does not ensure them adequate income to rise out of poverty, nor does it grant women in patriarchal societies control over the use of their income. Some have argued that Sub-Saharan Africa's already very high and rising female labor force participation rates are due to persistent and pervasive poverty, making economic activity a necessity rather than an option.[18] In fact, the precarization of the world labor market has made it more difficult for households to subsist on a single adult's wages;[19] poverty has been linked to households where only one adult is at work.[20] To foster sustainable, inclusive development, female occupations must be valued and the labor market must provide secure work. Women's participation in the labor market at all levels will provide them with the necessary economic autonomy to break intergenerational poverty cycles and contribute to their countries' development.

Africa is at a critical juncture: unprecedented economic growth presents vast opportunities, but due to socioeconomic and gender inequalities, many women continue to be at risk of poor development outcomes. Despite greater political empowerment, labor force participation and service utilization, African women fare worse than women in other regions and their potential to be fully productive members of societies and economies remains untapped. Gender discrimination is an act of violence against women's fundamental human rights.

Unless concrete measures are undertaken to address gender gaps, women will remain a subordinate part of the emerging Africa, thus diminishing economic growth prospects and social and human progress. It is critical to invest in high-impact human development strategies that capitalize on empowerment and participation, catalyzing women's contribution to economic growth and social progress. Empowering women to fulfil their potential, participate in their societies' decisionmaking, make autonomous and responsible choices and fully contribute to the region's economic growth must be a priority in the development agenda.

Policy recommendations: High-impact strategies for development and gender equality

International experience shows that investment in women's empowerment through education, employment, access to family planning and reproductive health and to credit or cash transfers for results enables women to exercise more control over their life conditions and participate in household, community and national decisionmaking. These measures liberate women from traditional subordinate positions, giving them the opportunity to develop as integral human beings and citizens and leading intergenerationally to better outcomes for their children and helping their families overcome poverty.[21] Some key strategic investments can reduce gender disparities enormously and integrate women as equal members of Africa's emerging economies.

Sharpening women's skills through improved training and education, especially in science, technology and innovation, will serve Africa, and women, well. Although Africa has made substantial progress in primary education, parity challenges in secondary and tertiary education remain. Technical vocational education and training programs for women in entrepreneurship and with specific labor market needs can improve women's employment prospects and transform their lives. Emphasizing skills in science, technology and innovation to better respond to the demands of emerging African economies and increase opportunities for female employment and leadership will support efforts toward economic development and social progress. For

example, with the support of African Development Bank, the national authority of Côte d'Ivoire decided to introduce quotas in favor of female students among scholarship recipients to increase the proportion of female students in the science and technology streams (from 26% in 2013 to 30% in 2015).[22]

Improving women's access to entrepreneurship, financial resources and decent wage employment will increase their autonomy and empowerment and help break the cycle of poverty. This move requires improving labor market conditions to create more decent jobs and widening women's access to financial resources that allow them to design enterprises and save, borrow and insure. Such schemes should be tailored to women's needs, especially those of rural women and female heads of households—for example, by enabling access to collateral for credit and savings mobilization. Empowerment through microfinance can change the lives of some of the poorest women in Africa by not only alleviating poverty but also boosting their health, participation and leadership, but microfinance remains underdeveloped in Africa.

Increasing women's political voice through democratic governance with gender accountability programs can promote gender balance, empowerment and equality in development. Governance that emphasizes accountability, transparency, responsiveness and inclusiveness can effect social transformation. It influences how public resources are allocated and whether services consider both women's and men's needs and interests. Gender parity in decisionmaking in public office and at the household, community and local levels is necessary for better economic and social outcomes.

Investing in family planning, facilitating access to reproductive health care and preventing adolescent marriage and pregnancy will improve women's health and increase their education and employment opportunities, maximizing their potential to contribute to development. Access to family planning will likely reduce fertility rates, essential to capture the demographic dividend and the dependency ratio, which lies at the crux of economic growth (box 25.1).[23] Family planning not only improves women's health and autonomy but also maximizes human capital and reduces poverty.[24] A greater focus on reproductive health is also necessary to reduce maternal mortality.

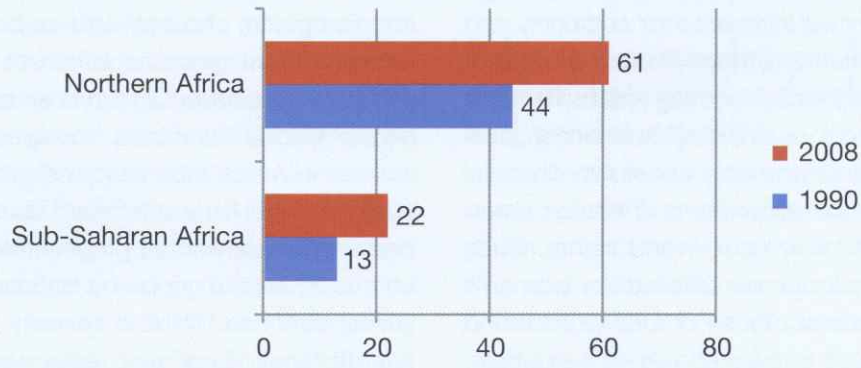
Improving life choices and opportunities for adolescent girls can stimulate their full potential as citizens and productive members of Africa's labor force. Young adolescent women in Africa face many risks, including early marriage, early and forced sexual debut, coerced sex, unwanted pregnancies, unsafe abortions, female genital mutilation and high susceptibility to HIV and sexually transmitted diseases. Economic opportunities for young women are limited, and early marriage or pregnancy frequently forces them to abandon school and become trapped in low-wage activities. When girls stay in school through adolescence, they delay marriage and pregnancy and acquire the skills and training needed to be healthy, empowered and productive adults. Incentivizing female enrollment at the secondary and tertiary levels and addressing contextual factors will improve young women's life prospects and development. Preventing early marriage and pregnancy also protects girls' rights. Early marriage is associated with a higher probability of gender-based violence and maternal mortality.

Developing rural infrastructure, secure land tenure and access to water and agribusiness can improve women's agricultural productivity. Since agriculture is the foundation of the African economy and women are its backbone, expanding secure land tenure and agribusiness can dramatically reduce poverty among women by increasing their access to an income. With equal access to and use of productive inputs, gender differences in agricultural productivity tend to disappear.[25] Giving rural women access to technologies and value-addition skills can thus reduce current

Box 25.1 Family planning: A North African success story

North African countries, including Algeria, Egypt, Morocco and Tunisia, have performed better than Sub-Saharan countries on family planning. Between 1990 and 2008 contraceptive use rose from 44% to 61% in North Africa, compared with 13% to 22% in Sub-Saharan Africa. Policies favoring family planning improved access to such information and services among North African women. The successes indicate best practices that can be replicated in Sub-Saharan Africa, where family planning remains a neglected priority.

Proportion of women ages 15–49 using any contraception (%)



Source: UNDP 2011.

disparities in productivity and income. Investing in rural infrastructure, including roads and other means of transport, can also link women to markets, storage and agroprocessing facilities. Integrating women in the value chain is necessary to transform Africa's predominantly small-scale farmers into market-oriented actors who can access the necessary income to allow dignified lives. Lack of access to clean water and sanitation also disproportionately affects women and girls, who are traditionally saddled with water fetching, transport, storage and usage. Collecting water takes up a substantial amount of women's and girls' time, contributing to high education dropout rates among girls. Carrying water a long way is also a health hazard, especially during pregnancy.

Addressing analytical gaps on gender inequalities and facilitating evidence-driven policy led by committed institutions and robust national gender machineries will help maximize effectiveness. Gender policies and programs gain when driven by evidence and implemented by institutions with the necessary human and financial resources. A shift in focus is necessary to make gender commitments more effective. More robust and rigorous methodologies must be incorporated into gender operations, policy and analytical work. To make progress toward gender equality and good governance, governments should be held accountable for reducing gender disparities. To address the paucity of data and to inform gender-sensitive policy decisions, national statistical institutions need to strengthen their capacity to generate and analyze gender statistics, which in turn will provide evidence of progress.

Addressing discriminatory legal provisions and practices is necessary. Discriminatory provisions in statutes governing marital property, inheritance, land and labor prevail in the region,[26] disempowering women and reducing their potential to become fully developed economic, social, political and cultural agents. Women are underrepresented in the political arena and public office in Africa. Customary practices usually discriminate against women and endanger their human rights and development. Some electoral systems do not support the election of women, especially in

societies with strong biases against women occupying decisionmaking positions.[27]

Safety nets and pro-poor cash transfers for results will help women. Pro-poor transfers of cash for results (vaccinations, improved nutrition) have reduced poverty and empowered women in various regions, especially Latin America. In Brazil Bolsa Escola, later renamed Bolsa Familia, started in the 1990s and expanded rapidly, supporting children's education by providing monthly cash payments to poor households with children between 6 and 15 years old who were enrolled in school. Bolsa payments are usually given to women through a bank card, because studies show that women tend to use additional income to raise their families' well-being. This program raised enrollment and reduced dropout rates.[28] Oportunidades in Mexico, the Mexican government's principal antipoverty program, confirms this strategy's potential for empowering women and furthering development. Oportunidades focuses on helping poor families through cash transfers to women in rural and urban communities to invest in human capital—improving the education, health and nutrition of their children—leading to the long-term improvement of their economic future. By providing cash transfers to households (linked to regular school attendance and health clinic visits), the program also alleviates current poverty.[29] Cash transfers for results could be a very relevant policy option for women's empowerment and the fight against poverty in Africa as well.

Annex 25.1 Gender inequality indexes

The following are some gender inequality indexes and the variables they consider:[30]

- *The Gender-Related Development Index (UNDP)* measures gaps in life expectancy, education and income.
- *The Gender Empowerment Measure (UNDP)* measures gaps in income, the economy, political representation and professional and management positions.
- *The Gender Inequality Index (UNDP)* measures reproductive health (maternal mortality and adolescent fertility), the labor market (female and male labor force participation rates) and empowerment through education (female and male population with at least secondary school) and political representation (female and male shares of parliament seats).
- *The Global Gender Gap Index (World Economic Forum)* measures:
  - *Economic participation:* activity and unemployment; remuneration for equal work.
  - *Economic opportunity:* duration of maternity leave; women in management; availability of child care; wage inequalities.
  - *Political empowerment:* female ministers; women's share of seats in parliament; women holding senior legislative and managerial positions; number of years with a female head of state.
  - *Educational attainment:* literacy; primary; secondary; tertiary.
  - *Health and well-being:* births attended by skilled health staff; adolescent fertility.
- *The Social Institutions and Gender Index (OECD)* measures:
  - *Family code:* parental authority, indicating whether women can be legal guardians of children during marriage and have custody rights over children after divorce; spouse inheritance rights; early marriage rates; acceptance of polygamy (countries where this information is not available are assigned scores based on polygamy's legality).
  - *Civil liberties:* women's freedom of movement outside the home; women's freedom of dress; physical integrity, including several indicators of violence against women.
  - *Violence against women:* laws against domestic violence, sexual harassment and sexual assault; percentage of women who have undergone female genital mutilation.
  - *Son preference:* missing women, indicating women's economic valuation by measuring gender bias in mortality and sex ratios of young people and adults.[31]
  - *Ownership rights:* women's access to property, including land and bank loans.
- *The African Gender and Development Index (UNECA)* comprises the Gender Status Index (quantitative) and the African Women's Progress Scoreboard (qualitative).
  - *The Gender Status Index* has three equally weighted components: social power, economic power and political power, each with equally weighted subcomponents.
    - The social power component (capabilities) consists of two subcomponents:
      - Education: girls' and women's literacy, school enrollment and dropout levels.
      - Health: child health; new HIV infection; time spent out of work because of illness.
    - The economic power component (opportunities) consists of three subcomponents:
      - Income: women's income from agriculture, cash transfers and work in the formal and informal sectors.
      - Time use or employment: time spent by women in economic activities and employment.

    - Access to resources: women's access to management positions and means of production.
  - The political power component (agency) consists of two subcomponents:
    - Women's representation in key decisionmaking positions in the public sector.
    - Women's representation in key decisionmaking positions in civil society.
- *The African Women's Progress Scoreboard* has three components:
  - *Women's rights component:* the Protocol on Women's Rights; the African Charter on Human and People's Rights; and the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), particularly its optional protocol, article 16 on marriage and family relations and article 2 on gender equality in national constitutions and other legislation.
  - *Social component:* level of demonstrated commitment to the Beijing Platform for Action; levels of violence against women, including rape, domestic violence, sexual harassment and trafficking in women; reproductive health, including contraception, HIV/AIDS, maternal mortality and sexually transmitted infections; education, including education in human/women's rights and policy on girls' school dropouts.
  - *Economic component:* access to land, technology and agricultural extension services; national poverty reduction strategy papers and other development plans; and ILO conventions and policies on equitable working conditions, including Convention 100 on equal remuneration, Convention 111 on discrimination and Convention 183 on maternity protection at the workplace.
  - *Political component:* development of effective national women's machinery; implementation of UN Resolution 1325 on the impact of conflict on women and women's role in peace building; gender equitable decisionmaking, including support for electoral quotas and gender mainstreaming in all government ministries and departments.

Notes

1. IFC 2013.
2. Girls have also been forcibly recruited as child soldiers, but the percentages of girls are usually lower and assigned roles are different (Betancourt and others 2011).
3. Jha and Kelleher 2006.
4. Berbegal 2011.
5. ECA 2011, 1.
6. AfDB 2013a.
7. Aguirre and others 2012.
8. WHO 2012.
9. WHO 2012.
10. UNECA 2009.
11. The source of the data in the human development section is AfDB (2013a) unless otherwise indicated.
12. WHO and others 2012.
13. UNAIDS 2012.
14. UNESCO 2010.
15. UNESCO 2010.
16. UN Women 2013.
17. UNECA 2007, 9.
18. ILO 2012.
19. Fraser 2013.
20. OECD 2011.
21. Malhotra, Schuler and Boender 2002.
22. AfDB 2013b.
23. The demographic dividend occurs when the largest proportion of the population is in the working age group and the proportion of those in the dependent age groups (children and the elderly) is smaller.
24. UNFPA 2012.
25. World Bank 2012.
26. Hallward-Driemeier and Hasan 2013.
27. UNECA 2009.
28. Glewwe and Kassouf 2010.
29. World Bank 2004.
30. Moser 2007.
31. Klassen and Wink 2003.

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CHAPTER 26

Microfinance: A powerful tool for financial inclusion

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For many poor people, finding a way out of poverty is limited by their inability to access finance (save, borrow or insure) due to limited infrastructure, constraining regulatory and legal environments, limited understanding and awareness of financial services and perceptions among others that lending to or insuring them is risky and commercially unviable.

Building inclusive financing systems offers a route out of poverty and system traps characterized by persistent poverty, limited economic opportunities and poor health and education. People, particularly the poor and women, can be economically and socially empowered through enhanced access to well-functioning and efficient financial services, allowing them to better integrate with the country's economic activity and contribute to economic growth.

Microfinance is one of the most significant innovations in development policy of the past three decades. Providing microfinance services to the poor (those earning less than USD2 a day) has been hailed by advocates as an effective poverty alleviation and human development tool.[1] It provides poor and marginalized households with access to financial services including credit, savings and insurance by linking them to the formal banking and insurance sector. It facilitates income-generating self-employment activities, financial risk protection and access to essential education and health services. It enables micro-entrepreneurs to build businesses and increase their income—and improves the general economic well-being of the poor and marginalized. It enhances financial outcomes of the poor such as savings and asset accumulation.

At the same time it generates nonfinancial outcomes such as health, food security, nutrition, education, women's empowerment, housing, job creation and social cohesion.[2] Microfinance is thus considered a powerful tool to build human capital in developing countries, especially in Africa. The *Human Development Report 2005* attributed Bangladesh's relative success in human development to microfinance that had expanded economic opportunities, particularly for women, providing them with greater empowerment and choice.[3] However, as microfinance is still evolving, its impact on human capital development is not yet known or fully realized.

Given its current progress, microfinance can be viewed as a step closer to taking formal financial services to the poorest. Its current beneficiaries are mostly the middle class and marginal poor. The poorest are left behind, less involved in microfinance and less able to move to a sustained labor and consumption pattern. Perhaps, the next logical step would be to make it suitable for the poorest so that financial inclusion is universal. There is also an increasing need for more systematic evidence of the positive link between microfinance and human capital development.

Starting from these observations, the objectives of this chapter are threefold. First, it seeks to provide a conceptual framework summarizing the theoretical links between microfinance and human capital development. Second, it extends the systematic review of van Rooyen, Stewart and de Wet (2012) of microfinance impact in Africa by including works related to North Africa and focusing mainly on human capital development. Third, it discusses key policy issues and strategic directions in order to increase the human capital effects of microfinance in Africa.[4]

What is microfinance?

Microfinance has emerged largely as a community or nongovernmental organization (NGO) response to market and government failures. Formal banks fail to provide services to poor clients, and governments are unable to ensure that needed financial services reach the poor. It is a promising way to allow the poor and disadvantaged to save, as well as to provide them with access to credit to improve their income-earning potential. Indeed, it has become an important tool in fighting poverty.

Microfinance is made up of a set of small financial products that include savings, credit and insurance, and that suit people with low incomes and who live in places where the financial system is not so well developed. These people were initially excluded from the classic or formal banking system. A review of data from 47 countries reveals that microfinance services are provided by large networks of development banks, big institutions (each reporting more than 100,000 clients) and numerous small institutions that vary by size, degree of organization and legal status. The first two categories of institutions, which are either state-sponsored or not-for-profit institutions (NGOs, associations, mutual insurance companies/cooperatives, limited companies) meet about 90% of the demand, particularly from the poorer population groups.[5]

Some institutions, primarily engaged in other businesses, extend microfinance as a means to generate community goodwill so as to enjoy a competitive edge through the banking–social sector linkage. Altogether, microfinance resources are estimated to constitute about 2.5% of total banking resources. The microfinance markets appear to be greatly segmented and with weak links among market segments. Funds of different lenders can hardly be substituted for one another. As a consequence, deposits mobilized—as well as credit facilities—differ in structure, associating demand with distinct socioeconomic groups.

Microcredit

The most common microfinance tool is microcredit, which extends small loans (USD50–1,500), often without collateral, to impoverished people. Microcredit provides loans at relatively low interest rates that could be used to generate income or be used to pay for services. First explored in Bangladesh in 1976 when the Grameen Bank was established, microcredit substitutes borrower collateral with social collateral through peer pressure support using small informal groups (largely female) to ensure repayment. The essence of microcredit lies in its low-cost procedures replacing sophisticated credit-evaluation techniques and collateral regulations. Loan interest rates (18–61% a year), while seemingly high by commercial credit standards, are generally far below rates (reportedly 36–5,000%) charged by informal credit sources such as money lenders in the same settings.[6] The most recent estimate of the median size of a microloan per borrower ranges from USD99 in South-East Asia to USD1,254 in Europe (table 26.1).

Table 26.1 **Median size of a microloan, by WHO region**

WHO region	Microloan size per borrower	
	USD	International $
Africa	203	779
Americas	636	1,428
Eastern Mediterranean	257	674
Europe	1,254	3,120
South-East Asia	99	453
Western Pacific	282	1,073

Note: WHO is World Health Organization.
Source: Durairaj, Sinha and others 2010.

Microsaving

Microsaving offers a safe, convenient and accessible saving platform for the poor and introduces sound financial, organizational and institutional practices that align with household needs. Through microsaving, the task of smoothing consumption is made easy for those, particularly women, who are unable to store money safely otherwise. Developed in the 1990s, it allows people to deposit money in small amounts for future use, without minimum balance requirements and often in conjunction with credit. Saving by the poor often comes in such small increments that conventional banks are not prepared to offer services to them, either because the transaction costs are unprofitable or because of other more lucrative investment opportunities. Although microsaving does not change the need for people to pay service providers (such as health care) when they get sick, it is a form of prepayment. Microsaving accounts work like any formal saving account in a bank, but are designed to accommodate smaller deposits.[7] The minimum balance requirements are often waived, or kept low, allowing users to save small amounts.

Microsaving encourages poor people to save for education, health care or other future investment. People who participate are usually better prepared to cope with any financial risks, which would otherwise force low-income individuals to borrow at high-interest or suffer from lack of service access. But the ability to save through a microfinance institution (MFI) is often limited to people who are willing to borrow from it. A survey of 166 MFIs in 2009 revealed that only 27% of MFIs offered saving products.[8] The total number of deposit-taking nonbanking financial institutions was 40,000 in 2011 even while the number of commercial banks declined from 16,000 in 2004 to 14,200 in 2011;[9] 20% of them were in low-income countries. In Burundi there were 124 deposit accounts per 1,000 adults in nonbanking financial institutions against 32 deposit accounts per 1,000 adults in commercial banks.[10] In an attempt to boost microsaving coverage, the Bill & Melinda Gates Foundation offers grants worth USD38 million to 18 MFIs in Africa, Latin America and South Asia.

Microinsurance

Microinsurance relates to risk pooling and financial risk protection. Although it is risky for MFIs with a smaller risk-base to offer insurance products, as larger risk pools facilitate better risk pooling, MFIs do provide them to cover health and agriculture risks. An insurance product can be termed microinsurance if it targets low-income or excluded populations, and the premium is adjusted based on affordability.[11]

What does microfinance offer to human development?

Microfinance impacts human development through six complementary instruments (figure 26.1): women's empowerment; income generation; education; employment creation; social and financial inclusion; and access to services.

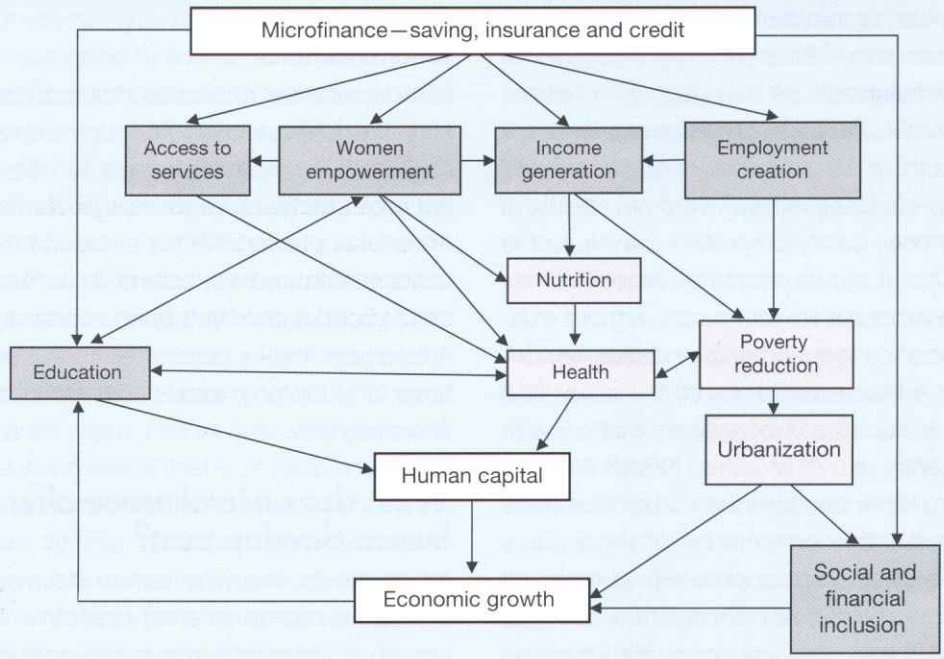
Several MFIs have sought to provide additional inputs to their financial products such as basic health services, health education or health insurance products.[12] "Such integrated package may provide both the means (income/empowerment) and the knowledge to address priority health concerns, and present the possibility of substantial cost recovery from microfinance providers."[13] Studies suggest these models can lead to higher immunization rates, the adoption of healthy breastfeeding practice and better management of childhood diarrhea.[14]

Education and skills building

Despite a huge change in the educational system in Africa, enrollment in rural areas and fragile states is still lagging (see chapters 16 and 17). Microfinance has strong potential impacts on education and enrollment, especially in primary schools.

According to Maldonado and Gonzaléz-Vega (2008), microfinance may influence education through five channels. First, access to microfinance influences the household income. Given the positive income elasticity of the demand for education, we expect

Figure 26.1 **Conceptual framework**



Source: Authors.

an increase of education demand especially in rural areas. Income-generating activities from microfinance permit higher investment in education. Second, income volatility does not allow sustained enrollment over time. Microcredit can help stabilize household revenue and avoid child labor in order to increase household revenue. In fact, most rural African households take their children out of school in such periods.

Third, women are supposed to have stronger preferences for educating their children than men; microcredit is meant to benefit women more and change their power in their households. Therefore, the education of children is improved by this effect. Women may dedicate more time to educating their children than alternative activities. "If preferences are gender-related and microfinance improves direct access to loans by women, thereby changing their power to influence household decisions, the rate of human capital formation may be affected (gender effect)."[15] Fourth, since microcredit improves the opportunities for educated household members and allows them to realize higher incomes and wages, the incentive for education will be strengthened. Incentives for education may be transmitted from one generation to another. This effect may be observed in the long term but not in the short term.

And fifth, microcredit may change demand for child labor within households and allow more time for education. The poor are used to involving their children in revenue-generating activities, even labor, because of lack of revenue. Because microfinance may allow sustainable revenues, the incentives to use child labor may change.

These five potential effects work together to improve the education outcomes (enrollment rates, time spent on education and knowledge acquisition). Several international reports, especially for Asia, Latin America and Central Europe, demonstrate such effects.

Access to essential services

Microfinance has the potential to make essential health services more accessible and to allow people to either save for future needs or to repay the costs slowly over time. By facilitating early case detection through timely financing of outpatient care, it can minimize risk of hospitalization, thus reducing costs, and allow people to continue working.

The interdependence of poverty, health and development might seem obvious, but cross-sectoral experience on how and where to intervene remains limited. Microfinance is at the center. Access to financial services allows rural and poor persons to borrow and save and can change their behavior toward health care. They can pay for medicines and clinics visits more easily. MFIs are used to operating in slums, villages and neighborhoods where poverty and unemployment are high. Combining health and financial interventions can be powerful. Pronyk, Hargreaves and Morduch (2007) discuss the potential of MFIs to contribute toward achieving the Millennium Development Goals, especially those involving health.

At least four channels are mentioned to discuss the link between microfinance and health for the poor. The first is linked to the section below. Improving education access can have profound effects on health and well-being (lower rate of illness, malnutrition and childhood mortality). Access to primary schools is sometimes accompanied by free nutrition programs for under- or malnourished children, as in Mauritius and many other countries.

The second channel is nutrition. Increased access to microfinance can raise food consumption, especially for children. Microfinance increases nutritional outcomes. Several studies show that in Bangladesh significant effects on nutrition, especially for children between 6 and 72 months old, have been reached following microcredit initiatives.[16] Helping the poor generate sustainable revenues improves their access to healthier nutrition and by this process improves their children's health.

The third channel is linked to the gender effect. Evidence supports a positive correlation between microfinance and enhanced health through improvement of social status of women. As women become active and more financially sustainable, they tend to improve their health conditions.

The fourth channel is linked to empowerment of women, which leads to less violence and HIV/AIDS infections.

Microfinance programs allow the poor to have better attitudes and reflexes about their health, especially the health of their children. One therefore expects to see a decrease in child mortality and improved sanitation conditions in general.

Financial inclusion and risk protection

Advocates of microfinance argue that access to finance can help substantially reduce poverty. Microfinance has been recognized as one of the most efficient tools to alleviate poverty, considering its significant contribution to job creation and revenue generation for a government.[17] This is due to the empirical finding that accentuated the vast potential of microfinance in improving the quality of life of poor people.[18] Given this, microfinance has become a prominent tool for poverty reduction, especially in Malaysia, Indonesia, Bangladesh and the Philippines. The contribution of microfinance to reducing poverty has convinced many governments, NGOs and individuals to support MFIs and their activities. Longitudinal studies from Bangladesh have found an association between poverty reduction and greater consumption attributable to microfinance participation.

One of the main criticisms of microfinance is the claim that it does not reach the poorest of the poor[19] or that the poorest are deliberately excluded from microfinance programs.[20] The core poor are generally too risk averse to borrow for investment in the future. They benefit only to a very limited extent from microfinance. Even when they do benefit from microfinance the most important part of the loans is dedicated to immediate consumption. An increasing objective of sustainability pursued by MFIs leads them to exclude the poorest and to focus on the "high fringe" of the poor and on the middle class. Only subsidized programs have tried to reduce poverty and to include them. The tradeoff between outreach and sustainability is becoming obvious worldwide.[21]

Women's empowerment

Microfinance has been celebrated for its ability to reach out to women and enhance

their welfare, offering them the possibility to move toward entrepreneurship and to abolish the poverty circle. While microfinance does not target women only, they form the majority of beneficiaries. At the end of 2005 it was reported that more than 3,000 MFIs were active and provided services to more than 113 million people worldwide, 84% of them women.[22] Women typically benefit from smaller loans than men.[23] D'Espallier, Guérin and Mersland (2010) survey performance data of 350 MFIs in 70 countries over 11 years and confirm that female borrowers are associated with better credit risk. One of the explanations consists in affirming, according to multilateral development agencies and MFIs, that women are good credit risks. The World Bank (2007, 124) argues that "experience has shown that repayment is higher among female borrowers, mostly due to more conservative investments and lower moral hazard risk." Some authors like Armendàriz and Morduch (2005) recommend targeting women to reduce the default risk for MFIs. Several empirical studies have found that women are more conservative or cautious in their investment strategies and thus have better repayment records. Another argument is that women have fewer credit opportunities than men and must repay their loans to ensure continued access to credit. Agier and Szafarz (2013) show that in Brazil, there is no evidence of gender bias in loan attribution by MFIs and the hypothesis of "ghetto-izing" women with small loan programs is invalid. Since microcredit is benefiting women's empowerment and entrepreneurship, this leads to several human capital improvements in the household like better education for their child, better health and more investment in social activities (building social capital).

This discussion shows that microfinance has a great potential in theory to develop human capital in Africa by targeting the poor. It improves their financial, economic and social inclusion in such a way that increases their education and skills. As the development of their human capital increases their employability increases, permitting better jobs and lives. This process also allows the creation of new businesses. Microfinance is considered nowadays one of the main policy tools to reduce poverty and boost human capital. The empirical literature has showed such impacts in Asia (particularly in India, Cambodia and Indonesia) and Latin America (Venezuela and Peru). Since they were first adopters of this financial technology, their experience is very useful for Africa.

But at least four issues remain over the link between microfinance and human capital formation worldwide. First, microfinance has not exceeded its borders to include the poorest.[24] Finding an appropriate way to target the poorest is still open and needs innovative solutions. Second, pushed by the need to be sustainable, many MFIs today are targeting the middle class. As many workers are poor (the working poor) and some middle class people are restricted in accessing credit and finance, they are asking for loans from MFIs. They consider MFIs as competitors of classical finance institutions with higher interest rates and easier loan conditions. As the target population for MFIs is changing, this may induce MFIs to prefer them over the initial target population.

Third, as most MFIs are financial institutions, cooperatives or NGOs, some are operating without the necessary skills. This emerging industry needs skilled employees for better performance. While the industry has existed for more than four decades, few higher-education institutions propose degrees and training in it. This is particularly true in Africa, which has a huge need for skills development and professional training in this industry. And fourth, the paradox is that the poor use MFIs more for saving than credit, to adjust their savings and smooth consumption over a longer period.

Microfinance in Africa

Despite serious structural obstacles such as lack of infrastructure, currency stability and high inflation, Sub-Saharan Africa recorded the largest increase in microcredit of any region, surpassing the South Asian portfolio for the first time since 2006.[25] Moreover:

> Sub-Saharan Africa looks set to be the fastest growing market over the next couple of years and perhaps beyond.

> This is good news for a continent that has some of the lowest financial inclusion levels, but is enjoying the political stability and demographic dividend that may provide a strong base for solid economic growth in the coming decade. With the right market conditions, this may be an excellent opportunity for microfinance investment, but here again it's worth noting that current growth in the continent is taking place in a relatively small number of countries and regions.[26]

Microfinance is still evolving and the actual number of poor people linked with formal banking institutions through microbanking is not yet known. Estimates of the number of savings and credit accounts with alternative financing institutions in 2004 indicated about 650 million micro accounts serving about 500 million clients worldwide, with a predominant (84%) presence in the Asia-Pacific region. Demand-side estimates indicate that microfinance has so far reached between 2% and 13% of the target (that is, the poor) population in different settings.

Some institutions, primarily engaged in other businesses, extend microbanking as a means to generate community goodwill so as to enjoy a competitive edge through the banking–health linkage. Altogether, microbanking resources constitute about 2.5% of total banking resources.

Despite structural problems and deficiencies, microfinance is progressing in Africa. Many funds and MFIs are entering this market for the first time despite the serious problems that still remain. Sub-Saharan Africa is still a difficult environment, with the less developed countries and Tier 2 and Tier 3 MFIs remaining inaccessible due to lack of market infrastructure.

Aryeetey (2005) reports that microfinance markets in Africa face several market failures. The most important one is the lack of market integration. As a result of fragmentation, and because each lending unit cannot alter the structure of its operations and products in the short to medium term without additional flows of resources, there are few lenders in Sub-Saharan Africa that meet the needs of borrowers. In Côte d'Ivoire, Togba (2012), using 2002 data, found that MFIs collect a much larger amount of savings than what they give out in loans, and that informal loans through microcredit institutions have a particular role to play in the financial sector in that country. Ethnic networks, especially religious ones, are important.

Microfinance can foster the human capacity to accelerate Africa's economic transformation and to move to more inclusive and green growth. In fact,

> Access to finance may contribute to a long-lasting increase in income by means of a rise in investments in income generation activities and to a possible diversification of sources of income; it may contribute to an accumulation of assets; it may smooth consumption; it may reduce the vulnerability due to illness, drought and crop failures, and it may contribute to better education health and housing of borrower. . . . Microfinance may have positive spillover effects such that its impact surpasses the economic and social improvement of the borrower.[27]

Self-funded groups are an increasingly common way of delivering microfinance services. In Africa several international NGOs are promoting village savings and loans associations as member-driven, local institutions. Although microinsurance is growing very fast in Africa, its coverage of lives and properties in still low (table 26.2). According to a survey in 2011, South Africa accounted for 60% of the insurance coverage in Africa.[28] The coverage is low in Africa despite the large number of community-based initiatives; formal commercial insurers accounted for 78% of the lives covered in Africa.[29]

The Gallup World Poll asks what sources of financing individuals would consider using to start a new business. Some 42% of responders in Sub-Saharan Africa state family as the primary source of funds for potential

Table 26.2 **Population covered by microinsurance in Africa, 2011**

Country	Population coverage (%)
Namibia	55.8
South Africa	54.5
Swaziland	12.0
Zimbabwe	11.0
Tanzania	7.3
Ghana	7.0
Mauritius	6.1
Senegal	6.0
Uganda	4.6
Kenya	3.2
Togo	3.1
Ethiopia	2.6
Comoros	2.6
Benin	2.3
Tunisia	1.9
Malawi	1.7
Cameroon	1.7
Botswana	1.2
Burundi	1.1

Source: Making Finance Work for Africa 2013.

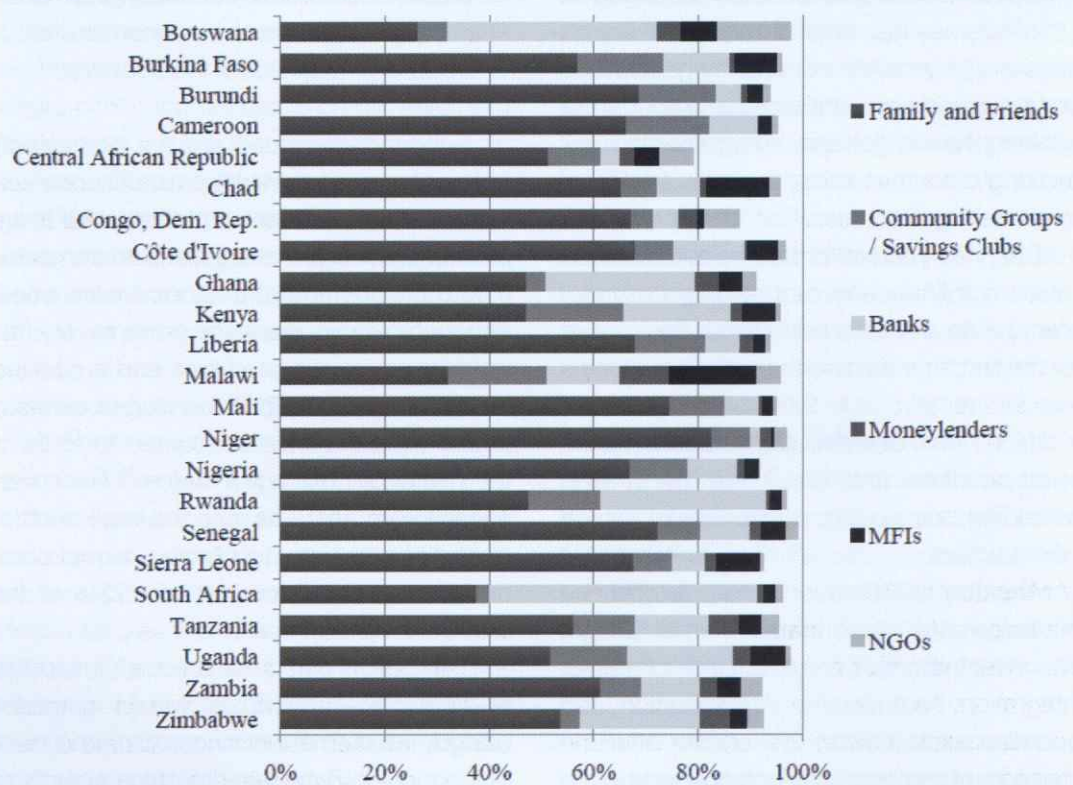
business needs (figure 26.2). Community savings groups, through which groups of people save money together, are a popular mode of savings in parts of Africa and are cited as a source of funds by about 10% of those surveyed. Importantly, commercial banks are reported by about 20% of responders.

To illuminate potential reasons for the low take-up of microfinance, the Gallup World Poll asked if individuals are aware of any institution in their community that helps people obtain small business loans. About 16% of the responders stated that they had never heard of such institutions (figure 26.3). Another 46% stated that such institutions are not available in their community. Certainly, a percentage of those reporting that microcredit was unavailable in their community might also simply be unaware of its presence.

Scope for human development through microfinance

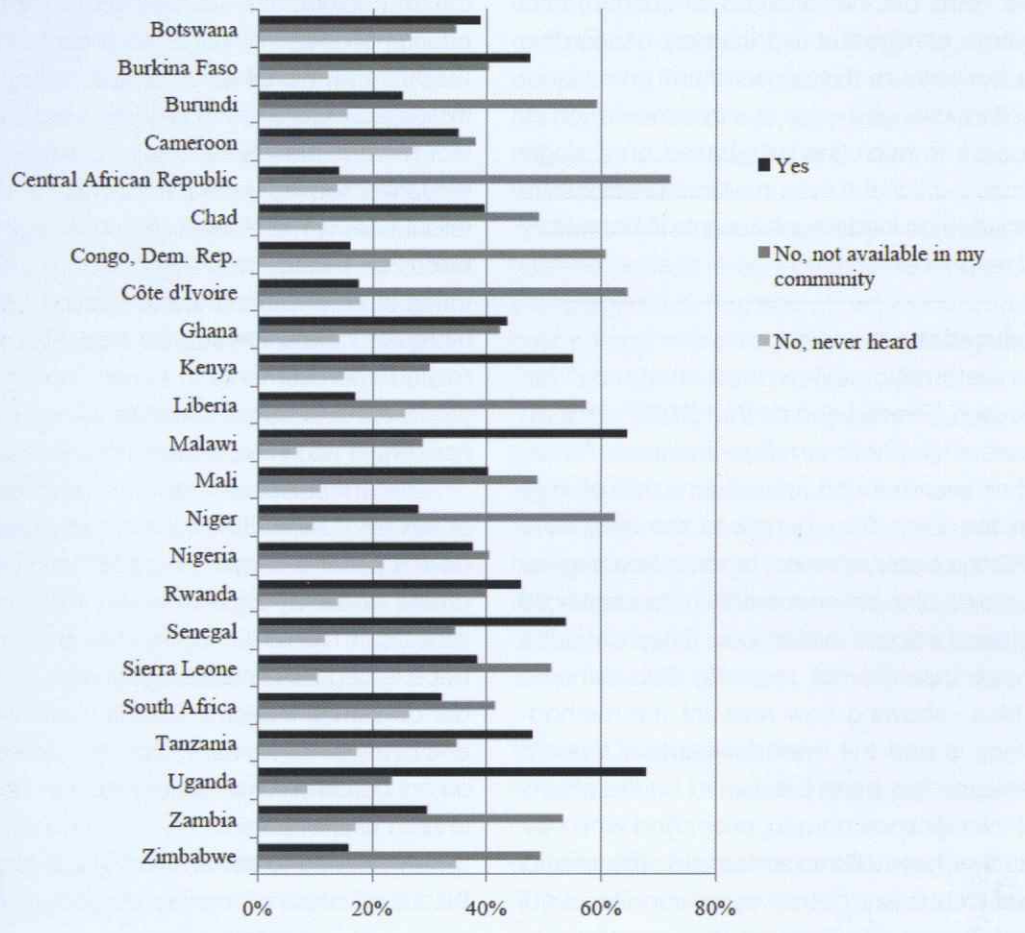
This section summarizes the key empirical findings in the area of human capital impacts

Figure 26.2 **Sources of business financing: If you needed money to start a business, where would you primarily go?**



Source: Gallup World Poll 2009 and 2010 (https://worldview.gallup.com).

Figure 26.3 **Awareness of microfinance**



Source: Gallup World Poll 2009 and 2010 (https://worldview.gallup.com).

of microfinance. Our main concern is to address the question of "what works?" We survey the main findings of the literature and try to identify the trends and best practices. But one of the main problems in microfinance is methodology. There is great debate about how to measure the impacts of microfinance programs (impact evaluation), especially on human capital, with which we start. We then examine the main findings, drawing heavily on a systematic review by van Rooyen, Stewart and de Wet (2012).

Methodological issues in measuring the impact of microfinance on human development

Most researchers in microfinance start their work by asking how to identify the marginal changes in the lives of microfinance users. Most measure the impact of microfinance by comparing recipients of microfinance with a control group that has no access to microfinance. In most cases the studies apply nonrandomized approaches. But the choice of the control group was criticized and the economic literature shifted to randomized approaches. These studies use randomized controlled trials (or experiments), in which two groups—the treatment group and the control group—are exactly the same along all relevant dimensions, except access to microfinance. The allocation of individuals in the treatment and control groups is random. Roodman and Morduch (2009) conclude that both randomized and nonrandomized approaches have weaknesses and strengths, and therefore both could be useful when analyzing the impact of microfinance. (Studies using randomized and nonrandomized approaches in fact lead to mixed effects of microfinance on human capital.)

New methodologies are also used. McIntosh, Villaran and Wydick (2011) developed the retrospective analysis of fundamental events contiguous to treatment. According to the authors this allows them to measure welfare changes—due to a treatment such as access to microfinance—based on a single cross-sectional survey in which questions are included on fundamental events in the history of respondents.

Education

A systematic review was made by van Rooyen, Stewart and de Wet (2012) of microfinance impacts on Sub-Saharan Africa. Their search found more than 6,000 studies on the web. They narrowed the sample to 383 "probably relevant" reports. Reading the full texts of these enabled them to identify 69 relevant impact evaluations. They excluded those that did not relate to Sub-Saharan Africa—showing how relevant the methodology is and the need for caution. Limited research has been conducted on the effects of microfinance on education. And wherever studies have been carried out, the results and trends are not always clear. Becchetti and Conzo (2010) found that microfinance generated positive effects on child schooling only when the income of the parents was above a certain threshold. In situations where the increased access to microfinance failed to raise income to a level higher than the threshold at which parents do not send their children to school out of necessity, there was no significant effect. Microfinance effects depended on income and schooling costs.

Augsburg and others (2012) looked at the effects of microfinance on education from the change in the way time was spent after receiving a loan. This was in light of the fact that most microfinance loans went toward financing businesses to be run by the household. They found that in households where the head's highest level of education was primary school level, children between ages 16 and 19 ended up spending more time helping run the family business. In some cases this led to a decrease in school attendance.

In Africa there is an even less systematic evaluation of microfinance impacts on education. Several studies reported contrasted effects. Studies from Uganda show that participation in microfinance is associated with increased investment in children education.[30] But findings from South Africa provided little evidence for increased enrollment.[31] Beneficial effects may therefore be context specific. For Mosley and Roch (2004), microcredit often enhances human capital through increased expenditures on education and related improvements in health, which may then extend to poor individuals through intrahousehold and intergenerational effects.

The most robust studies reported in annex 26.1 show that microcredit seems to have a positive impact on education,[32] while others show a negative effect for primary schools.[33] The remaining studies show positive and negative impacts depending on gender or district. It seems difficult to generalize and to argue for a clear effect of microfinance on education in Africa. More research into the implications of microfinance on education is clearly needed to better understand why the theoretical channels mentioned above do not always work in practice.[34]

Health

All the studies mentioned in annex 26.1 indicate that microfinance has a strong positive effect on health, whether the study was centered on microcredit only, microsavings only, or both. Microcredit improves the health budget of the household and in some cases awareness of health care of children. In some programs the MFI uses its position to give health information to its clients.

Interventions that improve financial access may complement interventions to improve health conditions.[35] In cases where MFIs deliver health-related services through microcredit groups, for example, there is strong evidence of a positive impact on health. These positive health outcomes are not only general, but include maternal and child health too.[36] In Ghana MFIs have contributed to both community and national malaria initiatives by increasing the level of

knowledge dissemination.[37] In Uganda 32% of women who received education about HIV/AIDS prevention through microcredit groups tried at least one HIV/AIDS prevention practice, versus 18% of nonclients.[38] And a positive impact was found in South Africa where comprehensive training and education programs on microfinance group members, for whom the risk of physical or sexual abuse by intimate partners was reduced by more than half compared with a control group of microcredit-only members and with the general public.[39]

Another improved dimension is the positive impact of microfinance on nutrition, as seen in longitudinal studies in Ghana.[40] Similar results were found in South Africa.[41] Annex 26.1 also shows that a fair number of the studies have found a positive impact of microfinance on food security. Improving nutrition, especially for children under 5, is vital for their health.

These findings strengthen the social effect of microfinance and are used by those who are in favor of subsidizing MFI. In recent debates, social benefits from improved health for MFI clients can be compensated by subsidies. But recommendations on sustainability of MFIs may lead to less impact on health if the MFI cares more about income than the social benefits (improved health). Further, small loans used for income generation can reduce poverty directly, while simultaneously causing wider benefits, including better health. Access to reliable borrowing and saving mechanisms makes it easier to pay for medicine and clinical visits.[42]

Poverty reduction

Several studies have shown the positive impacts of microfinance on poverty reduction in Africa. Microfinance has been described by Morduch and Haley (2002) as an instrument that, under the right conditions, fits the needs of a broad range of the population. Chipeta and Mkandawire (1991) have shown the positive impacts of microcredit in Malawi. Mosley and Roch (2004) present six case studies in Africa. They examine the indirect effects of microfinance (mainly microsavings) on the poor as they believe benefits to the poor are more likely to be felt in this way. They conclude that microcredit to the nonpoor can reduce poverty by drawing very poor people into the labor market as employees of microfinance clients, and that microcredit enhances social capital and helps the poor build social networks.

Most African poor especially in rural areas have no access to energy services and providing agencies. Rao and others (2009) show how energy microfinance is helpful, arguing that "energy has strong links with poverty reduction through income, health, education, gender and the environment. Without ensuring minimum access to energy services for a broad segment of the population, countries have not been able to move beyond a subsistence economy." These results confirm those of Saghir (2005) who shows that the energy sector has strong links to poverty reduction.

Women's empowerment

Empowerment of women is a complex process of change with power being rooted in social systems and values. The concept of empowering women through microfinance is therefore not a straightforward one with available evidence giving a mixed picture of both success and limitations. Empowerment is often viewed, among other things, as increased participation in decisionmaking, increased political power and rights, and increased self-esteem.

As Cheston and Kuhn (2002) show, microfinance empowers women in several ways. Access to credit and participation in income-generating activities is assumed to strengthen women's bargaining position in the household. There is also evidence of them having an increased decisionmaking role in family planning, education of daughters and other such household matters. Further, through their own businesses set up using microfinance loans, they have decisionmaking power in these businesses.

Women also appreciate the nonincome benefits of a group lending program as much as or more than credit. This includes the expanded business and social networks,

as well as the increased respect and prestige they receive from both male and female family members and the community at large. Kim and others (2007) also show evidence that economic and social empowerment of women can contribute to reductions in intimate partner violence. But Kabeer (2005) points out that while access to financial services makes important contributions to economic productivity and social well-being of poor women, it does not automatically empower women.

Afrane (2002) conducted a study on impact evaluations in Ghana and South Africa that focus on impact results. Microfinance interventions achieved significant improvements in business incomes, access to life-enhancing facilities and empowerment of women.

Impact summary

Microfinance has adverse impacts on human capital in Africa. While its effects on health and women's empowerment are well established, there is a lack of evidence about the impact on education. There is a need to run a systematic impact evaluation of microfinance programs in Africa. The recent debate worldwide about the need to assess MFI interventions only on a financial basis (sustainability) may lead to targeting the middle class and keeping the poor out of the scope.

Moreover, recent studies show adverse effects of microcredit. Crépon and others (2011) report the results of a randomized experiment designed to measure the impact of microcredit in rural areas of Morocco. The experiment was based on the assignation of a large set of villages to treatment villages where Al Amana, the largest MFI in Morocco, offered credit and control villages where no credit was offered. They find that providing access to microcredit did not lead to new business creation, only to an expansion in the scale of existing businesses. Households with no business at the baseline merely increased consumption once they got access to credit. (This again reminds us that credit, by itself, cannot spawn entrepreneurs.)

They also find that treated households decreased their wage employment and increased their consumption of leisure, offsetting the income gains realized from the scale expansion of businesses. If this finding has external validity, it not only casts a shadow on the income generating potential of microcredit, but also raises longer term questions about the borrowers' ability to repay their loans and the possibility of chronic indebtedness.

Policy implications

Despite the debate about the impacts of microfinance on human capital formation, most NGOs and governments advocate its use to empower women and to fight poverty. Following our analysis, in Africa at least three challenges need to be addressed. First, this industry—unlike that in Asia and South America—needs to strengthen its skills. Second, while the industry needs to be sustainable in Africa, its human capital impacts need to be considered by policymakers. Third, there is a need to develop the microinsurance services in Africa that are particularly needed in areas prone to climate-change effects and to natural disasters.

Building skills

One of the most recurrent issues in this developing industry in Africa is its need of skills to face its challenges. In fact, each country has specific needs. There is a strong need for local skilled workers in this industry to have basic skills but also particular knowledge of the area covered or the population's needs. Most MFIs do not have the ability to train their staff or build the skills locally. This is particularly true for cooperatives, NGOs and small MFIs that face financial constraints. Setting programs and training sessions for microfinance workers in their local context will increase the efficiency and human capital impact of microfinance. This industry needs to work closely with the national education system to develop curricula (see chapters 16 and 17). Each country has its own characteristics and microfinance-industry needs to reach the target population.

Strengthening sustainability of MFIs and targeting the poor

The tradeoff between sustainability and achieving social goals by MFIs is at the center of current debates in microfinance. While Africa is a promising continent for microfinance, generalization of overcautious practices may minimize its human capital impacts and may lessen any benefits to the poorest. Starting from these considerations, the long-run sustainability of microfinance may lead MFIs to target the middle class and the upper fringe of the poor that offers better returns. Sustainability may indeed be achieved by this shift in the target population, but microfinance will become less inclusive. Policymakers need to reverse these trends if the target is financial and social inclusion. Specific actions, programs or institutions are needed for the excluded populations, especially the poorest populations. NGOs are better positioned for this market segment and need to be helped by local bodies. The health and educational dividend for society surpasses the subsidy costs to these NGOs.

Promoting microinsurance

Microinsurance in Africa is less developed than microsaving and microcredit, due to lack of awareness among the poor, financial constraints and absence of insurance promotion by MFIs, as well as economic viability.

Developing microinsurance is vital for Africa. Severe climate change is provoking migration of the poor from rural areas to towns where they often live in slums. Increasing access to microinsurance may limit these trends. Most rural poor are making their living from agriculture where income is highly variable. Microinsurance will protect these populations from such swings by pooling and protecting against financial risks. These instruments may increase enrollment of children in school and limit the scope for child labor. The microinsurance mechanism will act as a safety net allowing the poor to invest more in human capital (health and education) (see chapters 21 and 23). Promoting microinsurance needs strong partnerships between public and private sectors.

Conclusions

While there is a well-established consensus about the potential positive impact of microfinance on human development, especially for the poor, voices are also heard about its practical limitations. Negative voices focus particularly on the functioning of MFIs and the microfinance crisis triggered by them in India, Bosnia, Morocco, Pakistan, Nicaragua and Nigeria. MFIs are under tremendous pressure to become self-sustainable. There are also concerns about public health services offered by some of them because MFIs lack expertise in this area and offering such services is cost-ineffective.

While microcredit and microsavings are developed to a degree in Africa, microinsurance requires further attention. Africa's poor, like those in the rest of the world, appear to have a strong preference for microsavings, but we need a more systematic evaluation of human development effects of microfinance programs. The health dividend seems well established, though education outcomes are less observable. But microfinance is still evolving in Africa and its real impact may be felt only once it reaches optimal coverage.

There is also a strong need to better assess evaluation studies by encouraging scholars to set better research settings and to carry more systematic and in-depth studies. Observing the human capital dividends needs long-term studies for a cohort of individuals (a generation at least) to make conclusions on the real impacts of microfinance, including its sociocultural and ethnic dimensions.

Annex 26.1 Findings on impact of microcredit models on health, food security and nutrition, and education

Study	Source of evidence			Evidence of impact		
	Type of impact study	Microfinance type	Microfinance model	Health	Food Security	Education
Impact of microcredit						
Adjei, Arun and Hossain (2009)	With and without study	Credit with business management training and client welfare scheme	Group-based lending to men and women	(+)		(+)
Barnes, Keogh Nemarundwe (2009)	Control trial	Credit with business management training	Group- and individual-based lending to men and women	(+) (in terms of range of income sources to smooth health shocks		(+) (boys) (–) (girls) (especially for continuing clients)
Doocy and others (2005)	With and without study	Credit	Group-based lending to men and women		No effect	
Gubert and Roubaud (2005)	With and without study	Credit	Group-based lending to men and women			No effect on enrollment
Lacalle Calderon, Rico Garrido and Duran Navarro (2008)	With and without study	Credit	Group-based lending to men and women	(+)	(+)	(+)
Nanor (2008)	With and without study	Credit with financial training	Individual loans for women		Varied	Mixed (+) in some districts (–) in others)
Pronyk and others (2008)	Control trial	Credit with gender and HIV/ awareness training and community mobilization support	Group-based lending to men and women	(+) (but not attributed to microcredit element of the program)		
Shimamura and Lastarria-Cornhiel (2009)	With and without study	Credit with financial training	Group- and individual-based lending to men and women		(+) (only in specific instances)	(–) (for primary) No effect (for secondary)
Impact of microsavings						
Dupas and Robinson (2008)	RCT	Savings with scope to purchase shares	Individual savings accounts	(+)	(+)	
Ssewamala and others (2010)	Cluster RCT	Savings dedicated to paying for postprimary schooling alongside training and mentorship programs	Individual savings accounts for young people (boys and girls)	(+)		(+)
Combined impact of microcredit and microsavings						
Barnes, Gaile and Kimbombo (2001)	Control trial	Credit and savings with nonformal education in health, nutrition, family planning and HIV/AIDS prevention	Group-based lending to men and women			(–)
Brannen (2010)	Control trial	Credit and savings with business training	Group-based lending to men and women	(+)	(+)	No effect

Source: van Rooyen, Stewart and de Wet 2012.

Notes

1. Robinson 2001; Yunus 1999.
2. Afrane 2002; Khandker 2001; UNICEF 1997.
3. UNDP 2005.
4. van Rooyen, Stewart and de Wet (2012) provide a synthesis of what works in microfinance in Sub-Saharan Africa and their financial and human capital effects. Their methodology is to assemble the main findings (bringing together the best quality, most relevant evidence (DFID 2011). Starting from their findings, we tried to discuss the link between human capital and microfinance. Two main changes, however, were added. While they discussed the broader impacts of microfinance on economic development, we focused only on human capital. We also extended their approach to the whole of Africa by adding contributions for North Africa.
5. Durairaj, Sinha and others 2010.
6. Durairaj, Sinha and others 2010.
7. Durairaj, Murali Kannan and others 2010.
8. *The Economist* 2010.
9. CGAP and IFC 2013.
10. By way of comparison, a recent survey of 18 African countries shows that use of formal financial products ranges between 1% in Niger and the Democratic Republic of Congo and 49% in South Africa (Beck and others 2011).
11. Making Finance Work for Africa 2013.
12. Dunford 2002.
13. Pronyk, Hargreaves and Morduch 2007.
14. Dunford 2002.
15. Maldonado and Gonzaléz-Vega 2008, 2441.
16. Pitt and others 2003.
17. Saad and Duasa 2010.
18. Some of the numerous studies on microfinance include Khandker and Pitt (1998), Khandker, Samad and Khan (1998), Park and Ren (2001), Afrane (2002), Khandker (2003) and Rahman, Rafiq and Momen (2009).
19. Scully 2004.
20. Simanowitz 2002.
21. Hermes and Lensink 2011.
22. Daley-Harris 2006.
23. Armendàriz and Morduch 2010.
24. Scully 2004.
25. MicroRate 2012.
26. MicroRate 2012, 11.
27. Hermes and Lensik 2011, 875.
28. CGAP and IFC 2012.
29. CGAP and IFC 2013.
30. Barnes, Gaile and Kimbombo 2001.
31. Pronyk, Hargreaves and Kim 2006.
32. Adjei, Arun and Hossain 2009; Lacall Calderon and others 2008; Ssewamala and others 2010.
33. Shimamura and Lastarria-Cornhiel 2009.
34. Ahlin, Lin and Maio 2011.
35. Pronyk, Hargreaves and Morduch 2007.
36. Leatherman and Dunford 2010.
37. de la Cruz and others 2009.
38. Barnes, Gaile and Kimbombo 2001.
39. Pronyk, Hargreaves and Kim 2006.
40. Dunford 2002.
41. Pronyk, Hargreaves and Kim 2006.
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CHAPTER 27

Addressing social and environmental needs through social business

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Africa has seen unprecedented economic growth in recent years but still faces numerous challenges, including high youth unemployment and inequality. To ensure that growth reaches the most vulnerable populations, private sector development must play an important role in creating jobs. Social business, as a model and subsegment of social entrepreneurship, can help reconcile economic aims with social outcomes and directly support major international development agencies' core agenda of skills and technology development, private sector development and governance to spur inclusive, green growth.

For over two decades interest has been growing in the social outcomes of enterprises and the private sector. In this increasingly global information society, exclusive interest in profits and value creation is no longer acceptable. New challenges such as global warming impose greater social responsibility (see chapter 4). Poor people lack accessible, affordable, quality services to satisfy basic human needs, particularly health and education (see chapter 21).

Since the early 1990s the private sector has become involved in issues such as the environment, education, health care, inclusiveness and international development. But despite impressive progress, corporate social responsibility in Africa—implemented mostly by multinationals—remains underdeveloped and unable to meet all the social challenges. Corporate social responsibility programs have been targeting in the past one-off projects with no plan for financial sustainability. Only recently, the private sector has discovered social entrepreneurship as a valid means of corporate social responsibility, but also as a source for innovation. Social entrepreneurship is attractive to large corporates as it aims to tackle social and environmental challenges by using profit for social motives rather than for particular shareholders. It does so by reinvesting profit for greater social impact or using it to ease the cost of goods produced or services rendered by the social business.

One of the most comprehensive of such initiatives is the global compact network of several hundred companies, dozens of non-governmental organizations, major international labor federations and several United Nations (UN) agencies in creating a more stable, equitable and inclusive global market by making shared values and principles an integral part of business activity everywhere.

Growing interest in social entrepreneurship and social business has encouraged businesses all over the world to provide services to poor people.

The social business model, as pioneered by the Nobel Peace Laureate Muhammad Yunus, has created more than 40 social businesses in Bangladesh and has been replicated in Albania, Haiti and African countries such as Ghana and Togo.[1] It has reduced poverty and improved social welfare by enabling greater access to clean energy, water, nutrition, health care and education.[2] Social businesses have also encouraged the poorest and most vulnerable people to participate in socially and environmentally sound businesses to generate income, spur entrepreneurship and create jobs.

Today the concept of social business is broadly acknowledged by academic institutions, multinational corporations such as Danone, the UN in its Millennium Development Goals action plan and the European Union in its social business initiative.

Social businesses are particularly well suited to developing countries. These businesses prioritize social and environmental issues over profit maximization and look for creative, homegrown solutions for these issues. They can thus remedy market failures by reaching customers whose needs are not currently addressed or by creating markets where none had existed before. Social businesses may be particularly able to generate inclusive growth in Africa—where social and cultural norms emphasize giving to kin and community, and where similar business models with a social objective and a sense of selflessness (such as in savings and credit cooperatives) proliferate.[3]

What is social business?

Social business, as part of social entrepreneurship, is at the heart of an extensive debate in managerial and economic literature.[4] Several authors have attempted to define social business, social entrepreneur and social entrepreneurship and clarify their aims and characteristics.

Definition and scope

The concept of social business has two components: social and business (entrepreneurship). There is no such thing as nonsocial entrepreneurship. In fact, traditional entrepreneurship creates most jobs in developed countries—a social aim.

Entrepreneurship. While consensus on the definition of entrepreneur and entrepreneurship is perhaps impossible, an entrepreneur can be defined as a person who starts or organizes a commercial enterprise, especially one involving financial risk.[5] A social entrepreneur is thus a person who organizes or operates a venture or corporation that features social goals.

Social. "Social entrepreneurship creates new models for the provision of products and services that cater directly to basic human needs that remain unsatisfied by current economic or social institutions."[6] While traditional entrepreneurship creates social wealth as a byproduct of economic value, social entrepreneurship creates economic value that allows the organization to achieve sustainability and benefit society. According to Dees (1998), "for social entrepreneurs, the social mission is explicit and central. Wealth is just a means to an end for social entrepreneurs." But developing new social enterprise business ventures is only one facet of social entrepreneurship; another facet is maximizing revenue.

Social business. Social businesses are more narrowly defined as companies created for social rather than personal financial benefit. While investors may recoup their initial investments, and while a successful social business generates profits, these profits are reinvested for growth and innovation or used to seed new social business ventures, rather than distributed to investors. Social businesses are similar to cooperatives—businesses that practice economic fairness by ensuring equal access to markets and services among an open and voluntary membership base. Because they are owned by the consumers of the services they provide, cooperatives tend to make decisions that balance the need for profitability with the greater interests of the communities they serve.[7] Social businesses instead are owned by an individual, or a small team, similar to any other enterprise.

What makes social entrepreneurship so promising?

Dees (1998) defines social entrepreneurs as "one species in the genus entrepreneur." But what constitutes the genus?

Pomerantz (2003) defines social entrepreneurship as "the development of innovative, mission-supporting, earned income, job creating or licensing ventures undertaken by individual social entrepreneurs, nonprofit organizations, or nonprofits in association with for-profits." Some social businesses have been started at the grassroots level and scaled up progressively—in some cases becoming large companies—while others have been created in collaboration with international corporations such as Danone, Veolia, Intel and BASF. All social businesses focus on the poorest and most vulnerable populations,

but are run in financially sustainable ways. Their business models are generally aimed at creating maximum impact by reaching scale and scope.

Seven principles of social business

According to the Yunus Social Business GmbH, seven principles characterize social businesses:

The business aims to solve social or environmental problems. A social business always has a social or environmental mission. In a developing country, the mission is typically related to reducing poverty. Such social or environmental missions can include housing and sanitation, nutrition and water, access to clean energy, financial services and insurance, education and training, empowerment of women or employment and income generation for poor or vulnerable people.

The business is financially sustainable. While profit making is not the primary goal of a social business, a social business still needs to generate revenue to cover its costs. A social business delivers products and services to its beneficiaries, based on a clear revenue model. It strives for effectiveness and efficiency and is typically incorporated as a limited company or other legal entity with well-defined ownership rights.

Investors are repaid but derive no further personal financial benefit. Social business investors may recoup their initial investment, but they agree not to receive any personal financial benefit beyond this amount, whether through profit distribution (dividends) or capital gains on the sale of shares or assets. This helps to ensure that the social business's focus does not drift toward personal enrichment at the expense of the social mission. Aside from investment money, if an entrepreneur or investor is also employed by the social business, he or she may earn market wages as with any other employment.

Profit funds expansion, improvement or seeding of other social businesses. Once investors have recovered their original investments, a social business's entire financial surplus is reinvested for greater social impact rather than distributed for private financial gain. This structure maximizes the social impact of the money invested. Because a social business does not rely on donations, funding to a social business can be made as an investment, and the impact of each "social business dollar" is multiplied as it is recycled and reinvested.

The business is environmentally conscious. Some social businesses have an explicitly environmental mission, but all social businesses operate in a way that respects the environment and preserves it for others and future generations.

Employees earn market wages and enjoy better working conditions. Employees of a social business receive market wages in the countries where the social businesses are located. They should also enjoy good working conditions, possibly better than those in competing traditional businesses in their countries and industries.

The business assumes that humans have complex motivations beyond maximizing money. While investors derive no personal financial benefit from their investment in a social business, they may derive nonmaterial value (for example, enjoyment or moral fulfillment) from helping others and creating social benefit. The fundamental assumption at the root of social business is that humans are not simply money maximizers (as taught by traditional economic theories of narrowly rational business behavior), but have complex motivations, including the desire to create happiness for others.

Human capital impact of social business: A conceptual framework

The market economy has generated unprecedented wealth for humanity and led to the rapid development of countries and regions. But there is growing awareness of the limits of business-as-usual profit maximization, which can lead to bubbles, crises, market failures

and inequality. Economic growth alone does not always reduce poverty or solve all problems. In fact, in some resource-rich but institution-poor African countries, strong GDP growth has not worked in favor of poor and vulnerable people, and in some cases may even have exacerbated inequalities, communal tensions and insecurity. This trend has recently manifested in the Arab Spring in North Africa, where, despite substantial economic growth, unemployment and rising poverty—particularly among young people—led to social unrest that toppled governments.

Social businesses can become important drivers of economic, social and environmental development (figure 27.1). They generate pro-poor economic activity, provide meaningful employment to marginalized groups and individuals and deliver much-needed products and services to vulnerable and disadvantaged beneficiaries. In doing so, they can create new industries and markets that traditional firms may also venture into.

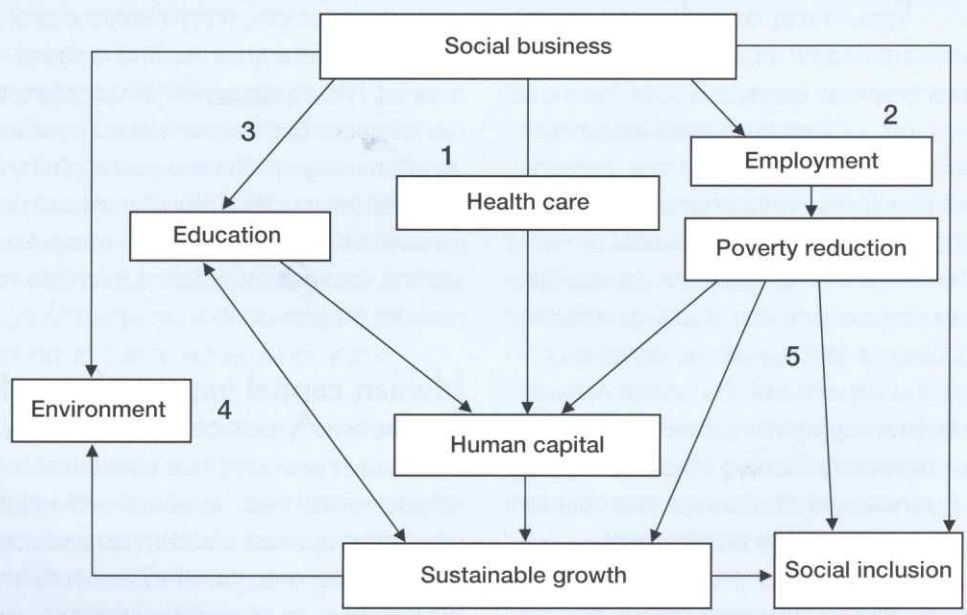
Employment

By investing profits in social issues and creating new businesses, social businesses generate employment for and with the poor and disadvantaged. They can provide opportunities for poor and vulnerable or marginalized people, including refugees, ex-offenders, disadvantaged youth, single mothers and people with physical or mental disabilities. A social business can be designed with poor people at the heart of the value chain—as suppliers, employees and distributors/independent salespeople. Beyond delivering essential services and products, social businesses that generate incomes for poor people can operate in sectors spanning from agriculture to manufacturing to services. Social businesses can be especially effective at combating youth unemployment and underemployment, focusing on sectors in which a country or region enjoys a comparative advantage. A social business can choose a deliberately labor-intensive operating strategy and actively seek employee growth beyond that of a typical profit-maximizing business. Rather than seeing more employees as a necessary but unwanted feature of company growth, it can actively seek to employ more people for the sake of employment itself.

Products and services for the poor: Health, nutrition, solar energy and others

Social businesses can serve a social mission through the products and services they

Figure 27.1 **Conceptual framework**



Source: Authors.

sell to their target customers, who are also their target beneficiaries. Grameen Danone, for example, fights child malnutrition by selling yogurt fortified with micronutrients. Grameen Shakti, which sells off-grid solar power solutions to people who lack electricity, has already been replicated in Togo by Kopeme Group since 2010. Grameen Veolia, which sells clean piped water in communities where the groundwater is poisoned with arsenic, could provide a particularly relevant model for some Sub-Saharan countries. Other social businesses provide health care, microinsurance, telecoms or other services and products that address the needs of poor people and other underserved, marginalized or vulnerable groups.

Education

Social business can improve education outcomes through two complementary channels. First, social businesses can provide education services. Creating social business to expand enrollment in education, especially technical and vocational education and training, seems an excellent way of mixing the advantages of the private and public sectors.

Second, by offering employment opportunities and generating revenue for poor people, social businesses provide poor children with greater access to education, which creates better opportunities for them and leads to human capital accumulation.

Improving the environment through social business

By reinvesting profits in social and environmental activities, social business contributes to sustainable development and green growth. By operating in an environmentally conscious manner, social businesses reduce environmental damage.

Social business in Africa

Social business is a powerful tool to combat youth unemployment, poverty, inequality and other challenges. The specific social business model outlined here—still nascent in Africa—is scalable and replicable and can spur new markets, turning poor people into customers, producers, entrepreneurs and employees. In a unique position to bring together all important stakeholders of an entrepreneurial ecosystem, the Bank is promoting social business across the continent, in collaboration with governments, international development agencies, universities, social business experts and other key stakeholders.

What kind of business model is suitable for Africa?

Some business models may be particularly useful in Africa, including:

- *Price-differentiation and cross-subsidization models.* These businesses offer a product or service to the most needy at or below cost and compensate for the loss through higher margins on sales to those who can afford to pay more. This may involve integrating specific features into the product or service intended for higher earners, who might consider these features signs of higher social status.
- *Pay-per-use models.* These businesses give a product or service to an entire community and ask customers to pay for each use of it.
- *No-frills models.* These businesses have highly standardized, basic but robust offerings that rely on high volume and low unit costs to keep prices affordable even for the poorest.
- *Shared channel models.* These businesses use an existing channel to distribute a social product.
- *Contract production models.* These businesses engage low-income producers as part of the supply chain through a simple assured buy-back arrangement.
- *Technology leverage models.* These businesses leverage disruptive products and services to solve social problems by designing them for the benefit of poor consumers.

Many of these business models have already been replicated in other countries, such as Albania, Colombia and Haiti, and have started to be replicated successfully in some African countries.

Social entrepreneurship initiatives in Africa

In late 2012 the Bank launched a 19-month pilot program in collaboration with Yunus Social Business GmbH to create a holistic social business movement (HSBM) in Africa (box 27.1). The program focuses on fighting youth unemployment, estimated at more than 20% in Sub-Saharan Africa and 27% in North Africa. It seeks to foster youth entrepreneurship and youth employment in poor regions by creating jobs and providing skills training. Other priority issues include empowering women, creating livelihoods in rural areas (agricultural and nonagricultural) and promoting clean energy. It can also address other important needs depending on local context.

The HSBM program in its pilot stage includes Togo, Tunisia and Uganda and has two phases. The first phase raises awareness, builds capacity by training Bank staff and key stakeholders in social business and develops an ecosystem conducive to social businesses. The second—the implementation phase—supports the creation and growth of social businesses through social business incubator funds.

The incubator and investment fund in each regional member country (RMC) is structured as a network of three to four related organizations acting within two pillars—the incubator and the investment fund.

The incubator's role is fourfold: spreading the movement of social business, identifying the most promising social businesses, building them to investment-ready phase for the RMC investment fund and providing ongoing support as needed to the social business entrepreneurs. Incubator services provide business development services and technical assistance to RMC-based social entrepreneurs, including coaching, strategic advice, general management support, business and financial planning, networking and partner searches and improvements to corporate governance.

The investment fund finances social businesses through long-term low-interest loans, equity investments or alternative financial instruments at better-than-market conditions. The investment fund raises capital for investment into social businesses from international and RMC-based philanthropic investors and donors. Returned capital from social businesses to the RMC fund can be reinvested within five years as agreed with investors, after which the principal will be returned. Any surplus derived from interest or any other form of upside, as well as any capital returned from donations earmarked for investment into social businesses, will be available for reinvestment or for coverage of the investment fund and the incubator's operational expenses. The social business incubator funds, for which the Bank provides anchor funding, focus on high-growth potential projects with investment needs between roughly USD50,000 and USD350,000.

Policy implications of social business

Skills development for social business

The competencies needed for social entrepreneurship differ from those for traditional

Box 27.1 The Holistic Social Business Movement

On March 13, 2013, the African Development Bank (AfDB) and Yunus Social Business GmbH (YSB) launched the HSBM in Tunisia, with a National Conference on Social Business gathering more than 500 people, 120 of whom participated in an interactive workshop on how to transform projects into social businesses. Professor Yunus and Bank President Donald Kaberuka both spoke at the conference. YSB has also conducted a training of Bank staff in Tunisia and a knowledge seminar on social business. The AfDB together with YSB is setting up a social business incubator in Tunisia. Other next steps included holding national conferences on social business and regional trainings for Bank staff in Togo and Uganda in the first semester of 2013 and establishing a social business incubator in Tunisia in the second semester of 2013. Further, the first social business accelerator worldwide was launched in Tunisia in March 2014. The HSBM has already gained the support of Tunisian President, the Togolese Minister of Development, the Ugandan Finance Minister and other high-ranking officials from Uganda's Ministry of Gender, Labour and Social Development in Uganda.

entrepreneurship. First, social entrepreneurs must maintain their sense of mission in the face of moral intricacy. Second, they must recognize and take advantage of opportunities to deliver, in a superior way, the social value they aim to provide. Third, they must exhibit in the social arena the risk tolerance, innovativeness and "reactiveness" of commercial entrepreneurs. Social entrepreneurs "exhibit a balanced judgment, a coherent unity of purpose and action in the face of complexity."[8]

Linking corporate social responsibility to social business

Interest is growing in exploring the intersection between private enterprise and public interest: taking the best of a business approach—ingredients such as entrepreneurial energy, market discipline and financial sustainability—and putting it to work for a social or environmental purpose (figure 27.2). A new generation of social entrepreneurs—some from Ghana, Senegal, Tanzania and Togo—is moving beyond the "business for me, charity for others" dichotomy, unleashing innovative solutions to social and environmental problems.

But how to ensure a lasting, sustainable impact from corporate social responsibility actions is not always obvious. Funding an orphanage, for example, is clearly benevolent, but how can this funding be maintained in the long term to ensure that the orphans' needs are met? Because social businesses emphasize financial sustainability, they are a powerful channel for corporate social responsibility resources.

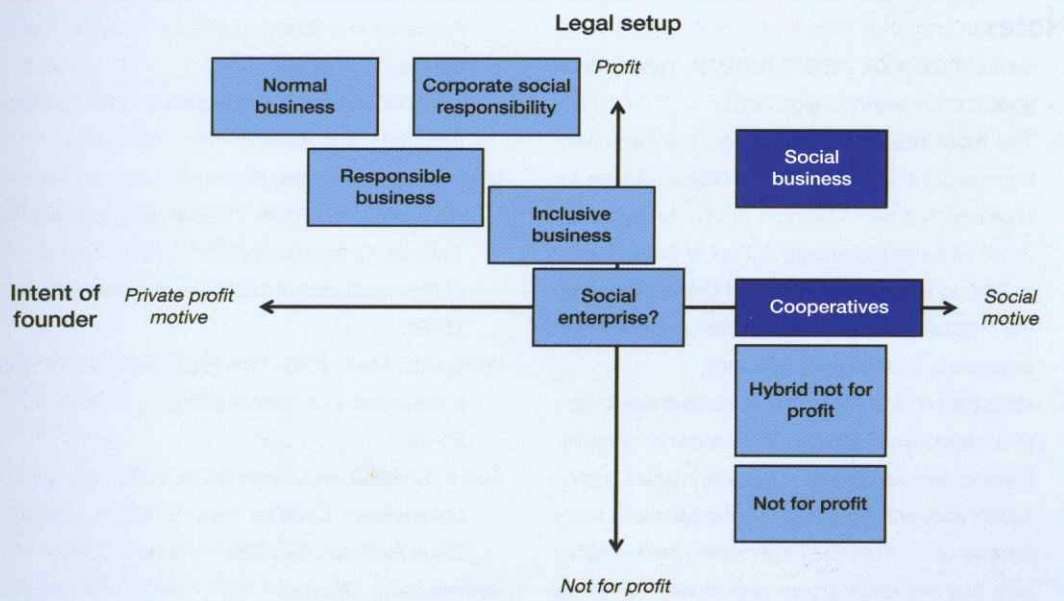
Leveling the playing field for social business

By way of its basic tenets, social business aim to focus on those who are often underprivileged and underserved, and who reside in the more disadvantaged regions of a country. Similar to policies that target other risky ventures such as startups, or disadvantaged groups such as women, developing countries may consider offering tax breaks to social business and more preferential financial products including vouchers, grants or loans with submarket interest rates and longer grace periods. These incentives could function as important triggers for setting up the by nature riskier social business and create markets for and with the poor.

Conclusions

The pilots aim to demonstrate that the social business concept is viable in Africa, and that

Figure 27.2 **Social business in an enterprise spectrum**



Source: Authors.

its implementation can support high-growth social businesses that positively and sustainably affect social issues in Togo, Tunisia and Uganda. The HSBM may then be scaled up and replicated in other countries across Africa. But this is just one step. The Bank can further integrate social business into its policies and procedures and promote social business development in Africa by developing funding windows for social business investment funds, promoting social entrepreneurship and social business curricula at secondary and higher education institutions, financing infrastructure projects and social business initiatives in an area and encouraging policies favorable to social business in the RMCs.

By taking these actions, the Bank can enable the poorest and most vulnerable people in Africa to benefit from services and products that will improve their livelihoods and to participate in socially and environmentally sound businesses that generate income, develop entrepreneurship and create jobs. By facilitating the growth of social entrepreneurship and social businesses in RMCs, the Bank can achieve its vision of inclusive growth, skills and technology development, private sector development and governance. Private sector development that incentivizes the creation and support of social businesses thus presents a crucial avenue for the Bank to achieve its long-term strategy.

Notes

1. Yunus 2003, 2007, 2009, 2010, 2011; Yunus, Moingeon and Lehmann-Ortega 2010.
2. The most researched has been the Grameen-Danone Joint Venture, with the Global Alliance for Improved Nutrition funding a study conducted by Johns Hopkins Bloomberg School of Public Health in 2011, to evaluate the impact of fortified yogurt on the nutritional status and cognitive performance of school-age children in Bangladesh.
3. More than 40% of African households are members of a cooperative society. The cooperative movement is Africa's biggest nongovernmental organization; cooperatives play a substantial role in many national economies and have created many salaried jobs and self-employment opportunities in Africa (ILO 1997).
4. Choi and Majumdar 2014; Certo and Miller 2008.
5. Venkataraman 1997; Barber 1998. Dees (1998) defines entrepreneurship as including three elements: recognition and relentless pursuit of new opportunities to further the mission of creating social value, continuous engagement in innovation and modification and bold action regardless of resource limitations.
6. Seelos and Mair 2005.
7. ILO 1997.
8. Mort, Weerawardena and Carnegie 2003.

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CHAPTER 28

Strengthening governance and accountability: Putting Africans at the center of social services

Gita Subrahmanyam, Caroline Jehu-Appiah, Nejmudin Kedir Bilal, Francis Ndem and Nakubyana Mungomba

"Whatever you do for me but without me, you do against me"

—Youth of Kazakhstan[1]

Governance and accountability are central to Africa's development goals. In particular, the continent's focus on sustained and inclusive economic growth and poverty reduction cannot be achieved without addressing governance. Poverty in Africa is partly attributable to waste, corruption, lack of transparency and inefficiency in the delivery of social services. More than 40% of the population of Sub-Saharan Africa is poor—that is, living on less than USD1.25 a day.[2] Only 5 of 54 African countries scored above 50 in Transparency International's Corruption Perceptions Index in 2012.[3]

Building human capital development systems centered on communities—with a focus on empowering the poor, especially poor women—is the key to increasing economic growth, overcoming poverty and achieving the Millennium Development Goals. Well-skilled and healthy people can contribute to more rapid and sustained growth in Africa, and programs focused on developing human capital would allow the poor to escape from poverty. Governance interventions focused on social service delivery are needed to achieve these multiple goals.

This chapter outlines the pivotal role of governance for improved social service delivery, more robust human capital and more inclusive and sustained growth in Africa. It contends that, to enhance governance, better mechanisms are needed to strengthen value for money, voice and accountability, transparency and greater citizen participation in service delivery. The main principle of improving governance and accountability is to put the poor at the center of service delivery, which would ensure that services provided are relevant, equitably distributed and of good quality.

The chapter is organized as follows. The first section defines "governance" and establishes its importance for human capital development. It shows that ideas of who should govern have evolved over time and points to the merits of a more decentralized model for improved human development outcomes. The second section examines the characteristics of governance and accountability in service delivery in Africa today. It demonstrates that overcentralized and weak governance systems have allowed waste, low value for money, poor management practices and regressive policies to continue unabated. The third section highlights the steps that some African governments have taken to improve their governance systems, while the fourth section suggests actions and policies that can enhance the relevance, quality and equity of social service provision through strengthening governance and accountability. The chapter concludes by considering the merits of "new public governance" as a step toward overcoming some of the problems of service delivery in Africa today.

What is "new public governance," and why is it important for human capital development?

"Governance" is a popular but imprecise term that has evolved in relation to changing ideas about the scope of government and who holds—or should hold—political power. It refers to the institutional arrangements and processes by which political decisions are reached or put into practice. Once a synonym for "government," "governance"

has now come to mean the opposite—that is, "governing without government."[4] Since 1980 "governance" has taken on at least six distinct meanings for public service provision: (1) "good governance," where public affairs are managed according to the principles of efficiency, accountability, participation, transparency, equity and rule of law; (2) economic governance, referring to the institutional environment within which the economy functions, including the formal and informal rules and regulations that govern economic transactions and determine access to markets and public services; (3) corporate governance, referring to the structures and processes by which organizations delivering public services are directed, controlled and held to account; (4) new public management, where private sector management methods—in particular, a focus on the "customer" and an emphasis on outputs, value for money, performance standards and measures, and consumer choice—are applied in public service delivery; (5) public–private partnerships, where markets and quasimarkets play a role in delivering public services; and (6) policy networks, where powerful coalitions comprising a variety of state and nonstate actors regulate and coordinate public policy and service delivery.[5] "Governance" thus refers to institutional arrangements and principles on how power should be exercised at both the state and market levels, with responsibility and ethics at the center (1–4 above), as well as political processes involving nonstate actors (5–6).

The movement from "government" to "governance" reflects an ideological shift from viewing state actors as the sole and legitimate source of political authority in a country, toward seeing the benefits of more participatory and diffuse power-sharing arrangements. The core idea here is that modern states should be responsive to the needs and preferences of citizens. The public administration literature thus documents a transition from traditional public administration to "new public management" and then to "new public governance" (table 28.1). What we see as we move down the table is a diffusion of political power based on the notion that neither states nor markets can be trusted to faithfully act in the collective social interest. In most countries the move toward promoting the private sector and privatization in social service delivery occurred in response to systematic problems in state provision linked to rent seeking, inefficient resource allocation, poor quality outputs, low performance, limited responsiveness and weak accountability.[6] Similarly, markets can be viewed either positively as efficient resource-allocating mechanisms or negatively as arenas where self-interested

Table 28.1 From traditional public administration to new public governance

Public administration paradigm	Institutional manifestation	Who has power	Basis of political authority	Nature of power	Source of legitimacy	Main contribution to policy process	Policy focus in service delivery	Accountability mechanisms
Traditional public administration	The state as sole policy authority	Government officials	State-centered	Unitary	State as "the epitome of the collective interest" (Pierre and Peters 2000, 15)	Authority (legal framework)	Policy implementation	*Top-down:* "Good governance" *Bottom-up:* Voice/ removal from office
New public management	Private–public partnerships	Government officials and market players	Market-based	Devolved	Markets as "the most efficient and just allocative mechanism available" (Pierre and Peters 2000, 19)	Economy and efficiency (value for money)	Service inputs and outputs	*Top-down:* Compact/ corporate governance *Bottom-up:* Consumer choice/client power
New public governance	Policy networks	Government, market and civil society actors (any combination of these groups)	People-centered	Plural and pluralistic	Citizens as the only ones who can ensure that their interests are represented and secured	Effectiveness (accountability)	Service processes and outcomes	*Top-down:* Constitutional and legal framework/ preference shaping (Dunleavy 1991) *Bottom-up:* Wider citizen consultation mechanisms

Source: Authors' compilation based on Osborne (2006), Skogstad (2003), Pierre and Peters (2000), and Dunleavy (1991).

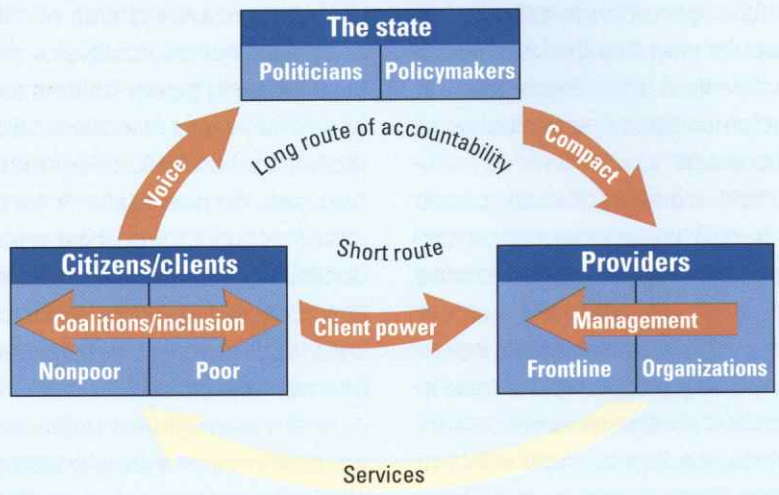
actors pursue their narrow personal goals at the expense of the broader social welfare.[7] New public governance reflects an increasingly popular view that the best way to ensure citizens' welfare is to involve them in the design, implementation and evaluation of public service delivery.

The transition from traditional public administration to new public governance represents an important step toward maximizing human development outcomes. In the new public governance model, multiple interdependent actors—including citizens—participate in policy decisions and contribute to the delivery of public services, leading to more effective policy outcomes. Participation by a plurality of actors both increases the level of expertise available in policy circles and enables the articulation of a wider range of interests. By putting people at the center of policymaking, new public governance ensures that policy decisions are more responsive to local needs and demands and that there is a greater focus on quality and equity in social service provision. In addition, because the model is based on deep decentralization, there is a greater chance of achieving synergy in interventions across social sectors.[8] Finally, it should be noted that the state is not replaced in the new public governance model: rather, civil society becomes a key partner of the state alongside the private sector, and any combination of these three sets of actors may be in force for any given policy area.

In an ideal governance system, power is tempered by accountability and those who hold power are held responsible for both their actions and the outcomes of their actions. Yet in some systems (even democratic ones), this does not happen. This is because people lack information, competence or will to hold those in power accountable,[9] and people in power are not held accountable through institutional mechanisms and processes. These shortcomings can be resolved by increasing transparency, which allows easy access to information; building peoples' skills and capabilities, so that they are better able to process the information they receive; activating peoples' voice, so that they feel empowered to act on the information they have processed; and strengthening institutional mechanisms, so that there are systems of checks and balances, as well as positive or negative incentives inducing power-holders to behave in an accountable and responsive manner. Positive incentives can include performance-related bonuses, commendations for doing a good job or retention of political office because of continued citizen confidence. Negative incentives can include legal redress, public censure, abandonment by citizens or clients or removal from power.

In an ideal service delivery system, there are built-in mechanisms enabling the users of services to hold those providing the services accountable. This can be better understood by examining the relationship between the three key stakeholders in the service delivery process: citizens/clients, service providers and politicians/policymakers (figure 28.1). Service users may pursue a "long route of accountability," whereby in their role as citizens they hold those in power (politicians and policymakers) responsible for putting in place institutional mechanisms (or "compacts") that induce service providers to deliver sufficient, relevant and high-quality outputs.[10] However, problems can occur in this circular relationship: policymakers may lack the competence, information or will to hold service providers fully accountable; or citizens' influence (or "voice") may be weak, as is often the case for poor people or in nondemocratic contexts. A much more straightforward and "short route to accountability" would be to empower service users in their role as clients to directly hold service providers accountable for the quantity, quality and relevance of their outputs. This could be done by increasing the level of competition among service providers, so that they have an incentive to perform better; enabling citizens to monitor and discipline service providers; or strengthening service users' role in policymaking by moving toward a new public governance approach to service delivery. In this way, "client power" is enhanced, and service users are transformed from passive service recipients to active and mobilized participant-members in the process.[11]

Figure 28.1 **Key relationships of accountability in service delivery**



Source: World Bank 2004.

Where accountability channels in service delivery are weak, basic services provided may be insufficient, irrelevant, inequitably distributed or of low quality. Any of these attributes would result in suboptimal human development outcomes. Moreover, other problems could arise, such as the capture of the benefits of government spending or service provision by a small set of actors at the expense of the many. In such situations the biggest losers will most likely be the poor or other vulnerable groups with weaker economic and social influence.

Strengthening governance and accountability in service delivery is thus very important for human capital development. Tying power to responsibility ensures not only that services are delivered but also that the services delivered are relevant, equitably distributed and of good quality. The main principle for improving governance and accountability is to put the poor at the center of service delivery.

What characterizes governance and accountability in service delivery in Africa?

Insufficiently decentralized administrations

Most African countries continue to deliver social services based on a centralized top-down model consistent with the traditional public administration model identified in table 28.1. Service delivery is performed mainly by public providers, and central government ministries retain responsibility for spending and resource-allocation decisions, rather than devolving these functions to regional, local or private providers. Education in most countries is mainly state provided, and across Sub-Saharan countries public facilities provide two-thirds of all health care.[12] In addition, centralized bureaucratic planning often means that policymakers become intensely involved in operational details and concentrate more on inputs than on outcomes and impact.

Where there is decentralization, it is mostly based on a "devolution of power and restriction of budget" approach. Therefore it tends to have the following constraints: weak capacities of local administrators, to whom management and finance functions have been devolved; no formal reporting mechanisms or information requirements; no specific performance requirements; lack of accountability of local-level civil servants either to their vertical line ministries or to local leaders in charge of basic social services; low representation of civil society through capable institutions at the local level; and lack of synergy between interventions across social sectors. Because the voice and authority of line ministries continue to prevail on local institutions, there are often

imbalances in resource allocations—which seems to be the case looking at the differences in spending and outcomes in the health and education sectors in Senegal and Tanzania (table 28.2 below).

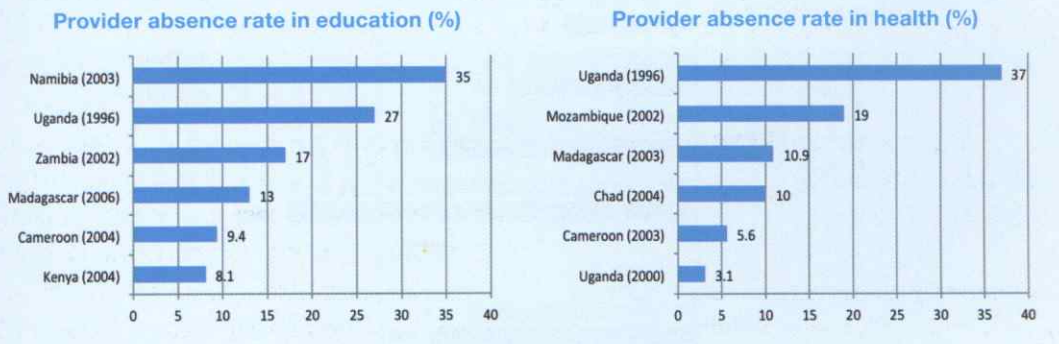
The main inefficiencies in service delivery are closely linked to failures from overcentralized bureaucratic structures. These include inadequate and inefficient resource allocation and financing options; inadequate domestic production of and access to commodities; inappropriate procurement and management of equipment and commodities; inappropriate staff mix; lack of performance incentives; and weak participatory and accountability mechanisms.

Inappropriate, outdated and weak regulation

Regardless of strong centralization, in many African countries government regulations for standards of service delivery are inappropriate or outdated, and enforcement is weak. This creates a lack of motivation and accountability for local civil servants and causes technical deficiencies and leakages of public resources. Due to weak clinical governance, the quality of care in African hospitals is generally low. In addition, the lack of hospital accreditation and weak enforcement of regulations and clinical standards has resulted in the poor quality of care. Due to poor regulation in the pharmaceutical industry, a third of medicines in developing countries, notably Africa, are counterfeit and may be damaging health, rather than contributing to better health outcomes.[13] Resources do not reach the frontline, often because of corruption, and there is inefficient and ineffective investment of the public budget. Across African countries there are indications of "leakages," where funds allocated to particular services do not reach the intended end-user. In Chad 99% of funds allocated never reached local health centers, and in Kenya more than 80% of schools did not receive the full bursaries to which they were entitled.[14] Given the lack of accountability to government and citizens, service providers have a large degree of latitude to follow their own agendas.[15] Moreover, policymakers have difficulty enforcing implementation of their policies and regulations down the chain of command.

Lack of control features and performance incentives lead to inefficiencies in education and health spending, though outcomes vary across African countries. Salaries are the highest-cost items in education and health provision: in some countries, such as Ghana and Malawi, teachers' wages make up more than 90% of primary education costs.[16] Yet in many countries a high percentage of teachers and health workers do not show up to work (figure 28.2). Absenteeism among teachers ranges from 8% in Kenya to 35% Namibia, while absenteeism among health workers ranges from 3% in Uganda to 19% in Mozambique. Improved learning and health outcomes can only be achieved when service delivery providers (teachers, doctors) are actually serving users. The reasons for absenteeism vary across countries,

Figure 28.2 **Teacher and health worker absenteeism rates, selected African countries**



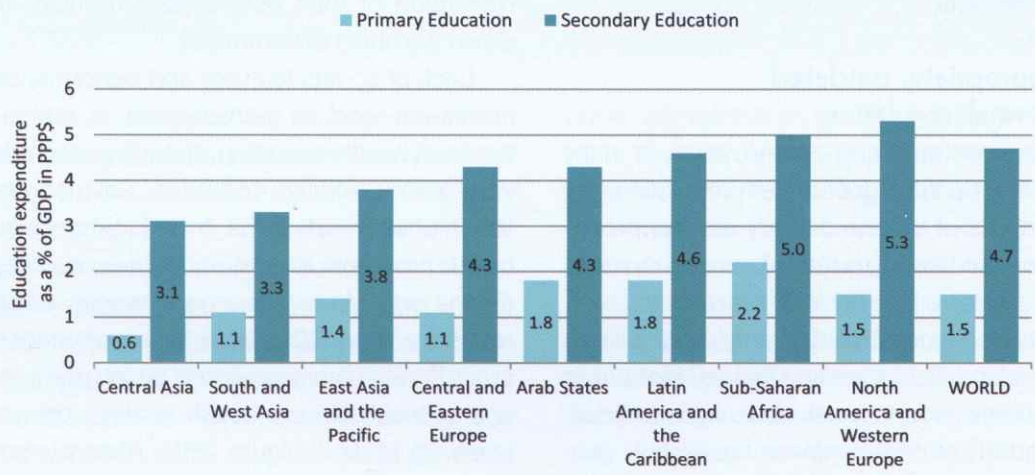
Source: PETS/QSDS Data Portal (http://pets.prognoz.com).

but civil service norms of guaranteed employment and salaries unrelated to merit or performance in many countries enable poor attendance.[17] The absence of incentives often makes it impossible to attract and retain qualified and knowledgeable civil servants in the social sectors, or to provide them with the necessary skills and support.

Low value for money

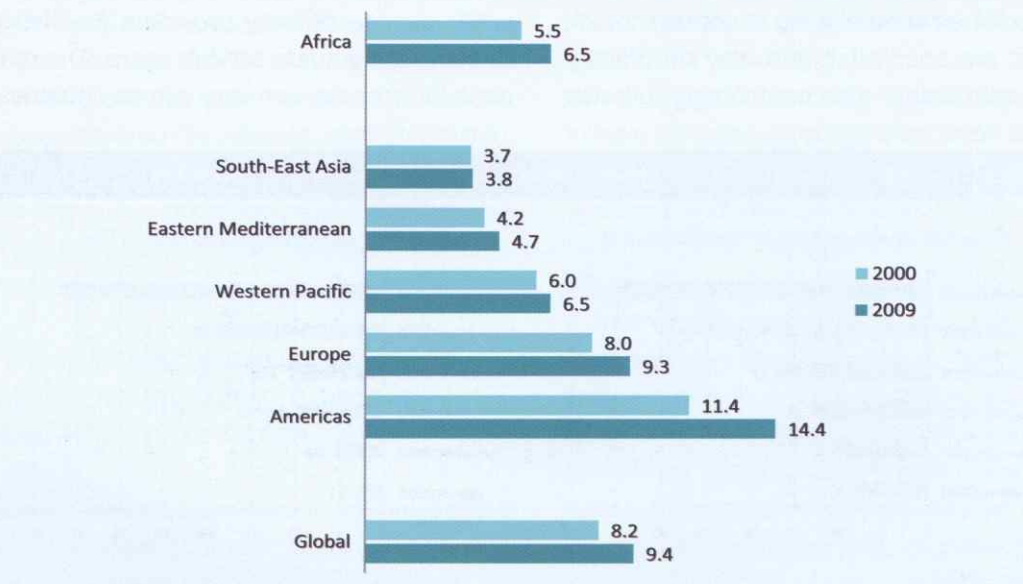
African governments dedicate a large share of their total spending to social services. Between 37% (Uganda) and 63% (Ethiopia) of total government expenditures in Africa are allocated to social services areas.[18] On average, African countries spend 7.2% of GDP on primary and secondary education and 6.5% on health—higher than any other region in the developing world (figures 28.3 and 28.4). Social protection measures also consume a large proportion of resources, notably in North Africa: in 2008 food and fuel subsidies constituted 31% of current government spending in Egypt, 20% in Morocco and 18% in Tunisia.[19]

Figure 28.3 Educational expenditures as % of GDP (PPP) by region, 2008



Source: UNESCO 2011.

Figure 28.4 Health expenditures as a % of GDP by region, 2000 and 2009

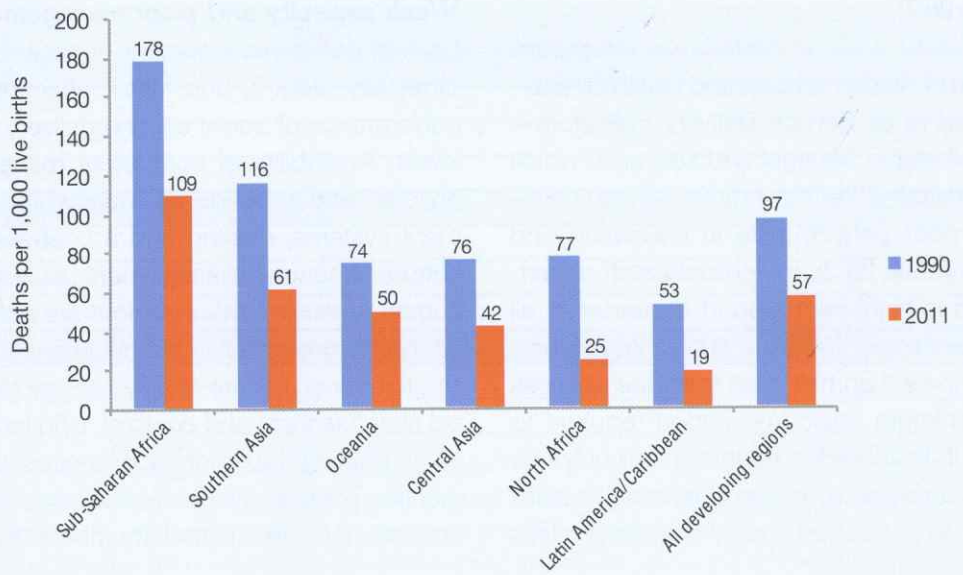


Source: WHO 2012.

Yet high spending has not generally translated into productive or effective outcomes. There is a weak link between resources allocated to social services and outcomes of social provision in most African countries—a problem partly attributable to weak governance and poor accountability. For example, the decline in under-five mortality has been slower in Africa than in other developing regions (figure 28.5). In Sierra Leone the government spends 18.8% of GDP on health, yet the country has one of the world's highest rates of child and maternal mortality, and national assessments by health workers indicate that the overall health situation is worsening.[20] In some countries social welfare remains low: nearly 50% of Kenyans live in poverty and more than 40% lack sufficient food.[21]

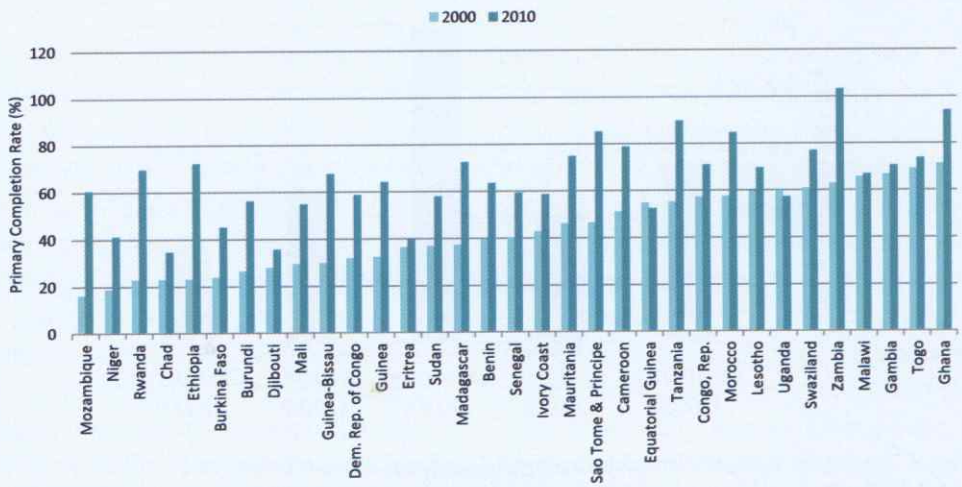
The reasons for poor outcomes differ across countries. While in most African countries the number of students with access to primary education has grown over the past 10 years (figure 28.6), the quality of education

Figure 28.5 Under-five mortality rate by region, 1990 and 2011



Source: UN 2013.

Figure 28.6 Africa's progress toward MDG 2: universal primary education



Source: Authors' calculations based on UNESCO Institute for Statistics data.

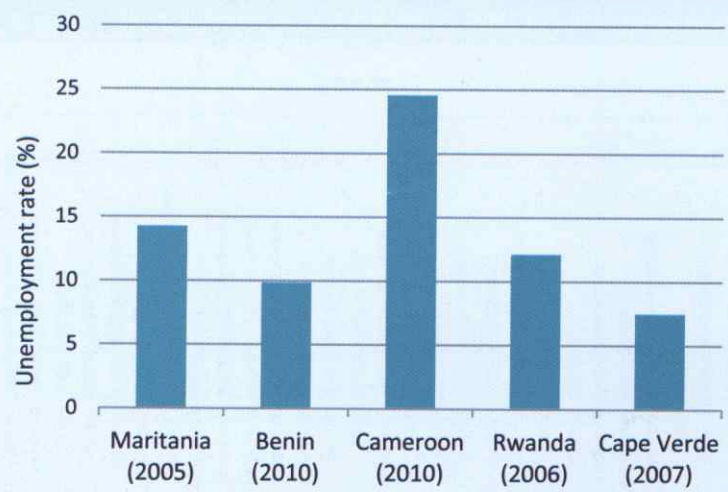
is not often globally competitive. For example, in international comparisons of student achievement, such as the Trends in International Mathematics and Science Study, African students have generally performed worse than non-African students.[22] In some cases it is not so much the quality as the relevance of the services that presents a problem. Skills mismatches between the outputs of education and the skills that employers demand have contributed to high youth unemployment and underemployment, even among those who have reached higher levels of education. A quarter of tertiary-educated young adults in Cameroon are unemployed (figure 28.7).

In 2010 a set of metrics on the performance of African schools and health clinics—referred to as Service Delivery Indicators—was piloted in Senegal and Tanzania, which demonstrated the reasons for African countries' poor performance in education and health (table 28.2). In Tanzania staff absenteeism is high, with around a quarter of all teachers missing on the survey day. Moreover, fewer than half of all teachers possess the minimum basic knowledge required to teach their subject, students spend only two hours a day at school and learning materials are in such short supply that there is less than one textbook per student. Given these constraints, it is hardly surprising that learning outcomes in Tanzania are poor. In Senegal only two in five health clinics have access to electricity, water and sanitation facilities, and only half have access to the three basic pieces of equipment (thermometer, stethoscope and weighing scale). In Senegal 22% of clinics were out of stock of the drugs considered essential, and one in five health workers was absent during the random spot check. Perhaps inevitably diagnoses are accurate in only a third of all cases and health outcomes remain poor.

Weak capacity and poor management

Lack of public management capacities and other key skills is one factor affecting the performance of social service delivery at all levels. Availability of competent managers, policies and procedures, quality-improvement systems, costing and a cost-analysis culture, financial management as well as human resources management are not high on the agenda in health or education. Administration functions are mainly held by technical staff (teachers and doctors), who lack the basic training and information necessary to monitor, plan, identify and solve problems.[23] For example, most staff members do not

Figure 28.7 **Unemployment rate among tertiary-educated people ages 25–34**



Source: Mauritania Core Welfare Indicators Questionnaire; Cape Verde Education Country Status Report 2011; Cameroon Employment and Informal Sector Survey; Benin Integrated Survey on Household Living Conditions; and Rwanda Integrated Household Living Conditions Survey.

Table 28.2 Summary results for Service Delivery Indicators pilot survey, 2010

	Senegal	Tanzania
Education		
At the school		
Infrastructure[a]	0.17	0.03
Children per classroom	34.23	74.05
Average number of students per teacher	28.74	48.71
Textbooks per student	2.55	0.94
Teachers		
Absence rate	0.18	0.23
Time children are in school being taught (minutes)	195	124
Share of teachers with minimum knowledge	0.52	0.42
Funding		
Education expenditure reaching primary schools[b]	153.59	124.54
Delays in salaries[c]	0.002	0.020
Health		
At the clinic		
Infrastructure[a]	0.39	0.19
Medical equipment per clinic[d]	0.53	0.78
Stock out of drugs[e]	0.22	0.24
Medical personnel		
Absence rate	0.20	0.21
Diagnostic accuracy in outpatient consultations[f]	0.34	0.57
Time spent counseling patients per clinician (minutes)	39	29
Funding		
Health expenditure reaching primary clinics[g]	1.78	7.01
Delays in salaries[c]	0.05	0.02

a. Percentage of facilities with electricity, water and sanitation.

b. Education expenditure reaching primary schools per primary school age student (purchasing power parity USD).

c. Proportion of employees whose salary has been overdue for more than two months.

d. Health facility's access to all three basic pieces of equipment (thermometer, stethoscope and weighing scale) (=1), or lack of one or more of them (=0).

e. Percentage of 15 basic drugs that during the survey were experiencing stock-out in the facility.

f. Average score 1 if correct diagnosis is reached, 0 otherwise, during patient case simulations.

g. Primary health expenditure reaching primary clinics per capita (purchasing power parity USD).

Source: Bold and others 2011.

have the skills to interpret and use data for decisionmaking, particularly at lower levels. At higher levels, policymakers and social services planners do not always have the management, analytical or communication skills for policy formulation and implementation.

Failures in forward planning have also affected service delivery outcomes. Across Africa there is a shortage of qualified health workers and teachers, with the problem stemming partly from past investment shortfalls in preservice training and weak human resource management.[24] Sub-Saharan Africa on average has two doctors and 11 nurses/midwives per 10,000 people—compared with 19 doctors and 49 nurses/midwives in the Americas, and 32 doctors and 78 nurses/midwives in Europe.[25] According to some estimates, the African health workforce would need to expand by around 140% to achieve enough coverage to have a positive impact on health and life expectancy in their countries.[26] In some countries low domestic production has resulted in shortages in medical supplies; in other cases poor supply chain management has resulted in drug shortages. In Malawi drug shortages have reached critical levels, with only 9% of health facilities (54 of 585)

possessing the full Essential Health Package list of drugs for treating common diseases.[27]

Poor allocation of resources and targeting of benefits

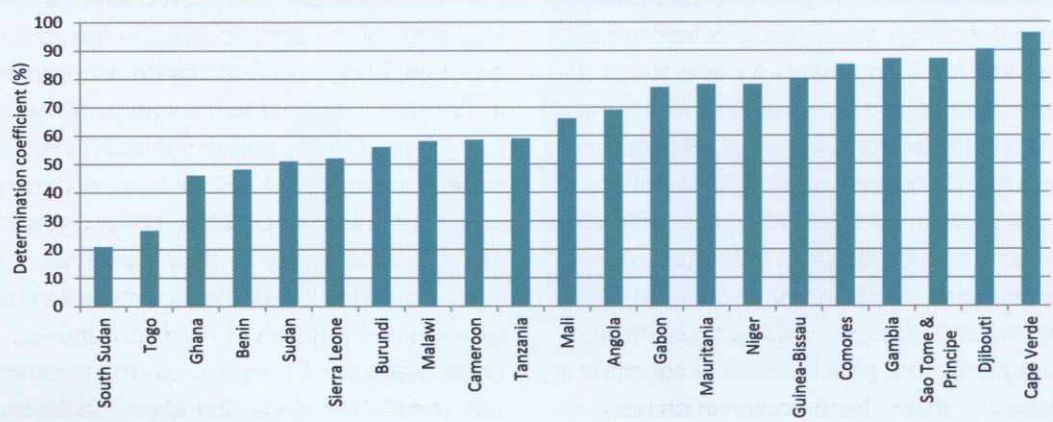
Poor planning and management mean that resource allocations often do not follow a logical pattern. In education the allocation of teachers largely reflects the distribution of public expenditures, since salaries are a major component of spending. In a consistent and fair system, the number of teachers available to a school should be higher when the number of students is larger. From a statistical point of view, this implies that the coefficient of determination that reflects the relationship between the number of students and the number of teachers should be close to 100%. In reality, however, this statistic varies from one country to another (figure 28.8). More than half of the countries in figure 28.8 have a coefficient below 70%. In Benin it is 48%, in Ghana 46% and in South Sudan only 21%. In Togo, for public schools with 200 pupils, the number of teachers varies between 2 and 16. Given that people are the main resource in social sectors, their equitable distribution among units of production is an important aspect of governance.

Additionally, within countries, resources are often unevenly distributed and not carefully targeted, so that those most in need of government assistance—the poor—do not receive the greatest benefits of social service provision. The wealthiest tend to capture the bulk of public social spending benefits, because governments allocate the greatest resources to the areas where the rich live (for example, urban centers) or to the sectors that they use the most (for example, tertiary education or specialized health care). In Guinea 48% of public spending on health goes to the richest quintile, and only 4% trickles down to the poorest quintile.[28] In Madagascar the poorest quintile receives only 8% of the education budget, the richest quintile receives 41%.[29] In Egypt nonpoor consumers receive 80% of the value of government food subsidies, and 93% of the benefits of state-subsidized gasoline go to the richest quintile.[30] Inequities in service delivery have led to widening income inequalities and contributed to intergenerational poverty. Many of the poor are women or single mothers.

Weak citizen voice and low transparency

In most African countries, service users (the citizens/clients shown in figure 28.1) have weak voice and no strong instrument to influence the allocation of resources or the planning and implementation of social service delivery. They are not involved in some or all of policy formulation, planning, implementation or monitoring of budget use and quality of services. Hence accountability by service providers to either communities or technical

Figure 28.8 **Determination coefficient (%) of the relationship between number of pupils and number of teachers in public primary schools in Africa, various years (2006–2011)**



Source: Authors' calculations based on data from Pôle de Dakar (www.poledakar.org/index.php/en).

ministries is very weak. Moreover, ordinary citizens often lack experience in negotiating or consulting with public institutions on service quality, which contributes to their institutionalized passive behavior on poor performance in service delivery. The fact that citizens do not generally have the capacity to hold their administrations and service providers accountable for inefficient social service delivery leads to exclusion of marginalized communities that have weak citizen and civil society organization capacity to demand accountability. This issue is particularly critical in fragile states where the rule of law is generally poor.

Most service users also have inadequate awareness of their rights or a poor capacity to ask for and exercise their rights. The common way to express citizen's voice is through local or national elections in countries where democracy is just emerging. Once elected, leaders are so overwhelmed by various urgent and competing priorities that they neglect pro-poor social services. Since the poor have few prospects to strongly express their voice, civil servants are not held accountable for effective delivery of basic social services. In addition, most service users lack the experience to negotiate or consult with public institutions. This contributes to passive behavior, poor service quality and weak accountability by service providers to communities.

Moreover, weak information reporting requirements in many countries mean that there are low (or no) flows of information from service providers to either beneficiaries or financiers. Communication infrastructures and information systems are weak in most countries, and private data are poorly captured, despite legal requirements. Thus there is little information exchange between the private and public sectors in most countries, and policymakers have difficulty in enforcing implementation of their policies and regulations down the chain of command.[31] This communication deficiency among central government, local authorities and citizens negatively affects the provision of basic social services to disadvantaged groups. These issues could be overcome if governments made use of tools such as citizen report cards or community score cards (see below), established community consultation mechanisms or included communities on social services governing boards.

Lack of information on service delivery performance provides citizens with little leverage for applying pressure on governments or service providers to improve performance. In most African countries there is little robust data on the quality of service delivery, which is critical for holding providers accountable for service delivery. Budget allocations alone have proven to be weak indicators of the quality of services. Furthermore, depending on the public sector to address service delivery failures may not be realistic.

What have African countries done to improve governance and accountability?

Some African countries have taken steps to collate and make available information on social services provision, and in some cases this has led to improved governance systems. Information matters: it clarifies issues for people wishing to hold service providers and governments accountable, and it elucidates problems that agencies committed to reform will take steps to resolve. With data, the case to demand good governance becomes easier to make. For example, the Service Delivery Indicators (see above) allow for a broad understanding of the quality of services being provided and for results to be compared across countries.

More than 30% of African countries have implemented diagnostic public expenditure tracking surveys (PETS) to better understand the apparently weak link between resource allocations and outcomes (table 28.3). PETS provide an indication of leakages in funding by tracing the path between central government allocation and receipt by social service providers. By collecting and disseminating data highlighting at what point funds go missing, PETS empower citizens/clients and strengthen accountability in social services provision (box 28.1). Sometimes the information that emerges from PETS reveals

Table 28.3 Summary table of PETS carried out in education and health sectors across Africa

Country	Education	Leakage	Health	Leakage
Cameroon	2004	No firm estimates	2003	No firm estimates
Chad	—		2004	73% nonwage 99% local allocation
Congo, Dem. Rep.	2007	No firm estimates	—	
Ghana	2000	50% nonwage 20% salary	2000	80% nonwage 20% salary
Kenya	2004	36% of bursary funds	2004	38% health center level 25% user fees at facility level 37% community development funds at facility level
Madagascar	2003 2006	9% of cash contributions	2003 2006	No firm estimates 15% petroleum and registers sent
Mali	2005	60–90% allocated textbooks	2006	No firm estimates
Mozambique	—		2002	No firm estimates
Namibia	2003	No proof	2003	No proof
Niger	2008	No firm estimates	2008	No firm estimates
Nigeria	—		2002	No firm estimates
Rwanda	2000 2004	No firm estimates	2000	No firm estimates
Senegal	—		2002	No firm estimates
Sierra Leone	2001	No firm estimates	2001	No firm estimates
Tanzania	1999 2001 2004	57% overall 18% nonwage 5%	1999 2001	41% 18% nonwage
Uganda	1996 2002	87% on average 18%	1996 2000	Not defined
Zambia	2002	10% fixed-rule grants 76% nonwage	2007	No firm estimates

Note: — denotes that no PETS was carried out. "No firm estimates" means that a PETS was carried out but there were no percentage estimates of the level of leakages.

Source: PETS/QSDS Data Portal (http://pets.prognoz.com).

Box 28.1 Reducing leakages in educational funding through a PETS in Uganda

In 1996 Uganda was the first country to carry out a PETS focused on its education sector to see how much of funding reached intended end-users. The survey showed that, between 1991 and 1995, only 13% of all funding and 22% of nonwage funding reached schools. The remaining 87% was leaked at the district official level and went to purposes unrelated to education. Following these results, the government launched a publicity campaign to inform citizens of how much money was actually being spent on education. Monthly intergovernmental transfers of funds were made public knowledge through newspapers. This action went a long way to decreasing the leakages in education funding from 78% to 20%, as evidenced in the follow-up PETS conducted in 2002.

Source: Reinikka and Smith 2004.

why government spending does not achieve expected outcomes: a PETS in education carried out in Zambia in 2002 showed that increased government spending on education had little effect on outcomes, because parents reduced their private spending on education by an equivalent amount.[32] However, PETS may not be able to be implemented in all settings: in Mozambique the complexity of financing and logistical systems in the health sector rendered estimation of leakages during its 2002 PETS difficult and led to the conclusion that lack of government control provided little incentive against fraud and corruption.[33]

Staff absence surveys have also served as a powerful tool for highlighting deficiencies in the quality of public sector service

provision. By providing information on how many service providers (teachers, doctors, nurses) do not show up to work when they are supposed to be on duty allows for measures to be taken to counter absenteeism.[34] The data in figure 28.2 indicate that Uganda was able to reduce absenteeism in the health sector from 37% in 1996 to just 3% in 2000.[35]

Citizen report cards (CRCs) and community score cards (CSCs) are also powerful tools in promoting transparency and public accountability. CRCs and CSCs gauge the quality and performance of public services, and the results of these surveys are normally made available to the public. However, there is little evidence of their widespread use across African countries. Some of the countries that have documented their use include the Gambia, Ghana, Kenya, Malawi, Rwanda, South Africa, Tanzania and Zimbabwe. However, in 2011/12 the Transparency Accountability Program of the Results for Development Institute issued requests for proposals from nongovernmental organizations (NGOs) to design and implement CRCs and CSCs in the health and education sectors in Burkina Faso, Ghana, Kenya, Mali, Rwanda, Senegal, Tanzania and Uganda—so these tools are gaining ground. Evidence from the Gambia shows how CSCs allowed for greater client power in decisionmaking, including a new public governance approach to policymaking in the health sector (box 28.2). Implementation of CRCs in Uganda led to improvements in both the quantity and quality of primary health care in Uganda (box 28.3).

Ethiopia and Senegal have launched several programs with the technical and financial support of bilateral donors' agencies to try and improve the quality of health care. Although none of these programs is specific to the issue of quality of care in the hospitals, they all have been implemented in hospitals and have shown that it is possible to improve results. A project in Ethiopia mobilized hospital management teams to enhance the performance of the hospital.[36] A similar approach has been undertaken in Senegal to develop quality awareness at the level of management teams.[37] These examples demonstrate that quality improvement is possible in hospitals.

Tunisia has recently addressed deficiencies in the outputs and outcomes of its education system—particularly the low quality and relevance of its offerings, which have contributed to difficult education-to-employment transitions and high graduate unemployment—by creating a Quality Assurance and Accreditation Authority (QAAA) (box 28.4). The QAAA has only recently become functional, so it is too early to report results on its effectiveness. However, it is expected to greatly boost the quality of higher education in the country, thereby tackling one of the main sources of youth unemployment, which was a main cause of the Arab Spring in 2010–2011.

Ethiopia's Protection of Basic Services program has substantially improved the access to and quality of basic service delivery through an institutionalized system for transparency, accountability and community voice

Box 28.2 Increasing client power through use of CSCs in the Gambia

In the Gambia CSCs found that teachers received more than 70% approval ratings across regions, while school facilities such as furniture, core textbooks and toilets ranked below 40%. These results led to lobbying by parents and school administrations to the Ministry of Education for the timely and adequate supply of teaching materials and equipment, as well as the establishment of a reward program to attract and retain qualified teachers.

In the health sector, the survey indicated less than 30% satisfaction with staff capacity and less than 15% satisfaction with the availability of essential health equipment. It was recommended that a health committee including community representatives be established for increased voice and accountability, through immediate feedback and mutually developed action plans. The CSC process also revitalized the self-help spirit among communities with individuals making voluntary financial contributions, and the emphasis on community roles in addressing problems with facilities in the community.

Source: Dedu and Kajubi 2005.

Box 28.3 Improving health outcomes through use of CRCs in Uganda

Experimental design. Uganda was the site of a randomized field experiment, where 50 rural communities were selected for intervention (treatment areas) and then compared against nonselected communities (control group). Surveys (or CRCs) were conducted to collect baseline information on health service provision: 50 service providers and 5,000 households were surveyed separately. The report card results were then disseminated to the two survey groups in three stages. During the first stage trained local health NGO workers organized community meetings to report results, provide information on patient rights and assist in the drawing up of an action plan to address community concerns. During the second stage the same NGO representatives reported results to health staff. The third stage was an interface meeting between community groups and health workers; a shared action plan was drawn up outlining steps to be taken by whom and within what time frame. The community contract was strengthened by measures to enable monitoring by citizens. At the end of one year the same respondent pool was re-surveyed to measure the impact of the CRC scheme.

Outcomes. Treatment area facilities showed marked improvement over control group facilities in the following ways.

Facilities saw an increase in quantity and quality of primary health care:

- 20% expansion in the utilisation of general outpatient services.
- 33% reduction in under-five mortality.
- 0.14 z-score increase in infant weight.
- Significant increase in child immunizations.

Additionally, there was an improvement in staff behavior and treatment practices:

- Absenteeism fell by 13 percentage points.
- Waiting times were 12 minutes lower than in control group facilities.
- Fewer drugs were leaked.
- Treatment group facilities were better maintained.

Cost. At a cost of only USD3 per household, or USD160,000 overall, the CRC scheme signified high value for money. The main expense related to collecting data for the report cards.

Source: Bjorkman and Svensson 2009.

Box 28.4 Improving higher education outcomes through quality assurance mechanisms in Tunisia

Context. Over the past decade Tunisia has experienced deterioration in the quality and effectiveness of higher education, with high leakages of funds and unprecedented graduate unemployment, which reached 33% in 2012. Apart from a poorly performing economy, factors contributing to this situation include a dramatic increase in student flows, insufficient number of consistent investment plans for infrastructure and equipment, degradation of teaching and learning conditions, and the absence of a quality monitoring system at process and product levels. Indeed, lack of accountability and performance audit mechanisms inevitably leads to poor quality and inefficient outcomes.

Major issues and challenges. An analysis of the determinants of quality education highlights the need for setting minimal performance standards in education and improving the definition of curricula. The absence of quality assurance hampers the professional mobility of graduates and thus limits regional integration prospects for the mutual professional recognition of diplomas and degrees. This jeopardizes youth employability in the long run.

Quality Assurance and Accreditation Authority. To address these challenges, in 2008 Tunisia passed a law to create a National Authority for Evaluation, Quality Assurance and Accreditation in higher education. The Quality Assurance and Accreditation Authority (QAAA) became functional in 2012. Its mission is to ensure better higher education and to enhance excellence among universities. Specifically, the QAAA will assess university curricula and learning outcomes, as well as graduates' employability and creativity; promote quality assurance; and conduct accreditation through certifying public and private higher education institutions to ensure that academic and administrative services are provided in accordance with standards. The QAAA is expected to greatly boost the quality of higher education institutions by making them more accountable for the quality of their outputs in line with citizen expectations and the needs of the labor market.

(box 28.5). Civic engagement in the country has been strengthened through participatory budgeting, citizen monitoring of public service delivery and grievance redress mechanisms.

In sum, the measures that African countries have implemented to improve governance and accountability are laudable, and it appears that some governments have made headway in improving their social services governance systems. But as the foregoing discussion shows, only a few countries have taken steps to empower citizens' roles in service delivery—so there is more work to be done. The next section highlights measures that can improve governance and accountability and thus lead to more relevant, higher quality and more equitable service delivery outcomes.

What future actions and policies can lead to better governance and accountability in service delivery?

Across Africa, peoples' welfare has been threatened by poor health and education outcomes and limited access to social protection. Often this is not because of a lack of commitment to these goals, but rather because of inefficiencies, weak oversight and low standards of performance. Demand-side governance interventions focused on service delivery areas are needed to ensure that money spent in social sectors translates into improved human outcomes. Well-skilled and healthy people can contribute to more rapid, sustained and inclusive growth in Africa, as well as enabling the poor to escape from poverty.

Strengthening value for money, accountability and voice

Problems of poor performance and low accountability may be overcome by strengthening the compact between policymakers and service providers (see figure 28.1) through mechanisms such as reporting requirements, performance criteria/benchmarks and sanction/incentive systems. Increasing client power relative to service providers by

Box 28.5 Promoting governance in Ethiopia—Protection of Basic Services program

The Protection of Basic Services (PBS) program was established in June 2006 by the government of Ethiopia and international development partners. PBS supports Ethiopia's progress toward the Millennium Development Goals. Its goal is to expand access to and improve the quality of decentralized basic services in education, health, agriculture, water, sanitation and rural roads; strengthen local government systems by supporting financial transparency and accountability; and enhance social accountability to enable service users to influence policy and monitor service delivery.

The emphasis of PBS is on financial transparency and accountability; social accountability; and support of grievance redress mechanisms. The objective is to improve the quality of service delivery at woreda and kebele levels through an institutionalized system for transparency and accountability that is socially inclusive and responsive to local needs. Supported by targeted capacity building and systems strengthening, the three components are to contribute to the following key outputs:

- *Financial transparency and accountability:* information and communication activities with citizens on expected service standards, budgets and budget use, and public education on budget processes.
- *Social accountability:* continuing assessments of service delivery and budget use by service users/citizens, and development of joint action plans by service users and providers to improve services.
- *Support of grievance redress mechanisms:* strengthened opportunities for complaints and redress by citizens in cases of maladministration related to service delivery, and public education on existing opportunities.

Two subcomponents—public financial management and citizen engagement—integrate aspects of the supply and demand sides of governance. Strengthening these linkages will improve local accountability and transparency systems.

The expected outcomes of the project are that, by 2014: the percentage of citizens informed about the *woreda* budget will increase from 19% to 23%; the percentage of citizens who report that woreda officials have sought their views on improving the quality of basic services will increase from 48% to 50%; and an updated interim report on the social accountability component should demonstrate continued government commitment to demand-side accountability.

enhancing mechanisms for monitoring, evaluation and grievance redress—for example, by including citizens on decisionmaking bodies or using CRCs and CSCs—can also lead to higher quality outcomes by strengthening provider incentives to serve the poor.

Community involvement in social audits can lead to increased transparency and accountability, better quality decisionmaking and more effective use of budget funds.[38] It can also act as a control on corruption through improving monitoring functions. Social audit experience has grown in Africa over the past decade, but its use remains far behind that of other regions. While Latin American and the Caribbean is considered at the forefront and numerous examples can be found in Asia, social audit remains relatively undeveloped in both North African and Sub-Saharan countries.[39]

Open and transparent information flows and feedback between the providers and users of services on topics such as the use of resources, the quantity and quality of services and the attendance of teachers and health workers can support social accountability mechanisms. Increasing e-government practices in financial reporting, strengthening public monitoring through the Service Delivery Indicators and PETS and promoting participatory budgeting would not simply increase accountability and support voice within the service delivery system, but would also likely result in better value for money. Measures that promote greater access to and transparency of information—such as Freedom of Information Acts—support accountability mechanisms.

Initiatives that explicitly tie spending to outcomes, such as results-based financing or performance-based financing, can fast-track improvements in value for money. Performance-based financing, a credible and innovative funding alternative that ties the allocation of resources to final system outputs, works as a service delivery system in which public service managers and staff work with communities to plan and produce the performance they desire. Programs such as the Quality Education in Developing Countries initiative work to link education funding to results.[40]

Information and communications technology (ICT) plays a strong role in securing better governance and service delivery. ICT has the potential to deliver more services for the same (or lower) cost and to deliver them to people that have had little or no access. Improved service delivery eliminates bottlenecks and, through e-government, minimizes personal contacts while enhancing transparency—which helps reduce corruption and improve value for money. The information revolution gives Africa opportunities to leapfrog conventional barriers to access in education and health at fairly modest cost. Technology can also reduce fiduciary risks and promote multiplier effects by involving the private sector as a partner. E-health is, for example, enabling African countries to develop vital registration and medical records, essential for improved management and delivery, while mobile technology can help transmit information rapidly, from medical alerts to remote diagnostics.

Capacity building and skills development

Capacity building is a key aspect of improved governance in service delivery. Training policy makers and service providers to better manage public resources and deliver public services will in many cases result in improved social outcomes. The evidence provided in the previous section points to the need for skills development in data collection, analysis and use of critical information, as well as procurement and allocation of equipment and commodities (for example, school books and medical products).

Capacity building and skills development is also required to overcome shortages in the supply of high-quality teachers and health workers (including pharmaceutical industry workers). Dedicating resources to higher education—and more specifically teacher and medical training—is one way of addressing this gap.

Capacity and capability development is likely also necessary for activating citizens' voice, to help ordinary people—and especially poor and marginalized groups—to better

understand their rights and to know how to access and process information. Community education programs, budget literacy courses and ICT training are some of the measures that can be implemented to achieve this goal.

More inclusive financial and social systems

Administrative, financial and political decentralization of social service delivery is critical for fostering inclusive growth. Greater citizen participation in and control of service delivery can improve its quality and efficiency. Specific governance programs may be needed to bolster the voice of women in policymaking and service delivery. Women's participation in policy processes that influence their children's education (such as parent–teacher associations) and health is crucial for breaking the cycle of intergenerational poverty.

Involving the private sector and households in delivering services can result in greater efficiency and effectiveness, leading to better human development outcomes. Including a greater number of partners in service delivery can also provide access to a wider range of expertise and resources than could be provided by government alone, thus overcoming inefficiencies in service provision from capacity, capability and resource constraints. Moreover, increased competition among service providers alters the incentive structures by widening consumer choice and allowing service users to "vote with their feet" and punish bad performance.[41]

Replacing central allocation of resources with citizen allocation—for example, by financing social services through conditional cash transfers rather than direct allocations to service providers—also boosts client power. Tightly targeted cash transfer programs are also more equitable, since funds are transferred directly to the poor, making it difficult for nonpoor groups to reap the greatest benefits of social service provision.

Conclusions

The issue of governance is central to Africa's development goals, particularly the continent's focus on achieving sustained and inclusive economic growth and poverty reduction. Over time, there has been an ideological shift from "government" to "governance"—that is, from viewing state actors as the sole and legitimate source of political authority in a country toward seeing the benefits of more participatory and diffuse power-sharing arrangements. The recent focus on "new public governance" highlights the view that the best way to ensure citizen welfare is to involve communities and service users in the design, implementation and evaluation of public service delivery.

In Africa today, social service delivery is characterized by insufficient decentralization, inadequate regulation, low value for money, weak capacity, poor management, uneven resource allocation, weak citizen voice and low transparency. While some African countries have implemented measures to tackle these issues, only a few have taken steps to strengthen the role of citizens in service delivery. It is only through empowering citizens to voice their demands and ensuring that the public sector and service providers can be held accountable for service delivery that good governance can be secured.

Some African governments have made headway in improving their social service governance systems through use of instruments such as PETS, staff absence surveys, CRCs and CSCs. However, Africa still has a long way to go in securing value for money, voice and accountability in social service delivery. Specific measures that have been shown to improve service performance include results-based financing, e-governance, capacity building and tightly targeted cash transfer programs.

Administrative, financial and political decentralization combined with more pluralistic power structures is now viewed as the route to optimizing human development outcomes, and the new public governance paradigm offers two main benefits and opportunities. First, the different bases of authority depicted in table 28.1 are complementary, as each participant offers specific value added to the policy process: authority (the state), efficiency (the market) and effectiveness (civil society). Second, new public governance

may politically be a more saleable concept than its predecessor, new public management: "Politicians prefer words such as 'network' and 'participation' to words such as 'efficiency' or 'responsibility.' This seems to be partly attributable to the nature of political communication."[42]

While the approach here favors new public governance and policy networks because citizens/clients are included in the service delivery process, there are potential risks and challenges that also need to be recognized and addressed. First, policy networks, like any other decisionmaking forum, may be subject to capture by self-referential actors—and may thus not serve the wider collective interest.[43] Mechanisms need to be put in place to offset this risk. Innovative solutions must be introduced, especially in fragile or weak states—which, when they devolve power, leave space for capture by vested interests.[44] This may explain why studies have found a link between fiscal decentralization and corruption.[45] Second, nonstate actors in policy networks may seek to obstruct government introduction of unpalatable measures, such as budget cuts, and may be successful in blocking such measures, since government is simply another policy actor, rather than the strongest actor in the network.[46] Under such circumstances, service delivery may not result in value for money—not because of the outcomes of policy but because of the inputs. Again, there is a need for offsetting measures, such as subjecting policy decisions to wider community consultation. Third, new public governance tends to be more popular with center-left parties than with the political right, at least when viewed from a developed country perspective. This may limit the practical application of the new public governance model in specific African country contexts.

Notes

This document was prepared under the guidance and supervision of Agnes Soucat (Director, OSHD) and Mohamed Youssouf (Manager, OSHD1). The authors are grateful to the following colleagues for their valuable inputs and comments: Mouhamed Gueye, Adel Ben-Youssef, Mulle Chikoko, Nawsheen Elaheebocus, Laurence Lannes, Ezzedine Larbi and Justin Murara.

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2. Chandy and Gertz 2011, 4
3. The Corruption Perceptions Index ranks countries on a scale of 0 (highly corrupt) to 100 (very clean).
4. Rhodes 1996.
5. Pierre and Peters 2000; Rhodes 1996; Hodges, Wright and Keasey 1996; Santiso 2001.
6. Mehrotra 2006.
7. Pierre and Peters 2000.
8. Mehrotra 2006.
9. Lack of will to challenge authority generally arises from a sense of powerlessness or a lack of influence (or "voice") in political processes. It is often a problem for poor, vulnerable and marginalized groups.
10. World Bank 2004.
11. Lee 2011.
12. Castro-Leal and others 2000. The statistic on health excludes South Africa, which has developed private sector medical care.
13. Taylor 2008.
14. The Kenya education PETS website states: "It is found that some schools are receiving more allocation than required and that funds are diverted for personal gains" (see http://pets.prognoz.com/prod/CountryProfile.aspx?c=104&su=418).
15. Malen 2006.
16. Castro-Leal and others 1999.
17. Poverty Action Lab 2009.
18. Hagen-Zanker and McCord 2010. Six sectors are covered in this estimate: education, health, social protection, water and sanitation, agriculture and infrastructure. This reflects the fact that social service delivery is linked to wider service delivery issues. For example, energy, water and sanitation are directly related to health outcomes, while agriculture contributes to nutrition.
19. Albers and Peeters 2011.
20. WHO 2013; Curtis 2013. However, in absolute terms the level of resources allocated per capita is low

compared with other parts of the world (Malarcher, Olson and Hearst 2010).

21. Curtis 2013.
22. Nkosi 2012. Information on results can be found at http://timss.bc.edu/ or in individual reports at http://timss.bc.edu/timss2011/downloads/T11_IR_M_Chapter2.pdf.
23. Mills, Rasheed and Tollman 2006
24. Nyoni 2008. Other issues include international migration, career changes among health workers, premature retirement or mortality, morbidity and the challenges to education and health provision from Africa's "youth bulge" (Kinfu and others 2009).
25. Naicker and others 2010.
26. Anyangwe and Mtonga 2007.
27. Oxfam GB 2012.
28. Castro-Leal and others 2000.
29. Castro-Leal and others 1999.
30. Jones and others 2009; Iqbal 2006.
31. Malen 2006.
32. Winkler 2005.
33. Gauthier 2006. In this case, PETS highlighted poor record management systems, which inhibited control of corruption.
34. Chaudhury and others 2006.
35. However, Uganda's 2000 absenteeism rate should be treated with some care, since apparently health staff had prior warning of when the random spot check would be taking place.
36. Bradley and others 2008.
37. Details of this initiative can be found here: http://info.worldbank.org/etools/docs/library/233097/Reform%20Hospitaliere/htm/143_Domaines.htm.
38. Kay 2011.
39. World Bank Social Accountability Sourcebook electronic resource (www.worldbank.org/socialaccountability_sourcebook/).
40. For details, see www.hewlett.org/programs/global-development-program/quality-education-in-developing-countries. The initiative focuses its support on Ghana, Kenya, Mali, Senegal, Tanzania and Uganda.
41. Tiebout 1956.
42. Fattore, Dubois and Lapenta 2012.
43. Pierre and Peters 2000.
44. For example, a comprehensive and well-targeted technical assistance program combined with support for building state capacity and accountability is essential in sustaining the recovery process of postconflict or transition countries, but may not be possible where a country is still experiencing active conflict or prolonged crisis. Very weak states require tailored programs according to their multiple reconstruction objectives (Brinkerhoff 2007).
45. Fisman and Gatti 2002.
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CHAPTER 29

Value for money in social service delivery

Tomas Lievens, Nejmudin Kedir Bilal, Feng Zhao, Agnes Soucat, Nouria Brikci, Fabrice Sergent, Dalya Elziniy and Caroline Jehu-Appiah

This chapter introduces the value for money (VfM) concept. After briefly describing the origins of the VfM discourse, it discusses the results of a review of the literature on the meaning and purpose of the term.

The review reflects three approaches: purist economic evaluation that equates VfM with full economic evaluations; a more "balanced" approach that argues for economic evaluations to be integrated in a broader evidence spectrum; and an analysis of inefficiencies by the World Health Organization (WHO) within health systems blocks.

These approaches are not mutually exclusive but rather have a different focus. The first two are based on the same analytical framework (efficiency, effectiveness, cost-effectiveness, and equity); the WHO approach applies an operational and health-system management approach using a framework of specific indicators for each building block.

The chapter concludes that the focus on VfM is important to health systems in Africa attempting to achieve universal coverage, and that an approach integrating concerns of equity and accountability should form the basis for decisions on resource allocation.

What is VfM?

The birth of the VfM discourse can be traced back to the New Public Management agenda of the 1980s, with its focus on measurable results and prioritization of services within a given budget. Since the 2002 International Conference on Aid Effectiveness in Monterrey and the Paris Declaration on Aid Effectiveness in 2005, VfM has increasingly taken center stage in the aid narrative.[1] Particularly in the past few years, VfM has appeared in national and international health policy agendas as a result of the increased costs associated with evolving health technologies, and as a result of the current global economic crisis. Countries are ever more forced to justify health expenditures and reduce costs.

VfM, generally defined as obtaining the best possible outcome within available resources, is useful as it provides a transparent framework on which policymakers can base decisions and reassures citizens that decisions are evidence based. It also provides different stakeholders—clients, civil society, the Ministry of Finance (MoF), Ministry of Health (MoH), civil society organizations and parliamentarians—with a framework and practical tools and indicators to assess the aspects of VfM particularly relevant to their mandates. While its potential usefulness is therefore not in question, what it means and how to measure it are the source of much debate.

Much of this debate focuses on the centrality of economic evaluations in VfM. Some argue that VfM is synonymous with undertaking full economic evaluations,[2] others that achieving VfM should be the result of getting the best balance among economy, efficiency, effectiveness and equity.[3] WHO on the other hand proposes a different approach and discusses the inefficiencies of health systems within each health-system building block. We argue that this should form part of any VfM discussion and as such reframe WHO's inefficiencies approach within the VfM literature.

We now discuss each of these approaches, referring to analytical techniques and tools commonly used to assess VfM. The background report to this chapter, "Measuring Value for Money in Health," details the methodology and technical approaches for each of them, with practical examples.

The economic evaluation approach

Along a transformation path (figure 29.1), this approach stresses the relationship between resources invested and outcome or impact obtained. "Partial" VfM tools can be used to calculate the economy with which physical inputs are purchased, the extent to which the chosen inputs are combined in an optimal mix, the technical efficiency with which physical inputs are converted into physical outputs, the allocative efficiency of the system's chosen outputs, and the quality of care provided.[4]

To clarify this framework, let us define the key parameters.

Economy is the process of acquiring human and material resources of appropriate quality and quantity at the lowest possible cost.[5] Judgments about economy are made by looking at the unit cost of inputs.

Efficiency is the production of maximum output for any given set of inputs (or the use of minimum inputs to achieve the required outputs).[6] Judgments about efficiency are made by looking at the activities used to produce outputs and the cost of those outputs. Technical efficiency is where no more inputs are used than technically necessary to attain a given output.[7] Allocative efficiency refers to "pareto-optimality"—where output is not only technically efficient and cost-efficient but is also set at an efficient rate such that any decrease or increase would impose uncompensated losses on some individuals.[8]

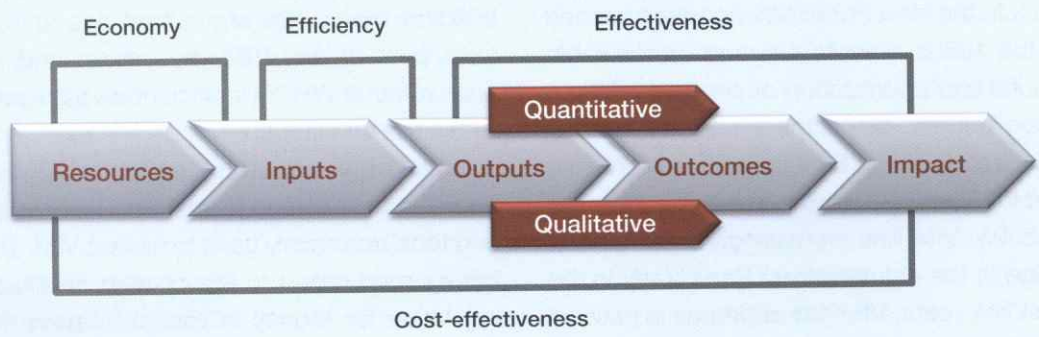
Effectiveness is the achievement of desired outcomes and impact in quantitative and qualitative terms.[9] Outcomes and impact define what is expected to change owing to the intervention and who will benefit. Effectiveness thus relates to objectives and strategy.

Equity—in access and in finance. Equity in access is achieved if individuals with the same health need have an equal opportunity to access care. Equity in finance means that individuals pay toward health care with respect to their ability to pay.

The proponents of the pure economic evaluation approach hold that VfM can simply be defined as a ratio of some measure of valued health-system outputs to the associated expenditure.[10] In this case VfM can be used for two purposes: prospective assessment for resource allocation (such as whether to prioritize investment in hospitals or small health centers, primary education or tertiary education), and retrospective evaluation of individual providers for operational performance assessment. This approach centers on full economic evaluations (table 29.1) as the best possible measurement of VfM to inform decisionmakers and provide a basis for scrutinizing all accountability relationships.

Cost-effectiveness is where a given output is produced using the least-cost technically efficient combination of inputs (conversely, where output is maximized for a given level of cost).[11] Economic evaluation is normally

Figure 29.1 **The transformation process**



Source: DFID 2011.

Table 29.1 Three forms of full economic evaluation

Type of economic evaluation	Outcomes of each intervention measured in terms of:	Impact on the outcomes of adopting the intervention vs comparator (i.e. incremental outcomes)
Cost-effectiveness analysis (CEA)	• Life expectancy (life years) • Mortality (number of deaths) • Morbidity (number of ill people)	• Incremental life expectancy (disability-adjusted life years) • Incremental survival (number of deaths averted) • Decrease in morbidity (number of cases averted)
Cost-utility analysis (CUA)	Quality-adjusted life years (QALYs)	Incremental QALYs gained
Cost-benefit analysis (CBA)	Monetary benefits (requires "translation" of health benefits into monetary values)	Net monetary benefit (or loss) of intervention vs comparator

Source: Adapted from Drummond and others (2005).

concerned with comparing a new intervention with existing practice to decide whether VfM arises in substituting the new intervention for the old. Two main approaches are used: one for CEA and CUA, one for CBA.

In CEA and CUA, to decide whether a health intervention is VfM compared with existing practice, the incremental cost-effectiveness ratio (ICER) is calculated.[12] The ICER is then used to decide whether VfM results in substituting the new intervention for the existing one.

For example, suppose that the total cost per patient under treatment A (the existing intervention) is USD10,000 (C_A = 10,000). Suppose that it is known that the average effectiveness of treatment A in terms of the outcome QALYs is 3 (E_A = 3). Suppose further that, with treatment B, the total cost per patient is USD15,000 (C_B = 15,000). Suppose that it is known that the average effectiveness of treatment B in terms of the outcome QALYs is 3.5 (E_B = 3.5). To calculate the ICER, the following formula is used:

$$ICER = \frac{C_B - C_A}{E_B - E_A} = \frac{15{,}000 - 10{,}000}{3.5 - 3} = \frac{5{,}000}{0.5} = 10{,}000$$

The interpretation of the above ICER is the following: the incremental cost per QALY gained of providing treatment B over treatment A is USD10,000. But, is this VfM? That depends on the willingness to pay threshold (WTPT) of the health care provider. Say that in western economies the WTPT is situated in the region of USD45,000 per QALY gained. If the ICER is lower than USD45,000 per QALY gained (as here) then one would say that treatment B is good VfM. Otherwise it is not, and treatment A should not be replaced by treatment B. (In poorer economies, however, the WTPT is likely to be far lower than USD 45,000 per QALY—the exact WTPT in each country is decided by expert consensus.)

In CBA, the outcomes are measured in monetary values. To decide whether a new health intervention is VfM the net benefit is calculated, according to the following formula:

$$N_B = (E_B - E_A) - (C_B - C_A)$$

For example, suppose in the example presented above that the outcomes of treatment A and treatment B are transformed into monetary values using a contingent valuation survey. Specifically, suppose that the results of the survey state that the average willingness to pay for treatment A is USD15,000 (E_A = 15,000) and that the average willingness to pay for treatment B is USD25,000 (E_B = 25,000). Recall that the cost of treatment A is USD10,000 (C_A = 10,000) and that the cost of treatment B is USD15,000 (C_B = 15,000). The net benefit (NB) is then:

$$N_B = (E_B - E_A) - (C_B - C_A) = (25{,}000 - 15{,}000) - (15{,}000 - 10{,}000) = 5{,}000$$

If the net benefit is positive (as here), the new intervention is VfM.

These approaches have many issues, however. First, to undertake a full economic evaluation generally requires extensive data as all relevant costs and outcomes—intended and unintended—should be measured. Calculating these costs and valuing outcomes is a complex exercise when all data are available—and even more so when they are missing[13] and some development objectives may be hard to measure (for

example reinforcement of civil society's voice in a national policy debate).[14]

Second, incorporating quality and equity considerations into economic evaluations is complex.[15]

Finally, the costs associated with a full economic evaluation will only be justified for larger investment decisions, and common sense "rules of thumb" will be used in many resource allocation decisions.

When applied to the health sector, full economic evaluations present further difficulties because of the complexity of "health" itself.[16] Indeed, obtaining and keeping good health is the result of a process, only partly influenced by the health care received. Attribution is therefore difficult and unobserved factors such as an individuals' genetic material and lifestyle as well as external events (such as air pollution or high stress levels) may greatly affect health outcomes and represent confounding factors in the causal relationship between inputs and outputs (or outcomes).[17] The same inputs may also lead to different outcomes in generally similar people for no objective reason (otherwise referred to as the stochastic nature of health).[18] Further, the transformation between input and outcome or impact may take decades, such as investments in cleaner air for decreases in lung cancers to show through in the data. This implies that VfM tools in health should have a long-term perspective.

Integration of equity or fairness of the health system is also very complicated. It can either be integrated as another outcome (as in the *World Health Report [WHR] 2000)* or outcomes can be weighted according to who receives treatment (with greater weight given for example to services focusing on patients in the lowest income quintile).

Two notable examples of the economic evaluation approach in health are *WHR 2000,*[19] which sought to estimate the cost-effectiveness of the entire health system in 181 countries; or at an intervention level, the work undertaken in the United Kingdom by the National Institute for Health and Clinical Excellence (NICE) through health technology assessments (HTAs). HTAs have been called "the bridge between evidence and policy-making," as it provides information for health care decisionmakers at macro-, meso- and micro-levels.[20] On a broad level, HTA can be defined as the systematic evaluation of the properties, effects, or other impacts of health care technology.

To systematically review the evidence on a health technology, HTA employs a multi-disciplinary framework to address four main questions:[21] Is the technology effective? For whom does the technology work? What costs are entailed in its use? And how does the technology compare with available treatment alternatives?

The UK government has used the full economic evaluation approach at national and international levels for more than a decade. Nationally, through the NICE, and internationally, through DFID, the UK is often seen as the precursor for VfM analysis and use, and was the first donor to coin the term: in 2001, DFID formally untied all development assistance with the justification that "tied aid reduces Value for Money."[22]

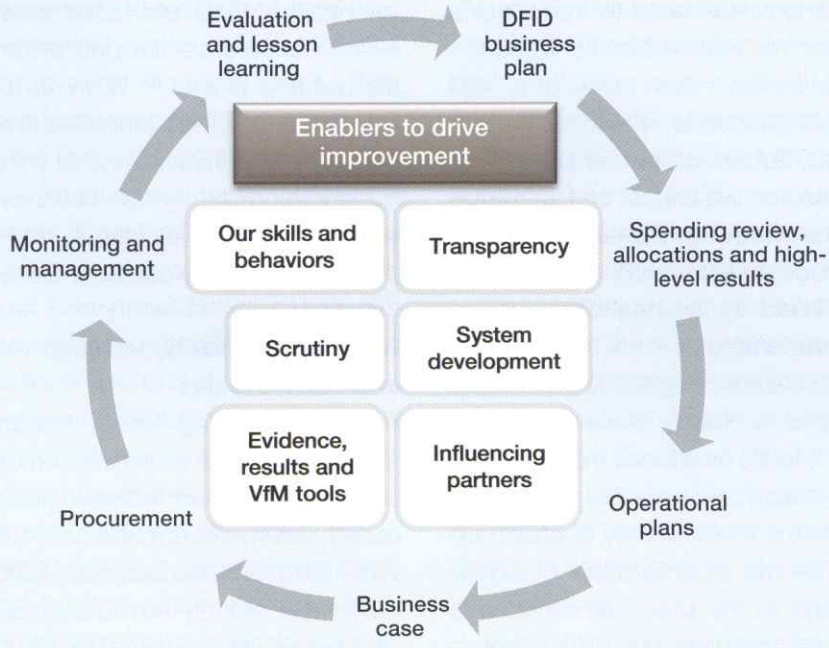
DFID uses the National Audit Office's definition of VfM—"the optimal use of resources to achieve intended outcomes."[23] It bases its analysis of VfM on the "3Es," on the strength of linkages in the transformation journey and adds equity as a central tenet to its VfM measurement. VfM assessment is integral to DFID's framework (figure 29.2). WHO has also relied on this approach in its analysis of priority setting.[24]

A multidimensional approach

Some, particularly within civil society, argue that while the concept of VfM is acceptable in itself, the way it is implemented dehumanizes the beneficiary, risks putting the emphasis on short-term outcomes when development warrants a long-term perspective, and may skew aid and more generally health investments towards easy-to-measure outcomes.[25] There is also a fear that VfM assessments prioritize costs over quality.[26]

An alternative to the "purist" economics approach to calculating VfM is getting the balance right among economy, efficiency,

Figure 29.2 **DFID's results and VfM framework**



Source: DFID 2011.

effectiveness and equity,[27] and explicitly considering the wider context of resource allocation decisions. This approach recognizes the transformation pathway as being the focus, and the 3Es as the simplest expression of this. Yet rather than emphasize the importance of effectiveness—and more specifically cost-effectiveness—as the ultimate form of VfM measurement, this approach holds that VfM must be the result of a balanced analysis between the 4Es (that equity must be integrated) and that other factors should be considered in decisionmaking.

Indeed, what is valued, by whom and why also has an impact on decisions. For example, a hospital director may judge, based on the conclusions of a CBA, that removing an emergency room is good VfM, yet it might not be ethically acceptable. Decisionmaking is further complicated because societies are not purely utilitarian (people may obtain greater satisfaction knowing that their taxes are helping the most vulnerable, who are often the hardest and most expensive to reach, rather than invested in the most cost-efficient way) nor are they homogeneous (civil society organizations may be at odds with each other over their priorities, such as HIV or universal access of a basic package of services). Overall, decisionmakers face many factors when deciding on resource allocation, and these may not be strictly economic but incorporate considerations of clinical medicine, public health, social sciences and ethics.[28]

A relatively recent framework that enables this type of analysis is multi-criteria decision analysis (MCDA). This is a mathematical modeling technique that combines (i) the assessment of the relative performance of alternative policy options on several criteria (these criteria are decided by the policymaker, but typically cost, effectiveness, cost-effectiveness, equity and the like) with (ii) the relative importance of weights that the policymakers attach to each of the criteria to rank the policy options from best to worst.

Another method that fits in this approach is political economy analysis (PEA). Indeed, PEA will provide "information on how power and resources are distributed and contested in different contexts, and the implications for development outcomes. It reveals the underlying interests, incentives and institutions that enable or frustrate change."[29] It can also help decisionmakers understand the perspectives of the groups or population groups they

represent (parliamentarians for example could use PEA to assess whether their constituencies would prioritize access to free malaria treatment over free maternal and child care).

Some agencies have tailored a VfM approach to their needs. The Global Fund to Fight AIDS, Tuberculosis and Malaria for instance measures the impact of its activities on these three diseases but also assesses VfM, the capacity of the recipient government to sustain the benefits, and the way aid agencies work collaboratively.

The World Bank's perspective on VfM has been illustrated in Hauck, Smith and Goddard (2004). It takes as a basis the economic approach, but expresses concerns about its limitations—in the methodology of economic evaluations, in the incorporation of equity principles, and in the practical constraints associated with carrying out full economic evaluations. The approach recommended therefore is to include economic evaluations as one of the aspects when deciding on a course of action, but to contextualize them and recognize their multiple limitations. Other factors such as political imperatives for example must be considered when judging whether programs at local or national levels represent good VfM.

Health systems and VfM

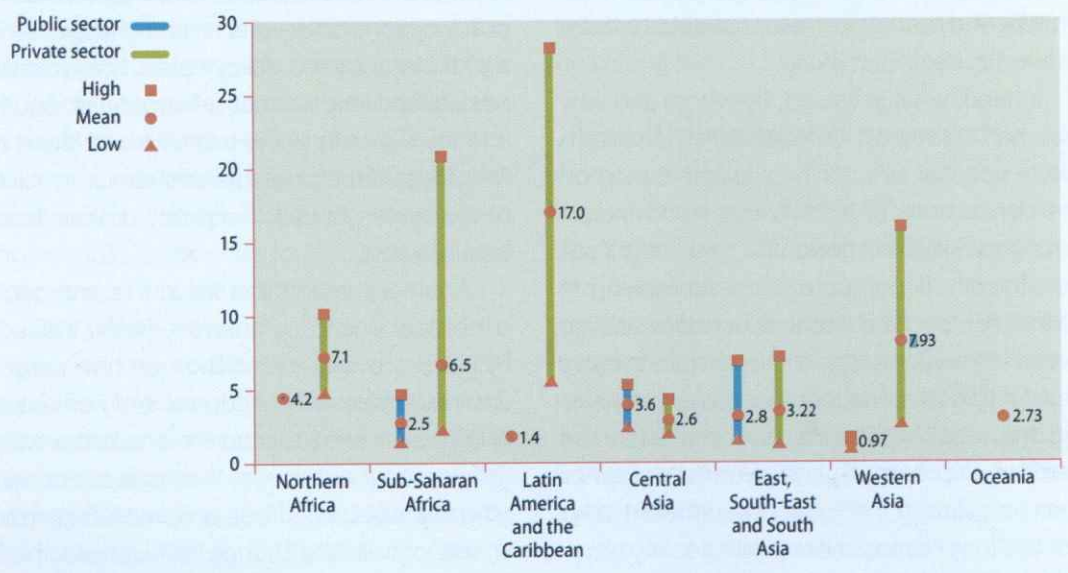
A third approach to VfM has been developed for health. WHO promotes what a health system should be through a framework of six building blocks.[30] *WHR 2010*'s "Health System Financing" identifies the 10 leading causes of inefficiency, all linkable to the building blocks.[31] In this section we describe each of these blocks, identify VfM issues and ascertain how they can be measured.

Medical products, vaccines and technologies

A well-functioning health system ensures equitable access to essential medical products, vaccines and technologies of assured quality, safety, efficacy and cost-effectiveness. *WHR 2010* ranked medicine-related causes of inefficiency among the most important. Medicine prices vary widely across countries and are generally much higher than international reference prices.[32] In Sub-Saharan Africa, the median price for selected generic medicines was 6.5 times higher than the international reference price in public facilities, and 2.5 times higher than that in private facilities, in the early part of the 2000s (figure 29.3).

VfM assessment relies on information on the use of generic and branded drugs, and

Figure 29.3 **Ratio of consumer prices to international reference prices for selected generic medicines in public and private health facilities, 2001–2006**



Source: UN 2008.

their prices at public and private outlets. WHO has developed a standardized methodology for facility-based surveys of medicine prices and availability using data from a representative sample of medicine outlets. The median consumer price ratio is computed by dividing the unit price as observed in the survey by the international median reference price. (Figure 29.3 reports this indicator at the aggregate level.)

Quality of use aspects are measured through appropriate prescription practices, rational medicine use and user adherence. The main problem is that poor quality use of drugs draws resources from effective use: it is estimated that fewer than 50% of patients in low- and middle-income countries receive drugs per national clinical guidelines for common diseases in primary care, and more than 50% of patients do not take prescribed drugs as they should.[33]

Public expenditure tracking surveys (PETS) can be used to track medicines through the health system. In Sierra Leone, PETS were carried out annually in 2001–2006, offering a time series to measure improvements. One study shows for example that in 2006, 88.2% of the total value of essential medicines supplied by district medical stores reached primary health units.[34]

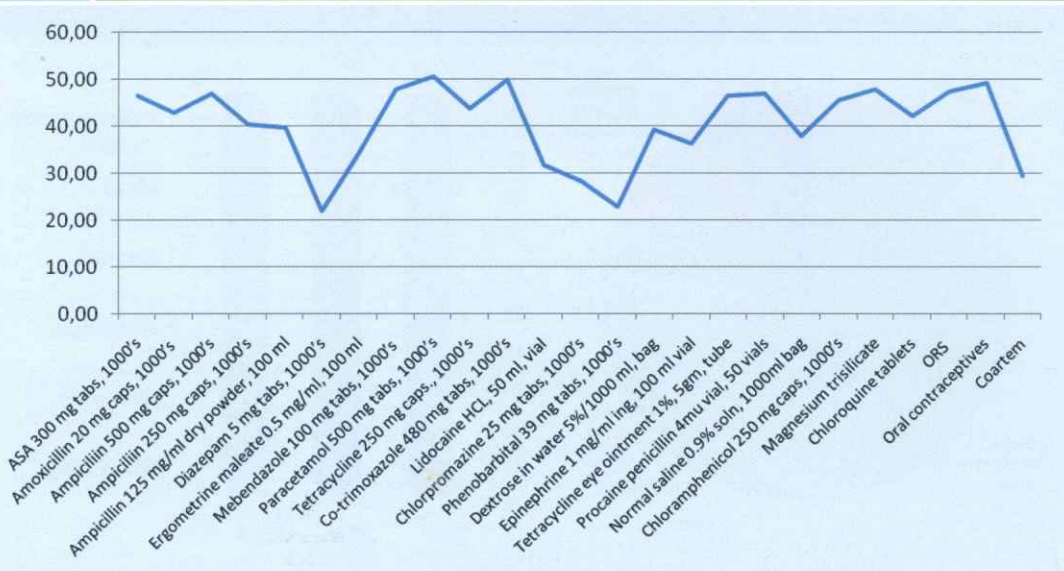
Quality of use aspects can also be measured through health record reviews, exit interviews and observation of patients and providers. The information feeds into indicators which allow an in-depth VfM analysis by comparing results with national clinical protocol and international benchmarks, such as those in WHO (2010a).[35]

Availability of essential drugs is one of the key determinants of access and quality of health services. Stockouts can stem from any hurdles along the supply chain (quantification, procurement, storage, distribution). Ensuring availability of such inputs is a key aspect of ensuring VfM. Qualitative service delivery surveys (QSDS) can help to diagnose availability of pharmaceuticals (including essential drugs) at service delivery points, as seen for Ethiopia in figure 29.4.

Such tracking of essential medicines' availability will help to strengthen the health commodity supply chain system.

Substandard or counterfeit drugs constitute a last potential area of loss of efficiency in health systems. "Bad" medicines come in many forms (falsely labelled, expired, counterfeit) but all share the same characteristic that they are poor VfM. One study in three African countries found that 26–44% of the samples of antimalarial medicines failed the

Figure 29.4 **Availability of drugs in Ethiopia, 2009 (weeks per year)**



Source: FMOH 2010b.

quality tests.[36] Some aspects of low-quality medicines, such as mislabeling and expired drugs, will be measured as part of the health facility survey tools described above. Testing the chemical composition of drugs obviously requires that samples of drugs are obtained and analyzed using laboratory services as part of the survey.

Sustainable financing and social protection

Health financing and social protection build on the functions of revenue collection and pooling, as well as service purchasing. These functions are organized and interact differently across countries depending on their institutional and policy context. Health financing performance has a direct impact on high-level policy objectives of health system effectiveness, efficiency and equity.[37]

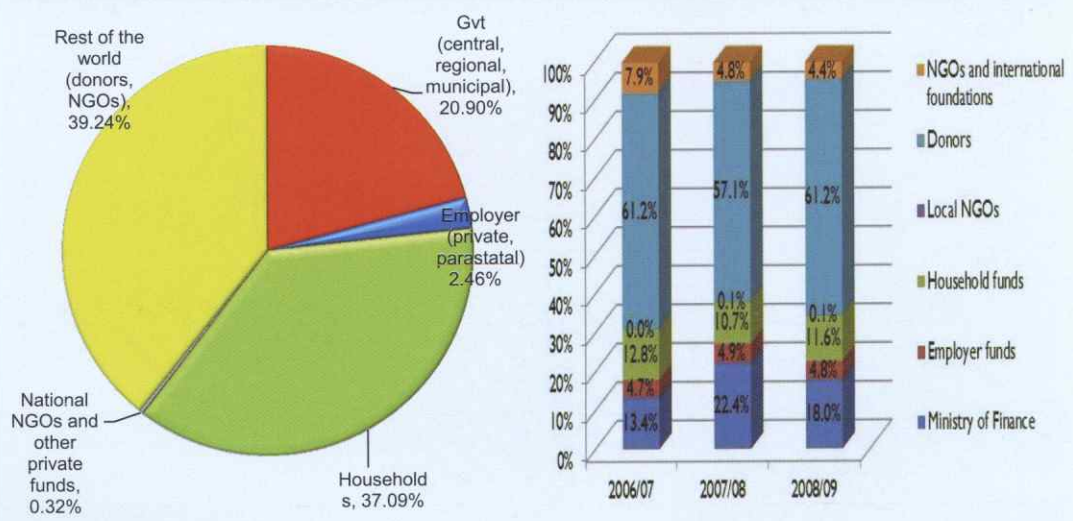
The analysis of health system financing arrangements is complex. In a seminal article Joseph Kutzin (2001) provides a detailed account of each of the health financing functions, their interactions and their impact on health system effectiveness, efficiency and equity. Revenue collection is how the health system raises money to pay for health services. Through resource pooling, members of the pool carry entitlements to health care which protect them from unpredictable and sometimes large health expenditures, thus undermining equity.

Health service purchasing consists of the mechanisms used by pooled fund managers to buy services from public or private providers. Payment mechanisms have a direct impact on how many services health facilities provide, the number of patients they enroll or hospitalize, and the number of days that patients stay in hospital. Health service purchasing therefore has a direct and significant bearing on health system efficiency.

Revenue collection and pooling and equity

The fairness with which funds are raised to finance the health system, and the extent of cross-subsidization following risk and resource pooling, are forms of equity that stem directly from the revenue collection and pooling functions. An intuitively straightforward way to assess whether financing sources are regressive rather than progressive is through out-of-pocket expenditure as a share of total health expenditure. Figure 29.5 shows the application of National Health Accounts (NHA) to generate such information in Ethiopia[38] and Malawi.[39] A high share of out-of-pocket expenditure corresponds with a small share of pooled resources, and limited scope to redistribute resources across population groups. As out-of-pocket expenditure is

Figure 29.5 Source of financing of health for Ethiopia (NHA 2010) and Malawi (NHA 2011)



Source: Report of National Health Accounts of Ethiopia and Malawi.

by definition a flat fee (not a function of household wealth), it hits poorer households harder than richer ones, and is therefore regressive. A more sophisticated approach to assessing the impact of health financing on equity is to make use of concentration indices.

Purchasing of services and technical efficiency

The way services are purchased greatly affects value attained for money spent. Purchasing refers to the numerous arrangements used by purchasers of health care services to pay the providers. Purchasers may be public (departments of health services or health districts) or private (private health care insurance funds). Providers can be publicly or privately owned. Resource allocation and purchasing mechanisms have important implications for health system efficiency.[40] Central to these reforms has been the separation of services purchasing from provision, and the use of incentive-based agreements to govern the relationship between purchaser and providers.

A taxonomy of common payment mechanisms, each corresponding to a specific incentive framework, is overviewed in table 29.2. Some payment mechanisms such as capitation, which is common for primary health care services, and case-based payments such as diagnosis-related groups for hospital inpatient care, constitute major cost-control mechanisms, especially compared with fee-for-service payment mechanisms. Efficiency and savings are measured by a suite of typical VfM ratios.[41]

These efficiency indicators require data found in a Public Expenditure Review (PER), NHA, tailor-made costing studies, or routine monitoring systems, although the quality of the last one varies across countries (and is often low).

Pay for performance: A special case of purchasing

Pay for performance receives increased attention as a strategy for improving health system performance. Rigorous evidence on the effectiveness of these strategies is missing, and there are concerns with side-effects, but many rigorous impact evaluations are under way.[42]

Table 29.2 Understanding the payment function: Different payment methods and their implications

		Risk borne by		Provides incentives to			
Payment mechanism	Basket of services paid for	Payer	Provider	Increase number of patients	Decrease number of services per payment unit(s)	Increase reported illness severity	Select healthier patients
Fee for service	Each item of service and consultation	All risk borne by payer	No risk borne by provider	Yes	No	Yes	No
Case-mix adjusted per admission (diagnosis-related group, performance-based financing)	Payment rates vary by case	Risk of number of cases and case severity classification	Risk of cost of treatment for a given case	Yes	Yes	Yes	Yes
Per admission	Each admission	Risk of number of admissions	Risk of number of services per admission	Yes	Yes	No	Yes
Per day	Each patient day	Risk of number of days to stay	Risk of cost of services within a given day	Yes	Yes	No	No
Capitation	All covered services for one person in a given period	Amount above "stop-loss" ceiling	All risk borne by provider up to a given ceiling (stop-loss)	Yes	Yes	N/A	Yes
Global budget	All services provided by a provider institution in a given period	No risk borne by payer	All risk borne by provider	No	N/A	N/A	Yes

Note: N/A is not available.

Source: Adapted from Hsiao (1997) and Bodenheimer and Grumbach (1994).

Incentives can be given to patients when they take health-related actions (such as having their children immunized), to health care providers when they achieve performance targets (such as immunizing a certain percentage of children in a given area), or to health managers at district, provincial and national levels, conditional on such things as timely and accurate reporting or the performance of the facilities they are responsible for. In low- and middle-income countries, the issue to address most often is that health services are underproduced, and performance-based financing generally has wider objectives, including to increase the allocative efficiency of health services (by encouraging the provision of high-priority and cost-effective services); to increase technical efficiency (by making better use of existing resources such as health staff); and to improve equity of outcomes (for example, by encouraging expansion of services to hard-to-reach groups).[43]

Health workforce

A direct association subsists between the number of health workers and health outcomes.[44] However, many poorer countries struggle to develop an adequate health workforce and battle with longstanding issues such as maldistribution over the country, international migration, lack of motivation and a poor skill mix. The Global Workforce Alliance has identified 57 crisis countries with a critical shortage of health workers.

However, methodologies to assess the adequacy of the health workforce to respond to the health care needs of a given population are in their infancy. One attempt to fill this gap is *The Labor Market for Health Workers in Africa: A New Look at the Crisis,* published by the World Bank.[45] This sets out a health labor market framework, outlining the major institutions and processes that predict health labor market outcomes, including health worker performance and health outcomes. However, many of the analytical tools discussed to measure efficiency and effectiveness are not yet widely applied.

For its part, WHO emphasizes the need for quality data on the health workforce as a prerequisite to improve the health workforce[46] and proposes two human resource VfM indicators:

- Number of health workers per 10,000 people, by cadre. WHO stipulates that countries with fewer than 23 physicians, nurses and midwives per 10,000 people generally fail to achieve adequate coverage rates for selected primary health care interventions. The drawback of this indicator is that it omits important dimensions such as quality of care and equity, and although easy to understand intuitively, its application across countries may be hampered by the diversity of health work cadres and health systems.
- Distribution of health workers by occupation, region, place of work gender. This measure is important to understand the extent to which the health workforce is balanced in terms of supply, deployment and composition, and provides an insight into how human resources for health contribute to equity in access and to health outcomes.

Delanyo Dovlo proposes documenting wastage in the health workforce in Africa by source of wastage (table 29.3). This approach is hands-on and straightforward for examining dimensions of VfM. Labor productivity is another approach. This policy question is similar to the assessment of health facility efficiency but applied to individuals. Unsurprisingly, similar analytical techniques are used, including data envelopment analysis (DEA), stochastic frontier analysis, unit cost analysis and total factor productivity.

Total factor productivity is the ratio of outputs to inputs. When several inputs (human resources, drugs, buildings) are combined to produce several outputs (outpatient and inpatient visits) they need to be combined into input and output indices. Unit cost analysis is obtained by dividing the total costs of inputs by an output index. Both indices provide information on what are likely productivity differentials across health workers, although it is important to examine closely possible confounding factors.[47]

Table 29.3 Wastage monitoring framework

Factor	Examples of contribution to wastage	Possible indicators
Direct wastage		
Movement from health to nonhealth sector	Probably small: 2–20 staff a year (Ghana, Mozambique, Namibia)	% of job leavers exiting health work completely (exit interviews)
Emigration to health sector outside country	10% of Mauritian nurses, 61% of Ghanaian doctors	Certificate verification rates; routine leaving data, such as resignations
Deaths, injuries and premature removal from the workforce	High significance of HIV/AIDS; Ghana 1.1% deaths compared with Malawi (<55%) of leavers	Mortality rates as % of workforce leavers, or mortality rate in workforce
Inappropriate administrative systems and policies	Affects other losses; delays lose work input and may increase likelihood of emigration	Average recruitment duration; staff recruitment rate versus vacancies
Indirect wastage		
Wastage as unemployment	Not well documented in Africa; estimates of "ghost workers"	Unemployed health workers as % of total workforce (for each category)
Wastage as underemployment	Data are not routinely collated but staff/workload indicators may help	Staff workload indicators, such as outpatient and inpatient staff per cadre
Wastage as a misuse	Significant in countries with senior medics and nurses as managers	% of staff: technical or professional in full-time managerial/administrative function
Wastage as inappropriate categories	4–6 categories to deliver package of services in Ghana	Workforce composition of skilled and semi-skilled staff
Absenteeism, low outputs	2.3 days of sick leave per staff member versus 1.7 days off for all staff (Ghana)	Number of days off per staff member, per annum
Misdeployment and maldistribution	Distribution differential for doctors (Ghana): best 1:16201, worst 1:66071	Doctor/nurse population ratios in different parts of country
Wastage from misadministration of health human resources	Difficult to assess quantitatively, such as 100% of new Lesotho nurses not recruited in 1998	Recruitment and retention rates of new graduates of health training schools

Source: Dovlo 2005.

Health service delivery

Health service delivery is concerned with transforming inputs such as health finance, human resources and drugs into health care services that meet defined characteristics for quality, safety, continuity of care, and access.[48] It involves service delivery models and provider networks, and pays particular attention to incentives throughout the chain that support effective and efficient transformation.

Leading causes of inefficiency in the health sector are often associated with the health services delivery building block, and can be traced back to inappropriate hospital size, medical errors and suboptimal quality of care, and inefficient service delivery packages (funding high-cost low-effectiveness interventions when low-cost high-effectiveness interventions are uncovered). Many of the indicators to monitor aspects of service delivery are related, at least indirectly, to VfM.

The "number of outpatient department visits per 10,000 people per year" is used as a proxy indicator for the availability and quality of services. This is implied by the observation that outpatient visits go up when facilities are brought closer to the population or user fees are abolished. This indicator is therefore mainly of interest to VfM at the lower end of the scale, when people are not visiting health facilities as would be expected, leaving investments in the health system with low returns. It is relatively easy to compute using routine information systems or health sections in household surveys.

The "number and distribution of inpatient beds per 10,000 people" indicates whether the inpatient service delivery capacity is proportionate to health need. Both over- and undercapacity of beds are poor VfM. There are no universal benchmarks, but a comparison with the same indicator from subnational or regional (that is, comparable) health systems, as well as tracking of the same indicator over time, adds insight. Data to compute this indicator are not always readily available, and facility surveys or censuses are often required to obtain them. This indicator should ideally be complemented with health-facility capacity indicators such as bed occupancy, bed turnover ratio and bed turnover

interval, to obtain a more complete picture of efficiency.

Indicators that measure general and specific service readiness attempt to score the extent to which health facilities are "fit for purpose." General service readiness looks into the availability of different components required for service delivery; the approach developed by WHO is to assess a number of tracer items in key service delivery areas such as infrastructure, basic supplies, laboratory services and medicines. The approach is straightforward and the total "general readiness score" is the unweighted average of domain scores, where each domain score represents the average number of items present and functioning in health facilities.[49] Data to populate this approach are not routinely available and surveys using standard questionnaires have to be carried out. The approach to assess service-specific readiness is identical to that of general service readiness, but will focus on a package of care and comprise elements that proxy for quality of care. As such it measures the capacity of facilities to deliver a specific integrated package of services.

Leadership and governance

Respect for the rule of law, transparency and accountability are essential in ensuring VfM in resource-allocation decisions. Indeed, 10–25% of public spending linked to procurement is lost each year to corruption.[50] There are many tools to measure leadership and governance of the health system,[51] and table 29.4 gathers those enabling the measurement of VfM.

The common tools address related yet different policy questions, described in the column "Objective." They also differ, starkly, in their requirements, and in their capacity to hold leadership to account, which is indicated with a score ranging from 1 to 3.

Ensuring that citizens have adequate voice in the design and delivery of services and that service providers are held accountable is vital for improved service delivery. These include supporting mechanisms that facilitate information flows, and feedback between providers and users of services on topics such as use of resources, quantity and quality of services, and attendance of teachers and health workers. Ensuring this can be done by strengthening public monitoring, say, through citizen scorecards and other service delivery satisfaction surveys, and by promoting participatory budgeting. Information and communications technology (ICT) has the potential to deliver more services for the cost and to deliver them to people that before had little or no access. The information revolution gives Africa opportunities to leapfrog

Table 29.4 Tools to measure VfM in leadership and governance

Tool	Objective	Example	Requirements	Power to hold to account (1 = low, 3 = high)
PER	Conduct a high-level budget analysis	• Budgeted versus actual expenditure • Expenditure per capita	Budget data publicly available	2
PETS	Track expenditure from source to frontline provider	• % of leakage and capture • % of budget that reaches frontline provider	• Detailed budget and administrative data available • Tailor-designed survey	3
QSDS	Assess how facilities turn received resources into quality care	• Absenteeism of health workers • Timeliness of releasing budget to facilities	Tailor-designed facility survey with exit interviews	3
NHA	Account for expenditure using a standard framework	Expenditure per source of funding	High quality accounts data available, or NHA suite of survey tools	1
BIA	Calculate the share of public resources accruing to different population groups	% of public expenditure on tertiary hospitals accruing to individuals in poorest income quintile	• NHA, PER, or costing data available • Household consumption survey data	2
PEA	Make explicit interests, incentives and motivations of health stakeholders, including decisionmakers	• Stakeholder mapping • Social audits	Tailor-designed qualitative research	2–3

Note: BIA = benefit incidence analysis.

Source: Authors.

conventional barriers to access in education and health, at fairly modest cost. Technology can also reduce fiduciary risks and promote multiplier effects by involving the private sector. E-health is, for example, enabling countries to develop vital registration and medical records—essential for improved management and delivery. Mobile technology can help transmit information rapidly, from medical alerts to remote diagnostics.

Responsiveness of service providers to clients is a key aspect of a functional governance system. Poor services due to absence of health workers is one of the challenges hampering access and quality of services. Tools can help monitor this situation for generating evidence for policy action.

Information systems

Many health information systems, particularly in the developing world, have serious inefficiencies in generating high-quality data for diagnostics and decisionmaking. Some of these inefficiencies stem from the multiplicity of indicators, multiple reporting channels, duplication of reporting tools, and lack of standardized collection, analysis and interpretation of data. A well-functioning health information system is one that "ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health systems performance and health status."[52] Health information covers diverse sources that include routine administrative reports, surveys, surveillance systems, experimental studies, and evaluation reports. This situation is exacerbated by disease-based projects that run vertically and tend to establish standalone information systems. Filling the various monitoring and evaluation forms takes a lot of time from (mostly public) health workers.

The MoH in Ethiopia has conducted a comprehensive reform of its health information system based on the principles of standardization, integration simplification. The reform vastly reduced the number of indicators to 108 sectorwide core indicators and reviewed reporting forms, tally sheets and channels of reporting. It also cut the administrative burden from health workers and wastage of resources from multiple reports and channels (figure 29.6).

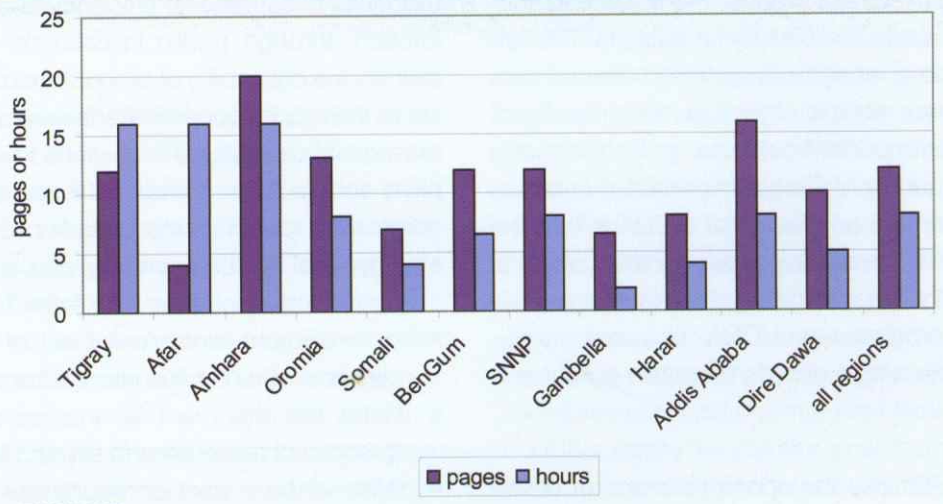
Summary of tools for measuring VfM

As many of the following key tools to measure VfM can generate similar information, users need to decide on the minimum combination (figure 29.7; table 29.5).

The economic evaluations: CEA, CUA and CBA

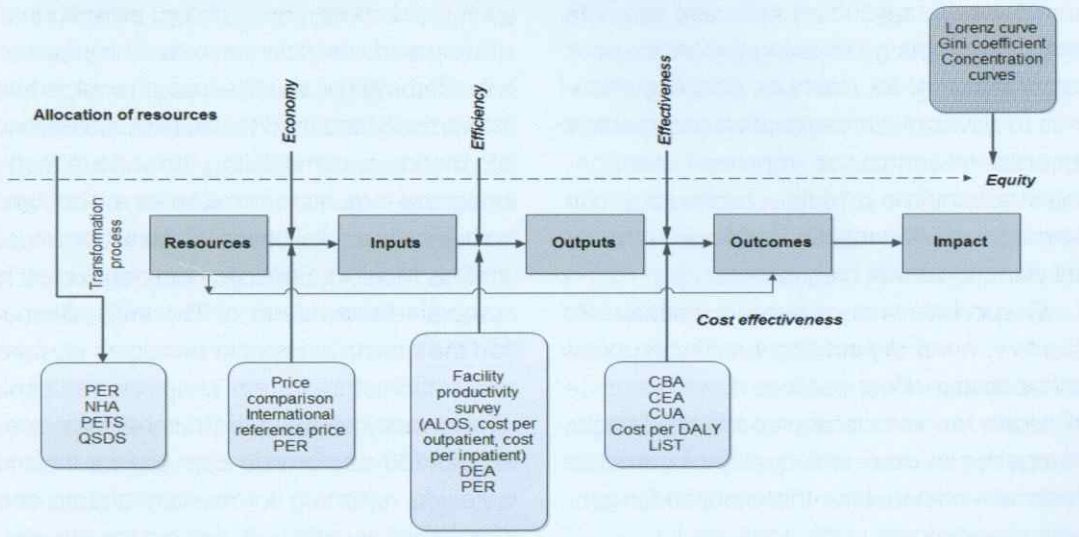
CEA compares alternatives and measures in natural units the primary objective (or objectives) of a program. CUA similarly compares

Figure 29.6 **Average monthly pages and time for health management reporting system by region, Ethiopia, 2006**



Source: FMOH 2007.

Figure 29.7 **Summary of key VfM measuring tools**



Source: Authors.

Table 29.5 **Summary of tools for measuring VfM and their use**

What is measured	Tool
The relative cost of improvements in life expectancy, mortality and morbidity, sometimes requiring to express health benefits into monetary values	CEA, CUA, CBA
Extent to which frontline provider converts received finance and resource into quantity and quality services	QSDS
Who is using services?	BIA
Priorities between options for health care interventions	LiST
To hold governments to account and to shed light as to why, beyond objective economic reasons, particular choices are made	PEA
Calculates the efficiency of an organization within a group relative to observed best practice within that group	DEA
Resource allocation decisions	PER
Standardized mapping of resource flow following an accounting logic	NHA
Proportion of resources reaching frontline provider	PETS

Note: BIA is benefit incidence analysis; LiST is Lives Saved Tool.

Source: Authors.

alternatives, but uses a more generic outcome measured directly on patients. This latter type of analysis is preferred when a program has multiple objectives, when quality of life is an important outcome, and when quality and quantity of life are important outcomes. The primary advantage of a CUA is that the outcome measure is more generic, which is helpful when comparing the relative merits of many program types. CBA compares alternatives by using a generic monetary outcome.

PER

This examines the appropriateness of developing-country policies to reduce poverty and examines effectiveness, efficiency and equity impacts through public investment. It also examines sustainability of expenditures according to the macroeconomic framework and the managerial capability of institutions to execute plans and budgets. In health, it is expected to address the following broad questions:[53]

- How are health spending and services distributed among the population?
- How efficient is the provision of health care and other related interventions?
- What are the macroeconomic consequences of revenues and expenditures?
- What is the impact on equity of sources and levels of revenues?

NHA

These are an internationally accepted tool for summarizing, describing and analyzing the financing of national health systems. NHA trace all the resources that flow through the health system over time, usually a year. They track the flow of all health funds (public, private and donor) in a health system, from their financing sources to their end uses, and can answer the following key questions:

- Who in the country pays for health care?
- How much do they spend and on what types of services?
- How are funds distributed across different health services?
- Who benefits from health expenditures?

PETS

These are a quantitative exercise that aims to track the flow of public resources across various layers of the administrative hierarchy, from allocating agency to intended beneficiary, and assess inefficiencies in the system and their magnitude.[54] Typically they consist of a survey of frontline providers (for example, schools and clinics and their staff) and local governments (public officials), complemented by central government financial (and other) data. PETS examine flows of funds and materials from the central government to local service providers, via regional and local governments, to identify resource use and leakages. They mainly evaluate the proportion of public resources (financial, human and in-kind) that reaches each level, in particular frontline service providers.

QSDS

These survey the efficiency of service provision, and can be used for analyzing reforms in public expenditure management, service delivery, public expenditure efficiency and cross-cutting public sector measures. They typically examine the efficiency of public spending and incentives, and dimensions of services delivery in provider organizations, especially at service facility level. They quantify the factors affecting quality of service such as incentives, accountability mechanisms, and the relationship between agents and principals.

The key motivation for undertaking QSDS is to improve public service provision. Conventional instruments for evaluating public spending, such as PERs, use highly aggregated information paying little or no attention to incentives within individual institutions. By contrast, QSDS use survey-based methods, which owe far more to firm or household surveys than to conventional expenditure analysis. Similarly, tracking studies are closely associated with auditing. The implication is that the novelty of public expenditure tracking lies not so much in developing new methods of analysis per se as in applying known methodologies from other disciplines to evaluating public expenditure.

Benefit incidence analysis

This examines who benefits from health care spending. It usually relates to public expenditure and is concerned with how effectively governments target their limited resources towards meeting the needs of the poor, as they often profess to do.[55] Target groups can be defined variously—by region, age, or gender—but use of services by income group, however measured, is usually of the most interest. Areas of public expenditure can also be disaggregated in a number of ways—a simple distinction could be made between inpatient and outpatient care. Alternatively, the approach might disaggregate by type of facility.

DEA

This calculates the efficiency of an organization within a group relative to observed best practice within that group. The organization can be a whole agency (such as a department of health), separate entities within the agency (hospitals), or disaggregated business units within the separate entities (wards). Given that DEA is particularly well suited to government service and other non-profit organizations, as well as private firms, individual units examined are often referred to as "decisionmaking units" rather than firms.

DEA's ability to identify possible peers or role models as well as simple efficiency scores gives it an edge over other measures.

Fried, Lovell and Schmidt (1993) listed the following as questions that DEA can help managers answer:

- How do I select appropriate role models to serve as possible benchmarks for a program of performance improvement?
- Which facilities are the most efficient?
- If all my operations were to perform according to best practice, how many more service outputs could I produce and how much could I reduce my resource inputs by, and in what areas?
- What are the characteristics of efficient operating facilities and how can they guide me in choosing locations for expansion?
- What is the optimum scale for my operations and how much would I save if all my facilities were the optimum size?
- How do I account for differences in external circumstances in evaluating the performance of individual operating facilities?

PEA

The use of a PEA in measuring VfM in health is particularly relevant for holding governments to account and for shedding light why, beyond objective economic reasons, particular choices are made.

Generally PEA can be used at macro level, to better understand the country's context and political-economy environment; at sector level, to identify specific barriers and opportunities within particular sectors; or to solve problems on a policy issue, such as why option A is chosen rather than option B. It can also be used to review individual policies.

Conclusions

Globally, there is a growing attention on improving VfM in social sectors, and there are many tools to measure it, although delivery in many countries still leaves a lot to be desired. Inefficiencies in health and socials sectors are even worse in low-income countries. Africa needs to gain more results from its investments, rely more on domestic spending and ensure accountable and transparent use of public and aid resources.

"What gets measured gets done"—thus measuring VfM is critical, but requires a credible and manageable measurement system that can be applied at various levels of the health system to track African countries' progress in assuring VfM. Such measurements are expected to be simple, reliable, specific and practical.

Many of these tools are not new, and each has its own strengths and weaknesses. It is up to countries or institutions to use a combination of tools, perhaps in a certain sequence, to meet their particular requirements.

Finally, measuring VfM is a means to an end. While putting in place the right systems is a start, measuring VfM and generating evidence is only part of the goal. It is crucial that information generated is used to influence decisions that range from day-to-day activities to overarching policy goals.

Notes

1. Emmi and others 2011.
2. Smith 2009.
3. OECD 2010a,b.
4. Smith 2009.
5. Hoole 2012.
6. Hoole 2012.
7. Culyer 2005.
8. Culyer 2005.
9. Hoole 2012.
10. Smith 2009.
11. Culyer 2005.
12. This is the ratio between the incremental cost (the difference in cost between the new intervention and the existing intervention) and the incremental outcomes (the difference in benefits between the new intervention and the existing intervention).
13. Hence the need for advanced costing analysis.
14. Drummond and others 2005.
15. Dawson and others 2005.
16. WHO 2003.
17. WHO 2003.
18. O'Brien, Drummond and Labelle 1994.
19. WHO 2000.
20. Battista and Hodge 1999.
21. Sorenson, Drummond and Kanavos 2008.
22. Jensen 2012.
23. NAO 2013.
24. See, for example, Chisholm and others (2012).
25. Bond 2012.
26. International HIV/AIDS Alliance 2010.

27. OECD 2010a,b.
28. Baltussen and Niessen 2006.
29. DFID 2009.
30. WHO 2000, 2007.
31. WHO 2010a.
32. UN 2008.
33. WHO 2010a.
34. GoSL 2007.
35. Common indicators include prescribing indicators (average number of medicines prescribed per encounter, medicines prescribed by a generic name, encounters with an antibiotic or injection prescribed); patient care indicators (average consultation and dispensing time, medicines actually dispensed, medicines adequately labelled, patient's knowledge of correct dosage); and facility indicators (availability of a copy of essential medicines list of formulary, availability of key medicines).
36. USAID 2010.
37. Kutzin 2001; WHO 2000, 2010a.
38. FMOH 2010a.
39. MoH 2011.
40. Gottret and Schieber 2006.
41. Common VfM indicators include average length of stay, bed turnover ratio, bed occupancy, bed turnover interval, Pabon-Lasso, cost per adjusted occupied bed-day and adjusted occupied bed-day per staff employed.
42. Witter and others 2012; Eldridge and Palmer 2009.
43. Witter and others 2012.
44. WHO 2010b.
45. Soucat, Scheffler and Ghebreyesus 2013.
46. WHO 2010b.
47. Maestad and Mwisongo 2013.
48. WHO 2007.
49. WHO 2010b.
50. WHO 2010b.
51. WHO 2010b.
52. WHO 2000.
53. World Bank 2003.
54. Engberg-Pedersen and others 2005.
55. Pearson 2002.

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CHAPTER 30

Fragile states and links to human capital

Xin Long, Issahaku Budali, Nakubyana Mungomba and Justin Murara

A fragile state is defined as "a region or state that has weak capacity to carry out basic governance functions, and lacks the ability to develop mutually constructive relations with society."[1] In these regions the state is unable or unwilling to deliver core functions such as security, basic public services and essential infrastructure to the majority of its people.[2] Further, fragile states are more vulnerable to internal or external shocks such as natural disasters or economic crises. Fragile states have the potential not only for self-destruction but also to endanger global peace, prosperity and security.[3] Of the 47 fragile states in the Multilateral Development Bank harmonized list of fragile and postconflict countries for 2012, more than half were in Sub-Saharan Africa.[4]

Some 1.5 billion people live in conflict-affected and fragile states, while about 70% of fragile states have seen conflict since 1989. While the issues affecting fragile states are usually particular to each state, there are some key issues common to fragility, including chronic poverty, inadequate provision of public security and basic services by government, little accountability to the citizens by the state, and a generally informal and opportunistic private sector.

Fundamentally, the central driver of fragility is weak state institutions. However, there are several primary drivers of fragility that often immediately precede conflict and fragility.[5] Lack of good governance can mean that there is no sound economic policy that exists, leadership is authoritarian and democracy dwindles. These factors can lead to economic nonperformance, and even collapse, resulting in possible conflict. State weakness and collapse is another primary driver of fragility. When government lacks the capacity to respond to service delivery and responsibility, with social and security amenities limited to the capital city at best, conflict can infiltrate into the security vacuum more easily. Other primary drivers of fragility, as suggested by Mthuli and Jones (2013) include economic and social exclusion, religious extremism and ideological exclusion, all of which can cause a country to descend into conflict and thus cause a state of fragility to arise, or deepen. Without a basic level of citizen security, there can be no enduring social and economic development.

Fragility poses such a challenge to fix primarily by virtue of the sheer scale and range of needs required to restore a country to being a nonfragile state. The need for the restoration of basic security and services for the people is so vast that the state cannot cope with all the priorities. Further, the depleted human capital that would have resulted from any length of time spent in fragility makes this restoration all the harder. This results in an inability to mobilize domestic resources and draw fiscal revenue from taxation that further diminishes the government's ability to provide public goods and services. There develops a reliance on development finance from international donors. It has in fact been calculated that to move a country out of a state of fragility can take between 20 and 40 years.[6]

As a result of the extend process required to lift countries out of fragility, a New Deal for Engagement in fragile states was developed and largely endorsed at the 4th High Level Forum on Aid Effectiveness in November 2011. The vision is that the members of the International Dialogue on Peace-building and State-building—which comprises the G7+ group of 19 fragile and conflict-affected countries,[7] development partners and international

organizations—take a different approach to deal with the situation and challenges of fragile contexts. The New Deal puts priority on what the fragile states themselves feel are the important issues to build peaceful states and societies, identifying five peace- and state-building goals as the foundation for progress toward the Millennium Development Goals (MDGs), and as a guide for work in fragile and conflict-affected states. These are legitimate politics, to foster inclusive political settlements and conflict resolutions; security, to establish and strengthen people's security; justice, to address injustices and increase people's access to justice; economic foundations, to generate employment and improve livelihoods; and revenue and services, to manage revenue and build capacity for accountable and fair service delivery.

The New Deal also aims to increase country–donor harmonization and donor coordination. Given that the action being advocated for is being driven by recipient countries, it is hoped that there will be better success where donors have so far only achieved modest results, partly because their approach was not sufficiently tailored to local needs. As Osaghae (2007) points out, it is ultimately up to the citizens of the countries concerned to determine when their state is no longer fragile—not donors or the international community.

Socioeconomic outlook of fragile states in Africa

The scale and intensity of development challenges in fragile states are tremendous (table 30.1). No fragile or conflict-affected country has yet achieved a single MDG. These countries account for the majority of the MDG deficit and are generally 40–60% behind the progress of other low- and middle-income countries in MDG achievement. Globally, they account for close to a fifth of the population of low-income countries but more than a third of their poor.[8]

In Africa the population of the fragile states[9] constitutes 25.4% of the population of Sub-Saharan Africa. The population living below the poverty line at purchasing power parity (PPP) $1.25 a day accounts for 50.3% of the total population of fragile states, compared with 45.4% for nonfragile states, while the population below the national poverty line repeats this pattern—59.2% for fragile states and 46% for nonfragile states.

With a Human Development Index (HDI) ranking from 137 (Republic of Congo) to 187 (Democratic Republic of Congo), African fragile states are the least developed for socioeconomic well-being. Many of the countries that were fragile in 1979 were still fragile in 2011, and the gap with other developing countries has widened since the 1970s. There are also growing concerns that new situations of fragility may emerge due to the recent global economic downturn, and that countries emerging from conflict and fragility may relapse. In more recent years HDI ranks for fragile states have stagnated or even fallen back, except for Liberia whose HDI ranking improved slightly between 2006 and 2011.

GDP growth in fragile states generally underperformed that for low-income and lower middle-income countries (figure 30.1). Variations in economic performance among fragile states are largely aligned with their resource richness (figure 30.2), which heavily determines their attractiveness to capital, accumulation of foreign reserves and

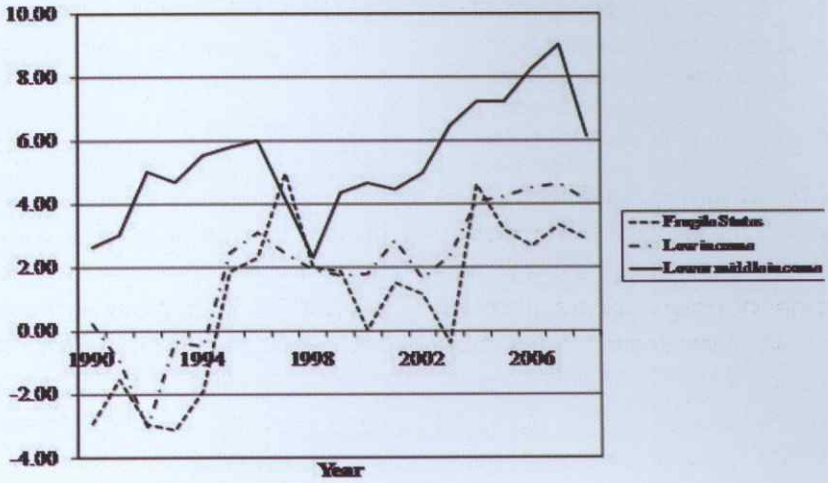
Table 30.1 Selected human development indicators for fragile states

	Human Development Index (value)	Life expectancy at birth (years)	Mean years of schooling	Expected years of schooling	GNI per capita (2005 PPP $)
Fragile states[a]	0.38	54.2	3.6	8.7	957
Sub-Saharan Africa	0.46	54.4	4.5	9.2	1,966

a. Simple average.

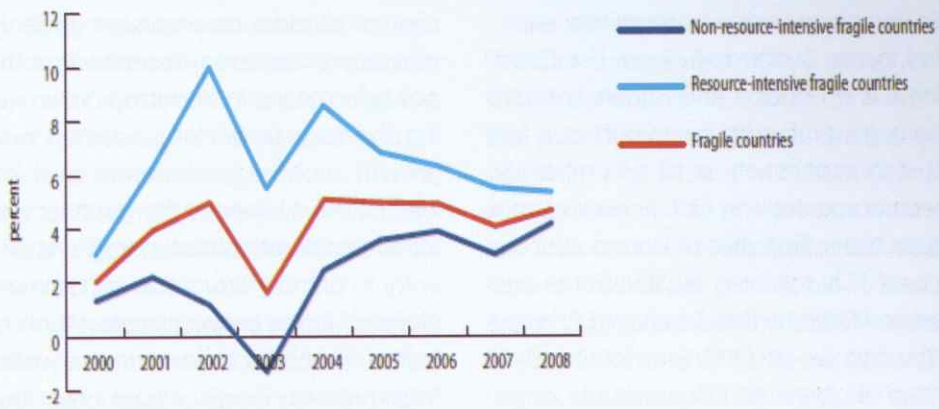
Source: UNDP 2012.

Figure 30.1 **Growth comparisons**



Source: Carment and Samy 2011.

Figure 30.2 **Real GDP growth of fragile countries, resource-intensive fragile countries and non-resource-intensive fragile countries**

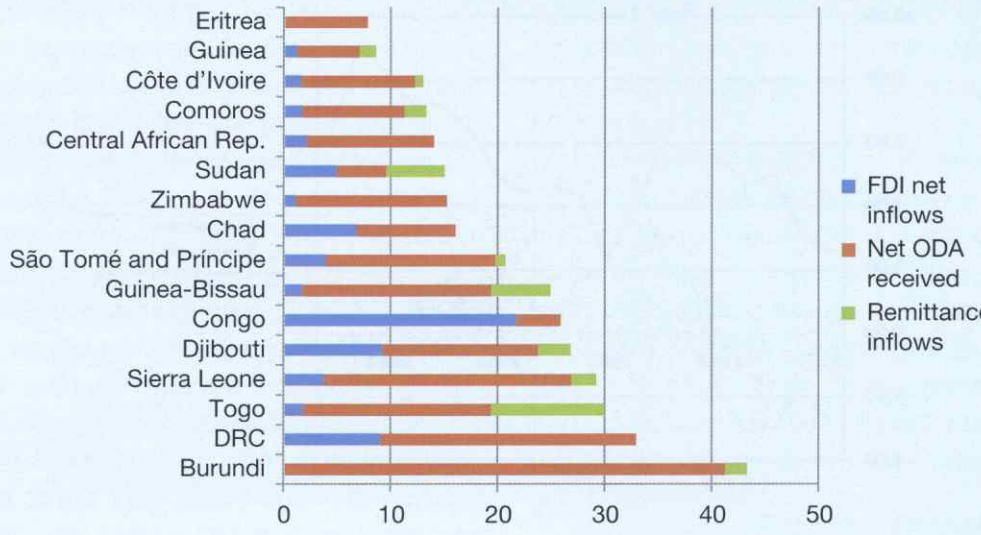


Source: European Communities 2009.

sustainability of foreign debt. State fragility and food insecurity are closely linked. In Sub-Saharan fragile countries the average food intake was 2,093 kcal per person, compared with 2,303 kcal in other Sub-Saharan countries; the undernourishment prevalence was 35% against 23%.[10] Malnutrition indicators are not only worse in fragile countries, but also reach dramatic peaks: in most Sub-Saharan fragile countries, undernourishment rates are above 40%, soaring to 68% in Eritrea and 76% in the Democratic Republic of Congo.

Foreign direct investment (FDI) is extremely uneven. More than 80% of all incoming FDI to Sub-Saharan fragile countries in 2005–2010 went to just three countries—Sudan, Republic of Congo and Democratic Republic of Congo.[11] Resource-poor countries, such as Guinea-Bissau and Liberia, have large debts, undermining their future development. For most fragile countries, the combined weight of aid, FDI and remittances is a large share of GDP, well above the Sub-Saharan average, but the composition differs substantially among countries (figure 30.3). Official development assistance (ODA) is the main inflow for most. Burundi, Republic of Congo, Eritrea, Guinea-Bissau, Liberia and Sierra Leone have aid as a share of GDP close to or

Figure 30.3 **Capital inflows, selected African countries (% of GDP)**



Note: Data for Somalia are unavailable; data for Liberia are outliers and have not been included.
Source: UNDP 2011.

greater than government revenue as a share of GDP. Remittances play a crucial role, especially in Liberia, Sudan and Togo. For Chad, São Tomé and Príncipe and Sudan, external revenue is generated by the export of a few natural resources, such as oil and minerals, and by resource-seeking FDI. However, on a per capita basis, Republic of Congo absorbs the highest FDI, followed by São Tomé and Príncipe and Djibouti; São Tomé and Príncipe ranks the first as an ODA (net total) recipient, ahead of Liberia and Republic of Congo, while Togo has the largest remittances, followed by Sudan and Djibouti.[12]

Labor participation in fragile states is comparable with Sub-Saharan Africa.[13] Given the very young population structure (figure 30.4), innovative solutions to enhancing employment, especially for youth, constitute a major task for fragile states.

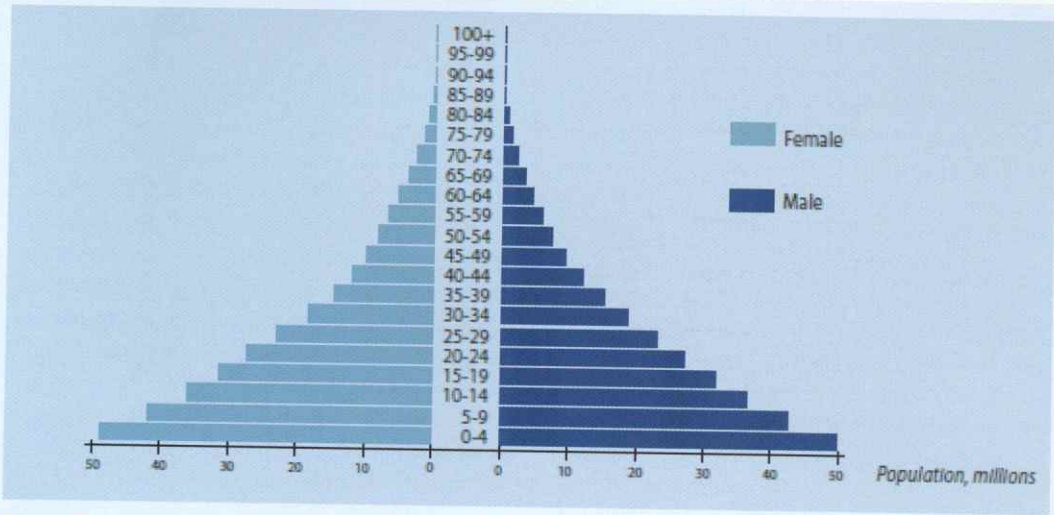
Building human capital in fragile states

Education

Assessments of progress toward the MDGs show that fragile states face the greatest challenge in meeting the targets. In particular, the goal toward universal primary education poses a great challenge, despite education being recognized as the foundation for progress for all other development goals. Primary education has been described as the most powerful means for reducing poverty and laying the foundation for sustained economic growth, sound governance and effective institutions. However, the greatest challenge for access to education in fragile states lies in entry to primary education and primary completion.[14] It has been estimated that a third to half of all school children in the world live in fragile states. Fragile states have the greatest difficulty in mobilizing domestic resources to finance national education strategies and so rely heavily on other sources of funding, particularly donor aid.[15] But such aid is not always readily available.

ODA flows to education in developing countries have shown an upward trend over the years, but fragile states continue to receive consistently low amounts of aid committed to education relative to other low-income countries. In 2006 fragile states were allocated just a fifth of the education aid committed to all low-income countries. Further, between 2004 and 2006 on average only 5% of total aid in fragile states was committed to education, compared with 13% in other low-income countries.[16] This is primarily due to the trend of donors linking

Figure 30.4 **Population pyramid in Sub-Saharan fragile states**



Source: European Communities 2009.

aid allocation to assessments of the quality of recipient country policies and institutions. It is generally acknowledged that countries with higher completion rates receive higher per-child basic education aid than those with lower completion rates. Moreover, countries with higher numbers of children not in school tend to receive lower amounts of aid. It is for such reasons that fragile states have limited access to the Education for All—Fast Track Initiative (box 30.1).

Most fragile states have a history of conflict, which has a strong negative effect on education performance, especially with civil war.[17] The economic and social costs of wars are high and can persist for years after the conflict has ended, an important factor harming education in affected countries. Sometimes, academics are targeted deliberately during conflict as an attack on the education system very often represents an attack on the state.

Preliminary results in Poirier (2011) show that armed conflicts have a strong negative impact on education. Results show that while the rates of children not attending school and of secondary school enrollment are very sensitive to conflict, the primary completion rate appears to be less affected. In the past few decades almost three-quarters of Sub-Saharan countries have been affected by armed conflict. In 2007 the net enrollment rate in Sub-Saharan Africa was around 72%, with a country like Eritrea not even reaching 50%.[18]

Funding for social service delivery in fragile states is mainly from ODA, and bi- or multilateral donations. In education the average per pupil financing gap in conflict-affected countries is around USD69, compared with USD55 for all low-income countries.[19] Yet low-income conflict-affected countries receive USD16 per pupil in aid to basic education compared with the USD22 average.

Erratic and often unpredictable ODA to fragile states makes planning for long-term systemic strengthening difficult. In 2007 less than half the aid scheduled for disbursement was delivered in Sierra Leone and Democratic Republic of Congo; in Chad and Liberia none of the scheduled aid was disbursed that year.[20] Bilateral donors have already withdrawn from—or have announced their intent to withdraw from—providing bilateral financing for education in 13 current or potential Global Partnership developing countries that are fragile states,[21] worsening the disadvantages of these countries. Increased support for a medium- to long-term education plan from development partners at country level is thus critical for fragile states.

Sub-Saharan fragile states lag behind the rest of the continent on adult literacy, which stands at 70.7% for males compared with

Box 30.1 The Fast Track Initiative

The Education for All—Fast Track Initiative (FTI) was launched in 2002 as a global partnership between donor and developing countries to ensure accelerated progress toward universal primary completion. The initiative aims to provide support for low-income countries to access more effective and predictable aid from donors to finance credible education sector plans that they are unable to finance by themselves. But fragile states often find themselves in a situation in which they are unable to develop education sector plans. And even when they do succeed in developing education plans, these are not credible enough to pass the tests required to receive FTI.

And even where finance could be made available, the low credibility of institutions at the sectoral and financial management levels, coupled with weak systems and low capacity, tend to make investing aid resources in these countries a high-risk proposition for donors. As such, even the tried and tested practices for expanding access may not be appropriate to the complex development environments where weak governance poses concern for the international development community.

Acknowledging the need to address the lack of progress toward universal primary education in many fragile states, the FTI established the interagency Fragile States Task Team in 2005 to determine how best to expand the partnership model to incorporate countries with weak financial and management capacity that fail to meet the regular FTI criteria.

The work of the team has revealed three key reasons as to why the FTI arrangement is unsuitable to engaging with fragile states. First, the FTI follows the principle that the process of funding education is driven by the recipient country and encourages the use of benchmarking and indicators. But these benchmark and data requirements are often too ambitious for fragile states to achieve, and they therefore fail to pass the indicative framework.

Second, structural barriers such as the fact that disbursements from the Catalytic Fund come through World Bank structures also make funding to fragile states difficult as the World Bank may not always have a presence in these countries.

Finally, the emphasis on country ownership placed by the FTI partnership does not mitigate many of the risks associated with fragile states. There is a trust gap that exists for the donors as a result of the implementation and fiduciary concerns due to the low credibility of institutions at the sectoral and financial management levels in fragile states.

Source: Turrent 2011.

78.8% in nonfragile Sub-Saharan nations, and 52.6% for females against 66.8%.[22] The poor human development performance is also indicated by the under-five mortality rate of 135.4 per 1,000 live births in fragile countries, much higher than the average of 101.7 for other Sub-Saharan countries. It is also echoed by the maternal mortality ratio—728.8 for fragile states but 619.0 for Sub-Saharan Africa.

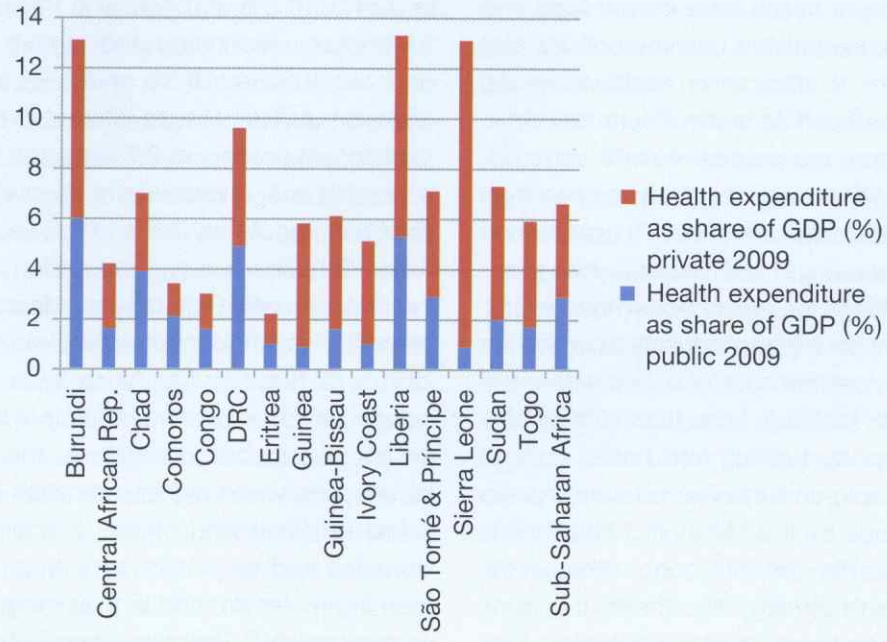
Public expenditure on education and total expenditure on health care accounted for slightly higher proportions of GDP for Sub-Saharan fragile states than for the rest of Sub-Saharan Africa in 2005–2009.[23] Among pregnant women, 77.2% had at least one antenatal visit, and 52.7% of births were attended by skilled health personnel, both higher than the Sub-Saharan average of 73.6% and 47.7%, respectively. However, the higher input has not yet been translated into better performance in education and health, which raises concerns on service accessibility and quality of services.

Health

For fragile states, the financial contribution of the public sector to health services falls far short of the population's needs. Current per capita public expenditure on health is far below the USD38 estimated by the World Health Organization's Commission on Macroeconomics and Health. Only five fragile states have reached the average level of public expenditure for health in Sub-Saharan Africa (figure 30.5). Owing to limited public health spending, private out-of-pocket expenditures account for 93% of total health spending in Sierra Leone and 49% in Democratic Republic of Congo.[24] These numbers are incredibly high. Such rates hit hardest the poor and vulnerable in fragile states, which lack rigorous monitoring of access to health services by the poor.

Increased financing will be important but is not a solution on its own. A country's absorptive capacity and administrative obstacles limit the effectiveness of aid. Many

Figure 30.5 **Public and private health expenditure as share of GDP in fragile states (% of GDP)**



Source: World Bank, Africa Development Indicators database.

governments in fragile states lack the capacity to deliver social services, and in such cases nongovernment stakeholders may receive funds and implement programs. The latter approach has been adopted, for example, for Guinea, where nonstate providers were used and they worked closely with government authorities and other local partners to maintain essential education services. In health, national government contributions are frequently challenged by competing priorities and political prerogatives, and the capacity of health systems is limited to implementing current levels of financing (and not absorbing rapidly scaled up interventions, partly due to governance concerns).

The failure to provide adequate funding to social service delivery affects the entire population, widening inequalities between men and women. Gender inequality in fragile states is higher than in the rest of Sub-Saharan Africa, as the fragility of state institutions can adversely influence women's condition. The difference between the HDI and Gender-related Development Index—a proxy for gender inequality—is nearly twice as wide for Sub-Saharan fragile states as for nonfragile states. The difference would probably be larger if data were complete, as the data used to compute this difference were missing for two countries—Somalia and Sudan—that presumably have a poor record on gender equality. Little public funding to the health sector drives up maternal mortality, which is much higher than in nonfragile states.

Weak government systems undermine service delivery in fragile states. Due to governments' limited implementation capacity and weak governance systems, nongovernmental organizations (NGOs) play a more important role in service delivery in fragile environments than in other contexts because they have formed the "backbone" of humanitarian services during conflict and have continued such services by extending relief aid. This stems from protracted periods of transition, primarily as a result of donor delays in shifting aid modalities from humanitarian to development aid. The lack of a well-established transition mechanism to a more structural approach often gives this kind of humanitarian aid a structural character, as exemplified in eastern Democratic Republic of Congo over the last 20 years.

Lack of an efficient service delivery system excludes the poor and vulnerable. These

groups tend to benefit least from health service delivery due to preventive opportunity costs of health care (travel, food and childcare), unregulated user-fee policies and few options to alternative health financing instruments (such as health insurance). As in Sierra Leone, the poorest quintile uses primary and secondary care far less often than wealthier quintiles, and receives only around 14% of spending. Health service beneficiaries qualifying for exemptions (the elderly, pregnant women) are regularly charged for health services because of limited revenue at local health facilities. Less than 10% of clinics are reported giving free health care to these groups, and there is no countrywide fee guidance by the Ministry of Health.[25] In Democratic Republic of Congo, although the government's strategy is in theory pro-poor, actual expenditures tend to go against it by favoring urban rather than rural services.

As a response to inadequate government health budgets, fragile and post-conflict states can see an increase in the reliance on user fees for health care, which may also be valid in other developing countries. However, assessments indicate that the capacity of user fees to raise significant amounts of money in complex emergencies is very limited, and the higher the cost of accessing health care, the lower the utilization.[26] Performance-based funding is one approach that some fragile states (such as Burundi and Democratic Republic of Congo) have used to deal with provider payments. Some commentators have suggested that performance-based funding has worked better in post-conflict settings for reasons such as providers being more amenable to financial incentives, a breakdown in funding and generally less inertia in the system.[27]

Competitiveness and employment opportunities

To build up skills for competitiveness and employment opportunities, the labor demand and supply sides should both be addressed. On the supply side, quality delivery of education is a major determinant. Sub-Saharan fragile states lag behind the average Sub-Saharan Africa in education service delivery. The gross enrollment rate is 92.4%, 31.8% and 4.46% in fragile states for primary, secondary and tertiary education, but 100.2%, 35.3% and 5.9% for Sub-Saharan Africa. Fragile states' 3.6 mean years of schooling and 8.7 expected years of schooling both underperform the average for Sub-Saharan Africa (4.5 and 9.2 years) (see table 30.1). The quality of education is also a big concern: only 69% of school teachers are trained to teach, compared with an average of 76% for Sub-Saharan Africa. While primary education often continues to be supported by community-based initiatives, the delivery of secondary and higher education requires more qualified and skilled teaching staff, complex and expensive infrastructure, and learning materials, and is thus more difficult to reestablish.[28] The population with at least a secondary education (age 25 and older) is only 31% for males and 17% for females in fragile states, against 35% for males and 22% for females in Sub-Saharan Africa.[29]

Lack of jobs is a major risk to stability in fragile states.[30] Private sector censuses and surveys, as well as labor force databases, are lacking in fragile states, making it hard to analyze overall patterns of sector employment and labor force skills. Thus assessments of skills mismatch between labor supply and demand are pure estimates. The picture is further clouded by considerable migration and labor mobility from fragile states to other countries, including nonfragile neighbors.

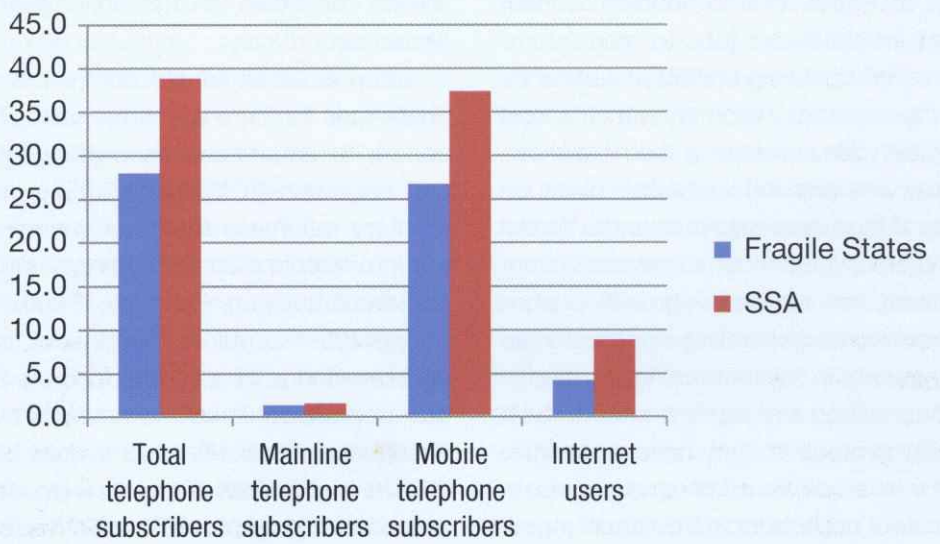
In most fragile states the lack of quality education and vocational training prevents the growing number of young people from gaining the skills needed for the recovery process. A serious lack of training providers is a major bottleneck, and shortage of financial resources for training is often cited as a significant obstacle by employers and training providers. However, the development of new communications infrastructure and technology, especially the rapid expansion of information and communications technology (ICT) and low-cost mobile platforms, provides a unique opportunity for economic empowerment and skills development for young

people. Mobile communications networks provide an excellent substitute for face-to-face, locally available quality training and skills building. The potential of using ICT for skills development must be realized—which is possible in fragile states only once the digital divide between them and the rest of Sub-Saharan Africa is narrowed (figure 30.6).

Fragile states have very weak business climates that restrict private sector activities through several channels. The indirect costs of poor infrastructure, regulatory challenges (such as a weak judiciary and poor contract enforcement and property rights, excessive licensing fees, bribes and so on) and low labor productivity can reduce profit margins and dampen incentives for business owners and prospective entrepreneurs.[31] Ramachandran and Shah (2011) show that business owners in the poorest African countries—including most fragile states—usually cite basic infrastructure deficiencies, weak access to financing and lack of macroeconomic stability as the primary constraints to profitability and expansion, while governance factors are more frequently cited in the next higher income tier (such as Kenya and Senegal) and limited job skills in the highest income group (such as Gabon and South Africa) (figure 30.7). Thus support for private sector development and private sector–led job creation and skills development in fragile contexts should be more oriented toward infrastructure-related skills for countries in the initial transition to nonfragility.

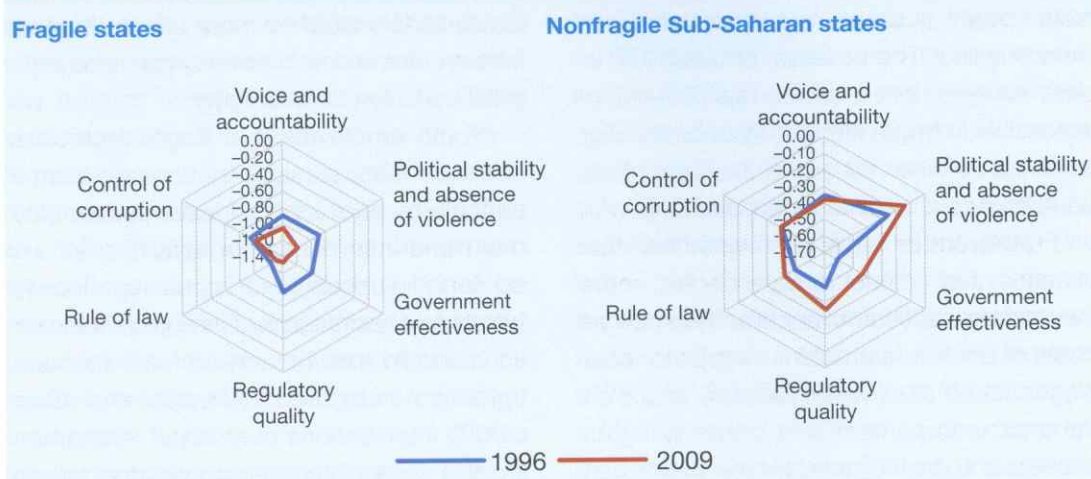
Youth employment in fragile states has common features such as concentration in agriculture and agribusiness, self-employment and informal sector activities, as well as gender inequality in access to skills for formal and decent jobs. Composite interventions should thus be applied for skills development. As identified by Peeters and others (2009), interventions may target strengthening the skills of formal and informal private sector employers and their employees, implementing specific interventions in agriculture, developing work experience of young people through public work schemes and strengthening the skills profile of out-of-school young people. They also need to focus on supporting self-employment and entrepreneurship for young people by increasing access to financing and building business and financial management skills. Further interventions should include expanding access to quality higher education, including technical and vocational education and training, as well as developing specialized labor for sectors needing such workers.[32]

Figure 30.6 **ICT prevalence in fragile states and Sub-Saharan Africa (%)**



Source: World Bank, Africa Development Indicators database.

Figure 30.7 **Governance scores for fragile states and nonfragile Sub-Saharan states**



Source: World Bank, Africa Development Indicators database.

Inclusion and social cohesion

The resilience of a socioeconomic system depends on the ability of its different layers—household, community and country—to adjust to internal and external shocks. Vulnerable cohorts can be more exposed in fragile contexts to risks that are far beyond the control of the members of these layers.

State fragility implies heavy costs, especially for the most vulnerable sections of society, such as women, children, the elderly and poor youths. Fragile states are more exposed to violent conflict, and the consequences are not gender neutral. The effects on women's well-being represent severe costs of state fragility: in Eritrea and Zimbabwe women lost their formal sector jobs to men returning from conflict; during conflict, the absence of men leaves many women with the sole responsibility for maintaining the household, and many women cannot inherit or claim the property of their deceased husbands. Youths are often among the most vulnerable in fragile contexts: low economic growth pushes them into income-generating work for longer hours, typically in the informal sector and in agriculture-related activities.

Social protection can have a positive impact on empowerment and pro-poor growth and contribute to political stability and the re-forging of the social contract between the state and its citizens.[33] The implementation of social protection systems is a matter not only of capacity but also of the willingness and accountability of the state.[34] Diversity in fragility must be taken into account and the weakest countries are in the most need of support. Support by the international community for social protection is concentrated on states falling into the "gradual improvement" and "postconflict/crisis or political transition situations" categories, while support is very scarce for fragile states in more difficult environments of "prolonged crisis or impasse" and "deteriorating governance."[35] This may be because the political environment in these countries is not yet conducive for interventions on social protection.

Long-established aid actors are facing challenges to force a change in their positioning to enhance state building. Kharas and Rogerson (2012) identify three complementary rationales for development cooperation: high-impact philanthropy and non-government-giving channels; South–South cooperation combining trade and finance, and blended public–private funding in general; and exploration of the power of climate-change finance, considering its quite different country and project allocation logic. The use and combination of intervention instruments should aim for synergy to enhance voice and accountability in state building.

Table 30.2 Causality tests

Panel A Africa

		2 E.U.	2 F.D.I.	2 G.D.P.	2 H.E.	2 H.D.	2 L.E.	2 M.R.	2 S.E.S.	2 U.	2 U.P.	2 I.C.T.E
1	E.U.	—	—	1↔2	1→2	1→2	—	1↔2	1→2	N.A.	1→2	N.A.
1	F.D.I.		—	1→2	—	—	1↔2	1↔2	1→2	N.A.	1←2	N.A.
1	G.D.P.			—	1→2	1→2	1→2	1→2	—	N.A.	—	N.A.
1	H.E.				—	1↔2	1↔2	1↔2	—	N.A.	1←2	N.A.
1	H.D.					—	1←2	1←2	—	N.A.	1↔2	N.A.
1	L.E.						—	1↔2	1→2	N.A.	—	N.A.
1	M.R.							—	1↔2	N.A.	—	N.A.
1	S.E.S.								—	N.A.	1←2	N.A.
1	U.									—	N.A	N.A.
1	U.P.										—	N.A.
1	I.C.T.E											—

Panel B Chad

		2 E.U.	2 F.D.I.	2 G.D.P.	2 H.E.	2 H.D.	2 L.E.	2 M.R.	2 S.E.S.	2 U.	2 U.P.	2 I.C.T.E
1	E.U.	—	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1	F.D.I.		—	1→2	—	—	1→2	—	—	N.A.	—	N.A.
1	G.D.P.			—	—	—	—	1←2	—	N.A.	1→2	N.A.
1	H.E.				—	—	1→2	1←2	1←2	N.A.	1←2	N.A.
1	H.D.					—	1→2	1←2	1←2	N.A.	1←2	N.A.
1	L.E.						—	1←2	1←2	N.A.	—	N.A.
1	M.R.							—	—	N.A.	1→2	N.A.
1	S.E.S.								—	N.A.	—	N.A.
1	U.									—	N.A.	N.A.
1	U.P.										—	N.A.
1	I.C.T.E											—

Panel C Republic of Congo

		2 E.U.	2 F.D.I.	2 G.D.P.	2 H.E.	2 H.D.	2 L.E.	2 M.R.	2 S.E.S.	2 U.	2 U.P.	2 I.C.T.E
1	E.U.	—	1←2	—	1→2	—	1→2	—	—	N.A.	—	N.A.
1	F.D.I.		—	—	1←2	—	1→2	1←2	—	N.A.	1↔2	N.A.
1	G.D.P.			—	1↔2	—	1↔2	1→2	1↔2	N.A.	—	N.A.
1	H.E.				—	—	1←2	—	N.A.	N.A.	1↔2	N.A.
1	H.D.					—	1↔2	—	N.A.	N.A.	1←2	N.A.
1	L.E.						—	—	1←2	N.A.	1→2	N.A.
1	M.R.							—	—	N.A.	1→2	N.A.
1	S.E.S.								—	N.A.	1→2	N.A.
1	U.									—	N.A	N.A.
1	U.P.										—	N.A.
1	I.C.T.E											—

Note: E.U. = energy use (kg of oil equivalent per capita), F.D.I. = foreign direct investment, net inflows (% of GDP), G.D.P. = GDP per capita (constant 2000 USD), H.E. = health expenditure per capita (current USD), H.D. = human Development, Life expectancy at birth, total (years), M.R. = mortality rate, under-5 (per 1,000), S.E.S. = school enrollment, secondary (% gross), U. = unemployment, total (% of total labor force), U.P. = urban population (% of total), and I.C.T.E. = information and communication technology expenditure (% of GDP). 1↔2 = bidirectional causality between the variables 1 and 2; 1→2 = causality from variable 1 to variable 2; 1←2 = causality from variable 2 to variable 1; — denotes absence of causality. N.A. denotes that the series is not available or that the number of observations available is too short to get robust results. We consider a significance level of 10%.

(continued)

Table 30.2 Causality tests *(continued)*

Panel D Côte d'Ivoire

		2 E.U.	2 F.D.I.	2 G.D.P.	2 H.E.	2 H.D.	2 L.E.	2 M.R.	2 S.E.S.	2 U.	2 U.P.	2 I.C.T.E
1	E.U.	—	—	1↔2	—	—	1↔2	1↔2	1←2	N.A.	1↔2	N.A.
1	F.D.I.		—	—	—	1←2	—	1→2	—	N.A.	1→2	N.A.
1	G.D.P.			—	1→2	—	1↔2	1↔2	1→2	N.A.	1←2	N.A.
1	H.E.				—	1↔2	1↔2	1↔2	—	N.A.	1↔2	N.A.
1	H.D.					—	—	—	N.A.	N.A.	1→2	N.A.
1	L.E.						—	1→2	1→2	N.A.	1→2	N.A.
1	M.R.							—		N.A.	1↔2	N.A.
1	S.E.S.								—	N.A.	1→2	N.A.
1	U.									—	N.A.	N.A.
1	U.P.										—	N.A.
1	I.C.T.E											—

Panel E Liberia

		2 E.U.	2 F.D.I.	2 G.D.P.	2 H.E.	2 H.D.	2 L.E.	2 M.R.	2 S.E.S.	2 U.	2 U.P.	2 I.C.T.E
1	E.U.	—	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1	F.D.I.		—	—	1→2	—	1←2	—	—	N.A.	—	N.A.
1	G.D.P.			—	1←2	—	1→2	1→2	—	N.A.	1↔2	N.A.
1	H.E.				—	—	—	—	N.A.	N.A.	—	N.A.
1	H.D.					—	1↔2	1←2	—	N.A.	1←2	N.A.
1	L.E.						—	1↔2	1←2	N.A.	1→2	N.A.
1	M.R.							—	1←2	N.A.	—	N.A.
1	S.E.S.								—	N.A.	1↔2	N.A.
1	U.									—	N.A.	N.A.
1	U.P.										—	N.A.
1	I.C.T.E											—

Panel F North Africa

		2 E.U.	2 F.D.I.	2 G.D.P.	2 H.E.	2 H.D.	2 L.E.	2 M.R.	2 S.E.S.	2 U.	2 U.P.	2 I.C.T.E
1	E.U.	—	—	1↔2	1→2	—	—	—	1←2	1→2	1↔2	—
1	F.D.I.		—	1→2	1↔2	—	1→2	—	1→2	1→2	1→2	—
1	G.D.P.			—	1↔2	1←2	1→2	—	—	1↔2	1→2	—
1	H.E.				—	1←2	1→2	—	1→2	1→2	1→2	1→2
1	H.D.					—	—	—	—	—	—	—
1	L.E.						—	1↔2	—	1↔2	1↔2	—
1	M.R.							—	1←2	1→2	—	—
1	S.E.S.								—	—	—	—
1	U.									—	1↔2	N.A.
1	U.P.										—	—
1	I.C.T.E											—

Note: E.U. = energy use (kg of oil equivalent per capita), F.D.I. = foreign direct investment, net inflows (% of GDP), G.D.P. = GDP per capita (constant 2000 USD), H.E. = health expenditure per capita (current USD), H.D. = human Development, Life expectancy at birth, total (years), M.R. = mortality rate, under-5 (per 1,000), S.E.S. = school enrollment, secondary (% gross), U. = unemployment, total (% of total labor force), U.P. = urban population (% of total), and I.C.T.E. = information and communication technology expenditure (% of GDP). 1↔2 = bidirectional causality between the variables 1 and 2; 1→2 = causality from variable 1 to variable 2; 1←2 = causality from variable 2 to variable 1; — denotes absence of causality. N.A. denotes that the series is not available or that the number of observations available is too short to get robust results. We consider a significance level of 10%.

(continued)

Table 30.2 **Causality tests** *(continued)*

Panel G Somalia

		2 E.U.	2 F.D.I.	2 G.D.P.	2 H.E.	2 H.D.	2 L.E.	2 M.R.	2 S.E.S.	2 U.	2 U.P.	2 I.C.T.E
1	E.U.	—	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1	F.D.I.		—				—	N.A.	—	N.A.	—	N.A.
1	G.D.P.			—	—	—	—	—	—	N.A.	—	N.A.
1	H.E.				—	N.A.	—	N.A.	—	N.A.	1→2	N.A.
1	H.D.					—	—	N.A.	—	N.A.	—	N.A.
1	L.E.						—	N.A.	—	N.A.	—	N.A.
1	M.R.							—	N.A.	N.A.	N.A.	N.A.
1	S.E.S.								—	N.A.	1→2	N.A.
1	U.									—	—	N.A.
1	U.P.										—	N.A.
1	I.C.T.E											—

Panel H Sub-Saharan Africa

		2 E.U.	2 F.D.I.	2 G.D.P.	2 H.E.	2 H.D.	2 L.E.	2 M.R.	2 S.E.S.	2 U.	2 U.P.	2 I.C.T.E
1	E.U.	—	—	1↔2	1←2	1→2	—	1→2	—	N.A.	1→2	N.A.
1	F.D.I.		—	1→2	—	—	1↔2	1↔2	1↔2	N.A.	1↔2	N.A.
1	G.D.P.			—	1→2	1→2	1→2	—	1↔2	N.A.	—	N.A.
1	H.E.				—	1↔2	1↔2	1↔2	1←2	N.A.	1←2	N.A.
1	H.D.					—	1←2	1←2	1←2	N.A.	1↔2	N.A.
1	L.E.						—	1↔2	1←2	N.A.	—	N.A.
1	M.R.							—	1→2	N.A.	—	N.A.
1	S.E.S.								—	N.A.	1→2	N.A.
1	U.									—	N.A.	N.A.
1	U.P.										—	N.A.
1	I.C.T.E											—

Panel I Togo

		2 E.U.	2 F.D.I.	2 G.D.P.	2 H.E.	2 H.D.	2 L.E.	2 M.R.	2 S.E.S.	2 U.	2 U.P.	2 I.C.T.E
1	E.U.	—	—	1←2	—	1←2	1←2	1↔2	1→2	N.A.	1↔2	N.A.
1	F.D.I.		—	—	—	1→2	—	1→2	1→2	N.A.	—	N.A.
1	G.D.P.			—	1→2	1←2	1↔2	1↔2	—	N.A.	1→2	N.A.
1	H.E.				—	—	1↔2	1←2	1↔2	N.A.	1←2	N.A.
1	H.D.					—	1↔2	—	1→2	N.A.	—	N.A.
1	L.E.						—	—	—	N.A.	1↔2	N.A.
1	M.R.							—	1←2	N.A.	1↔2	N.A.
1	S.E.S.								—	N.A.	1→2	N.A.
1	U.									—	N.A.	N.A.
1	U.P.										—	N.A.
1	I.C.T.E											—

Note: E.U. = energy use (kg of oil equivalent per capita), F.D.I. = foreign direct investment, net inflows (% of GDP), G.D.P. = GDP per capita (constant 2000 USD), H.E. = health expenditure per capita (current USD), H.D. = human Development, Life expectancy at birth, total (years), M.R. = mortality rate, under-5 (per 1,000), S.E.S. = school enrollment, secondary (% gross), U. = unemployment, total (% of total labor force), U.P. = urban population (% of total), and I.C.T.E. = information and communication technology expenditure (% of GDP). 1↔2 = bidirectional causality between the variables 1 and 2; 1→2 = causality from variable 1 to variable 2; 1←2 = causality from variable 2 to variable 1; — denotes absence of causality. N.A. denotes that the series is not available or that the number of observations available is too short to get robust results. We consider a significance level of 10%.

(energy use and FDI) affect life expectancy. In addition, FDI seems to promote urbanization that, in its turn, affects human development and education. Moreover, GDP seems to cause health expenditure, life expectancy and school enrollment.

Similar findings are obtained from Côte d'Ivoire where energy use seems to play an important role by interacting with GDP, life expectancy, school enrollment and urbanization. GDP causes health expenditure, life expectancy and education, and it is caused by urbanization. However, compared with Republic of Congo, FDI plays a less important role in human development and economic growth.

For Liberia FDI seems to only affect health expenditure and to not be significantly linked to economic growth and human development. The contribution of FDI to GDP is in fact weak. In contrast, our empirical tests show that GDP interacts with health expenditure, life expectancy and urbanization.

In Somalia, for the one data series available, our long-run causality tests show that health expenditure and school enrollment seem to cause urbanization.

For Togo it appears that energy use is caused by GDP, human development and life expectancy, and that it causes school enrollment. In particular, there is a bidirectional causality between GDP and urbanization: GDP increases urbanization and by reducing transaction costs and permitting agglomeration effects, urbanization causes economic growth. FDI seems to cause human development and promote education.

Policy implications

There is no standard approach to dealing with fragile states. Most of these countries are aid orphans, and few are able to attract private financing on a sustainable basis.[40] These issues are further compounded by the conflict that several fragile states experience, or have experienced in the past. Even so, we offer up some policy recommendations on approaches that can be taken to help ameliorate the situation in these countries.

To begin, there is a need to harmonize donor programs. Further, however, the efforts of such programs must be aimed at issues that the countries themselves feel are most relevant. This helps build a sense of ownership by the country for development that is to take place. It further means that these programs will be better tailored to the situation on the ground for each of these individual countries, rather than a generic template being used across all fragile states. All these factors help increase the odds of success for the projects implemented.

Given that governments in fragile states are essentially unable, or unwilling, to provide the basic services to their population, any assistance meant to provide these services to the people should be provided to them directly at the grassroots. This is because in many countries, not just fragile states, when funding for service provision to the masses first passes through the government, most—up to 90%—of the funding fails to reach the grassroots. It is thus essential that a mechanism is set up in which aid donors and actors can interact directly with the people and that this aid is given to them directly.

Often, donors have adopted a strategy of substituting the state with an international aid agency or NGO. This is done particularly in humanitarian emergencies where there is a short-term urgent need to provide access to services. Such service contracts to non-state actors may produce short-term benefits for enhanced service delivery, but building sustainable service-delivery systems for the long term is an issue. This two-track problem raises a dilemma between mitigating immediate humanitarian needs and delaying the establishment of long-lasting local service delivery.[41]

As a long-term solution, it is necessary to strengthen government capacity, through, for example, training sessions for key individuals to raise their awareness of alternative, more effective ways of doing things; they in turn train those around them. Or general technical assistance can be provided to the government. Building government capacity can enable the country, in the long run, to become self-reliant and provide public services with the kind of governance people want.

Finally, it is important to develop programs to help ex-combatants in fragile states reintegrate into civil society as productive civilians. Many of these ex-combatants are young people, and if they are not given the guidance to move away from combat, they become a burden on society—or worse.

Conclusions

The limited capabilities of fragile states to provide services to the general population means that these countries are unlikely to reach many of the MDGs, particularly those on education and health. In these fragile situations, social service delivery is achieved primarily through ODA, but this often does not reach its intended destination—hence the long-run need to work toward systemwide reform so that states themselves can better manage their resources.

The lack of quality education and training, which often compounds unemployment, is a major risk to stability in fragile states, although the dearth of data on employment further complicates efforts.

The plight of fragile states is huge, and much effort will be required to take them out of fragility. The road to recovery is long, but must be taken as fragility does not stop at these countries' borders.

Notes

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The authors would like to acknowledge the contributions from Cristina Hoyos (Fragile States Expert, Fragile States Department, AfDB), Carla Silva (Consultant, Fragile States Department, AfDB) and John Afele (Consultant, Fragile States Department, AfDB), as well as from Professor Mohamed Arouri (University of Auvergne France).

1. OECD 2013, 15.
2. Stepputat and Engberg-Pedersen 2008.
3. Osaghae 2007.
4. Burundi, Central African Republic, Chad, Comoros, Republic of Congo, Côte d'Ivoire, Djibouti, Democratic Republic of Congo, Eritrea, Guinea, Guinea-Bissau, Liberia, São Tomé and Príncipe, Sierra Leone, Somalia, South Sudan, Sudan, Togo and Zimbabwe.
5. Mthuli and Jones 2013.
6. Mthuli and Jones 2013.
7. The 13 African countries that are members of the G7+ are Burundi, Central African Republic, Chad, Comoros, Côte d'Ivoire, Democratic Republic of Congo, Guinea, Guinea Bissau, Liberia, Sierra Leone, Somalia, South Sudan and Togo.
8. Background note to the 2010 MDG Review Summit.
9. Burundi, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Republic of Congo, Côte d'Ivoire, Djibouti, Eritrea, Guinea, Guinea-Bissau, Liberia, São Tomé and Príncipe, Sierra Leone, Somalia, South Sudan, Sudan, Togo and Zimbabwe.
10. EU 2009.
11. AfDB and others 2012.
12. AfDB and others 2012.
13. Fragile states have an average female labor participation rate of 62.2%, compared with 62.9% for Sub-Saharan Africa; male labor participation is 81.2% in fragile states and Sub-Saharan Africa.
14. Turrent 2011.
15. Turrent and Oketch 2009.
16. Turrent and Oketch 2009.
17. Poirier 2011.
18. Poirier 2011.
19. UNESCO 2011.
20. UN DESA 2010.
21. Global Partnership for Education 2011.
22. World Bank, Africa Development Indicators database.
23. The ratio of public expenditure on education to GDP is (simple average) 7.06%, higher than the ratio for Sub-Saharan Africa at 6.4%, while the ratio of total expenditure on health to GDP is also higher than the ratio for Sub-Saharan Africa (7.06% versus 6.2%) (UNDP 2011).
24. World Bank, Africa Development Indicators database.
25. Rothmann and others 2011.
26. Witter 2012.
27. Toonen and others 2009; Witter 2012.
28. Rose and Greeley 2006.
29. UNDP 2011.
30. One in two young people who join a rebel movement cites unemployment as the main reason for doing so (World Bank 2011). In Democratic Republic

of Congo more than 70% of the young are underemployed, particularly in urban areas, and even young university graduates face enormous problems in entering the labor market: of the 9,000 young people leaving university each year fewer than 100 find work (AfDB and others 2012).

31. Leo, Ramachandran and Thuotte 2012.
32. Peeters and others (2009) show in a survey for Sierra Leone that the skills most needed for nonfarm private firms are in marketing and management, and for farms and agribusinesses they are in food processing.
33. Darcy 2004; Harvey 2007.
34. EU 2009.
35. In the field of social protection, imbalances are particularly glaring: international support tends to focus on a handful of countries (Ethiopia, Ghana, Kenya, Malawi, Rwanda and Zambia) that have the potential to become "success stories". Meanwhile, many of those most in need—often countries in situations of fragility whose weak capacity to afford social protection domestically has been further undermined by crises—get scarce, if any, support (EU 2010).
36. World Bank 2013. There are yearly data on 1,301 indicators of countries throughout the world since 1960. This dataset is collected from different sources, and provided by international agencies and governments. It contains data on the share of urban population of countries since 1960 until 2012. However, many indicators such as health, education and employment indicators are available only for recent years. Data are available at http://data.worldbank.org/.
37. Stationary and cointegration tests are not reported to save space but available upon request.
38. The issue of testing for noncausality is addressed in a time series setting, in particular by Phillips (1995) in the context of a VAR in levels estimated using the fully modified estimator, and also by Toda and Yamamoto (1995) who suggest augmenting the VAR by the maximal order of integration for the process being examined. The former method provides some very interesting results as far as asymptotic inference is concerned. The most important one is that statistical inference in this framework can be conducted by means of standard asymptotics; no unit root limit theory is required. Normal and mixed normal limit theory are applied to the stationary and nonstationary components of the VAR respectively. This implies that optimal inference in levels VARs and Wald test for noncausality can be obtained without prior knowledge of the number of unit roots or the order of cointegration rank in the system, and without the use of reduced rank Johansen-type regressions (which are subject to pre-testing bias, as tests for cointegration ranks are extremely sensitive to the values of the nuisance parameters). The approach by Toda and Yamamoto (1995) also results in a standard Wald statistic for noncausality restrictions, although it does require some pre-testing for determining the lag length of the VAR.
39. A cointegration relationship between two series means that at least one of the two series Granger-causes the other.
40. Turrent 2011.
41. Witter 2012.

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Mrs. Bineta Ba-Diagne is currently a Chief Health Economist at the African Development in the Health Division (OSHD.3) of the Human Development Department where she has worked since 1997. She has extensive experience in Health Planning and Health Care Financing and in designing and monitoring health and safety net projects. She successfully managed a large number of social and health projects in Africa and has a good knowledge of health challenges on the continent as well as the linkages among health, water and sanitation. She acted as the Officer-In-Charge of the AfDB's Health Division for two years, and she was also tasked for many years to coach and mentor a number of junior staff. In September 2013, she was made the Regional Coordinator for the West and Central African Region and is currently based in the Bank National Office in Burkina Faso where she works in different sectors including health and gender. She has over 34 years of work experience in the health sector. Prior to the Bank, she worked for 10 years in the Ministry of Health in Senegal as a health planner and seven years as the Regional Health Care Financing Advisor in the USAID Regional Office for West and Central Africa covering 24 countries by working closely with governments and USAID national offices. She holds a master's of public health from the University of Ann Arbor, Michigan, United States, and a bachelor's in economics from the University Cheick Anta Diop of Dakar, Senegal.

Claire BALDIN

Dr. Claire Baldin, born in Nice in 1984, is currently a researcher at the University of Nice Sophia Antipolis. She obtained her PhD in Economics in 2012 and her thesis concerns the sanitary and environmental quality as strategic variable of the North-South agricultural trade. Her research interests relate to international trade and, more particularly, the environmental and sanitary constraints and their effects on the international competitiveness of African countries.

Oussama BEN ABDELKARIM

Dr. Oussama Ben Abdelkarim has been a Senior Education Economist at the African Development Bank in the Human Development Department (OSHD) since 2013. He

obtained his PhD in Economics from the University Panthéon-Assas (Paris 2) in 2009 and completed postdoctoral training at the Centre d'Études de l'Emploi, Noisy-le-Grand, in 2011. After his career as a researcher and associate-professor in France and Tunisia, Dr. Ben Abdelkarim joined the Tunisian Ministry of Higher Education and Scientific Research as an advisor to the Minister in 2011. His research interests are in applied economics, economics of education and labor economics.

Adel BEN YOUSSEF

Dr. Adel Ben Youssef is a professor of economics at the University of Nice Sophia-Antipolis (France). Dr Ben Youssef has coordinated several research projects in the multilingual and multicultural setting for UNDP, the European Commission, French ministries, the Economic Research Forum Cairo, FEMISE and the African Development Bank. In this framework, he has developed intellectual but also practical skills in the organization of international events. Dr. Ben Youssef has published more than 50 academic papers in different fields such as education economics, environmental economics, industrial economics, and digital economics. His publications are in English, French, Italian and Arabic journals like *Environmental and Resources Economics*, *Journal of Agriculture and Food Industrial Organization*, *Energy Policy*, *Energy and Development Economics*, *International Strategic Management*, *L'Industria*, *Middle East Development Journal*, *Economics Bulletin*, *International Journal of Computer and Information Technology*, *Education and Information Technology*, and *European Journal of Industrial Economics and Policy.* He worked for AfDB as a consultant for the Human Capital Development Strategy (2013–2017), the Pan African University Project (Cameroon, Nigeria, Ethiopia and Kenya) and the New Education Model for Africa (Mauritius).

Raymond BESONG

Raymond Besong currently serves as a Senior Infrastructure Specialist with the Human Development Department of the African Development Bank. Mr. Besong previously served as a Water and Sanitation Engineer and a Water Resources Consultant at the African Water Facility hosted by AfDB in Tunisia (2010). He has a Master of Engineering degree in Civil Engineering with Architecture from the University of Leeds, UK (1992), and an MSc (Eng) in Construction Management from the University of Birmingham, UK (1995), as well as a Certificate in Development Economics from the MRUniversity (2013). Mr. Besong has worked on the design and implementation of several human capital development projects in the last 15 years, covering competitiveness and job creation, youth development, local economic development, labor-based public works and water and sanitation.

Coetzee BESTER

Coetzee Bester served under the leadership of President Nelson Mandela and Deputy President F. W. de Klerk as a Member of Parliament in South Africa. He was also a member of the Constitution Writing Assembly that finalized the historic post-apartheid Constitution for South Africa. He completed a master's degree in Information Science (Cum Laude) that included an integrated model for management of information in community development projects in Africa. He currently serves as the Director of the African Centre of Excellence for Information Ethics that is based at the Department of Information Science at the University of Pretoria. His current doctoral research is on a curriculum structure to teach Information Ethics at universities in Africa.

Nejmudin BILAL

Dr. Nejmudin Kedir Bilal is a Principal Health Economist at the African Development Bank working on the Value for Money, Sustainability and Accountability Programme and Post 2015 Development Agenda, among others. Prior to joining AfDB, Dr. Bilal served as Director General for Policy, Planning and Financing in Ministry of Health of Ethiopia. He led the design and implementation of various reforms including evidence-based planning; national health information system; health insurance;

and harmonization and alignment initiatives. He led the development of rounds of Ethiopian national health strategy and comprehensive joint evaluations. Earlier in his career, he worked with UNICEF on the application of a MBB tool to assess equity in health; and with the World Bank on an assessment of the health labor market of Ethiopia, and negotiation and design of Programme for Results (P4R) for health in Ethiopia.

David BLOOM

David E. Bloom is Clarence James Gamble Professor of Economics and Demography at the Harvard School of Public Health. He earned his BS in Industrial and Labor Relations from Cornell University in 1976 and his PhD in Economics and Demography from Princeton University in 1981. In 2005 Bloom was elected a Fellow of the American Academy of Arts and Sciences. He also serves as Faculty Research Associate at the National Bureau of Economic Research, and Research Fellow at IZA in Bonn. He directs Harvard's Program on the Global Demography of Aging.

Felix BONGJOH

Dr. Felix Bongjoh, who just retired from the African Development Bank, was a Chief Education Analyst.

Loubna BOURKANE-LY

Loubna Bourkane-Ly has been a Senior Development Economist at the African Development Bank since 2010. She has previously worked for the French Agency for Development, Spanish Cooperation, EU and UNESCO, writing study and managing project across Africa in social sectors. She holds a magister in development economics and a master's degree in project analysis from the International Development Study and Research Center on (CERDI), Clermont-Ferrand (2003, 2007). She is currently working in the field of education, vocational training and youth employment in Africa.

Nouria BRIKCI

Nouria Brikci is a health economist and health policy specialist at Oxford Policy Management with particular expertise in health financing, qualitative research and the use of a political economy approach in health systems. She has carried out numerous analyses of health financing strategies, with a particular focus on revenue collection mechanisms and their impact on health systems. She has undertaken systematic literature reviews and qualitative operational research in various Sub-Saharan countries, focusing on perception studies and access to health care surveys. Her countries of expertise include Mauritania, Senegal, Burundi, Sierra Leone, Liberia, Côte d'Ivoire, Ethiopia, Sudan, Zambia, India and Pakistan. She has previously worked as a senior health policy advisor at Save the Children UK, as a research advisor for MSF and as a consultant for the World Bank and UNIDO. She speaks French, English, Spanish and Italian, and holds a Master's in Development Studies from the School of Oriental and African Studies, London, and a Master's in Health Policy, Planning and Financing from the London School of Economics and London School of Hygiene & Tropical Medicine.

Saskia BRUYTSEN

Saskia Bruytsen is cofounder and CEO of Yunus Social Business (YSB), which was also cofounded by Nobel Peace Prize Laureate Prof. Yunus. YSB aims to create and empower social businesses to sustainably solve social problems. A leader in the social business movement, Saskia Bruysten was co-CEO of Grameen Creative Lab prior to founding YSB. She started her career at the Boston Consulting Group in Munich and New York. She was appointed to the EU Commission's expert group on social business and has assisted Prof. Yunus on UN Secretary General Ban Ki-Moon's MDG Advocacy Group. She holds an MBA from the European Business School, Germany, and an MSc in International Relations from the London School of Economics.

Ruth Karimi CHARO

Ruth Karimi Charo has been a Human Development Practitioner for the past 10 years. She is currently the Principal Social Development

Specialist at the African Development Bank where she oversees the formation of education and health projects as well as their implementation. Prior to AfDB, Ms. Charo worked with development partners including the World Bank, the CARE International in Kenya and the Health NGOs Network. She has a Master's of Public Health and Epidemiology from Kenyatta University in Kenya.

Chukwu-Emeka CHIKEZIE

Chukwu-Emeka Chikezie spent the last 20 years exploring different ways to maximize the African diasporas' contributions to Africa's development. She cofounded the London-based African Foundation for Development in 1994; advised several African governments on private sector development strategies, including diaspora components; and served as Senior Advisor to the governments of Mexico (2010) and Mauritius (2012) in their respective capacities as Chairs of the Global Forum on Migration and Development, and during the latter tenure led efforts to enhance intra-African cooperation around talent mobility.

Mulle CHIKOKO

Mulle Chikoko is a Social Protection Specialist working with the African Development Bank since 2010 on poverty reduction, youth employment, skills development and social protection issues. She holds a master's degree in Sustainable International Development from Brandeis University. She has over 20 years of experience in the development field working on protecting the poor and vulnerable, voice and accountability, NGO capacity building, disaster risk reduction, rural livelihoods and gender. She has worked for several years for bilateral agencies and civil society organizations on both programmatic and policy issues with strong interface with government. She has worked on designing innovative cash transfer programs using smartcards and e-money for early recovery programs. She has contributed to the Africa MDG Report on social protection and coauthored an article on "Aging Population in Africa."

Aduba CHUKA

Dr. Aduba Chuka is a lead IT specialist in human development at the African Development Bank and was previously Manager of Applications Development. He holds a bachelor's degree in Computer Science and Economics and obtained a MSc and PhD in Computer Science from the University of Manchester, United Kingdom. His PhD thesis highlighted that a Network User Interface Manager would be key to future global network interaction between computer systems. He has been a frequent guest lecturer at the Financial Institutions Training Centre in Nigeria. His private sector experience spans the oil industry and commercial banking. He has published several articles in Nigerian and international journals. He is a former Commonwealth scholar and former member of the Association of Computing Machinery and the U.S. Academy of Sciences, and made contributions to the Fortran 90 XJ3 development standard. He was a member of the Nelson Mandela African Institute of Science and Technology working group. He is also a member of Solar Energy International, and served on the Executive Committee of the African Stakeholders Network of the UN ICT Task Force.

Bester COETZEE

Coetzee Bester served under the leadership of President Nelson Mandela and Deputy President F. W. de Klerk as a Member of Parliament in South Africa. He was also a member of the Constitution Writing Assembly that finalized the historic post-apartheid Constitution for South Africa. He completed a master's degree in Information Science (Cum Laude) that includes an integrated model for management of information in community development projects in Africa. He currently serves as the Director of the African Centre of Excellence for Information Ethics that is based at the Department of Information Science at the University of Pretoria. His current doctoral research is on a curriculum structure to teach Information Ethics at universities in Africa.

Mounir DAHMANI

Dr. Mounir Dahmani is currently a researcher at the University of Paris-Sud. He obtained his PhD in Economics from the University of Paris-Sud in 2011, and completed postdoctoral training in Informational Economics at the Ecole Polytechnique, Paris, in 2011. His research interests and areas of expertise include the economics of intangible assets, innovation in firms, competencies and ICTs, e-learning, human capital and digital divides, and is an author of papers in these areas. He has participated in various international research projects.

Richard J. DECKELBAUM

Dr. Richard J. Deckelbaum received his education at McGill University, Montreal, Canada. He is a Robert R. Williams Professor of Nutrition, Professor of Pediatrics and Professor of Epidemiology at Columbia University, and is the Director of the Institute of Human Nutrition. Dr. Deckelbaum's research interests include cellular effects of dietary fats and fatty acids on lipid metabolism and gene expression, and their impact on human health and disease. Dr. Deckelbaum leads and participates in international programs linking agriculture to human nutrition and health. He is the author of more than 350 scientific papers. He is a member of the Food and Nutrition Board of the Institute of Medicine, National Academy of Sciences. He also contributes to projects related to health, science and education as a bridge among populations in the Middle East, Africa and Asia.

Eric DE ROODENBEKE

Eric de Roodenbeke became Director General of the International Hospital Federation in June 2008. Prior to that, he was Senior Health Specialist and focal point for follow-up actions in Francophone countries at the World Health Organization–Global Health Workforce Alliance in programs to develop responses to the human resources for health crisis. He was Senior Health Specialist at the World Bank (AFTH2 and WBI) from 2004 to 2006, where he was team leader for various health intervention, educational, management and capacity-building programs, mostly in Africa. He was Director of the University Hospital (CHU) of Tours, and Senior Officer responsible for hospital and health financing interventions at the French Ministry of Foreign Affairs. He was Senior Officer for hospital policy expertise at the French Ministry of Cooperation. He was Deputy Director of the University Hospital of Nantes and Epinal-Vosges General Hospital in France. He was the expert task team leader for a project involving construction, equipment and management of a 500-bed hospital in Burkina Faso.

Nikhil DESAI

Nikhil Desai is an energy and environmental economist now dividing time between India and the United States. For over 30 years he has consulted, independently or through consulting firms, on energy policy and regulation, power system planning and operations, modern energy access and global environmental issues. He currently researches demographics and human capital.

Amadou Bassirou (Bachir) DIALLO

Dr. Amadou Bassirou (Bachir) Diallo is currently a Senior Economist at the African Development Bank since 2011. His work focuses on youth employment, poverty and inequality, child mortality and, more generally, human development across Africa. He led the background study for producing the 2012 *African Economic Outlook* on youth employment and has contributed greatly to put in place the ILO/AU/UNECA/AfDB's Joint Initiative Youth Employment in Africa. Prior to this, Dr. Diallo worked for two years as a poverty economist at the World Bank. There, his work focused on poverty in the Democratic Republic of Congo (DRC) and he contributed to a groundbreaking report entitled *DRC: The Resilience of an African Giant.* Before this, Dr. Diallo spent 10 years working as a consultant in a wide range of associations, firms and multilateral institutions including the World Bank and AfDB. He has been a main contributor to various reports and has published a number of articles and produced data portals on poverty and inequality. Dr. Diallo has

also worked as an assistant professor at the University of Auvergne, France, and as a professor of economics at Mayotte's High School, where he also served as director for a research center focused on adult education and access to employment. In his spare time, Dr. Diallo advises youths, associations, governments, startups and SMEs on ways to boost the business climate, productivity and employment in Africa. Dr. Diallo has a PhD in Development Economics from the University of Auvergne. He is married and a French national.

Maimouna DIOP LY

Maïmouna Diop Ly is a health analyst at the African Development Bank working on health and nutrition projects and has been working for several years as a public health and nutrition specialist. She is currently the nutrition focal point of the Human Development Department, responsible mainly for promoting nutrition-sensitive food and agriculture-based approaches in collaboration with the Agriculture Department. Prior to AfDB, she worked in a community nutrition program in Senegal funded by the World Bank. She also served as Deputy Head of the National Nutrition Service at the Ministry of Health in Senegal and as a Head of the Health Department at the Senegalese Red Cross. She holds a medical degree as a physician from the University of Dakar, a DEA in public health from University of Paris VI and a postgraduate degree in nutrition and dietetics from University of Rennes, France. She is currently a doctorate candidate in management (strategic opportunity management) at the Swiss Management Center.

Paul DOUGNA

Komi Paul Dougna has worked for the African Development Bank as an Economist specializing in education, poverty alleviation and postconflict reconstruction over the last 15 years. During this period, he has been in charge of the appraisal and monitoring of projects in more than 20 African countries. Dr. Dougna holds a PhD in economics (Laval University, Quebec, Canada) and worked for the International Development Research Center (IDRC Canada) and UNESCO. He also taught economics in several higher education institutions in Africa and France. Over the course of his career, Dr. Dougna held several senior positions such as Director of Planning and as Minister of Labor and Public Administration Reform in Togo. He has authored and coauthored various publications and technical papers on labor market, education financing and development issues.

Ute DUBOIS

Ute Dubois is a professor of economics at the ISG International Business School in Paris. She holds a PhD in economics from University of Paris-Sud (2007). She has been working for several years as a researcher specialized in energy economics and energy policies, with a focus on electricity market liberalization, market design issues, competition policy in electricity markets and organizational change in electricity distribution and supply. Her current research focuses on social issues related to energy consumption, especially fuel poverty and energy affordability in Europe and energy access in Africa.

Yohana DUKHAN

Yohana Dukhan is a Health Economist working at the Human Development Department of the African Development Bank. Her main activities cover health financing and health insurance, value for money in social service delivery and private sector participation in health. She holds a PhD in economics from the University of Auvergne, France. Her doctoral research focused on health financing issues in developing countries, particularly on health systems efficiency and health insurance. She previously worked as a consultant at the International Finance Corporation, World Bank, World Health Organization and International Hospital Federation on health financing issues such as health insurance and health system/hospital efficiency.

Varatharajan DURAIRAJ

Dr. Varatharajan Durairaj has been a Chief Health Insurance and Social Protection Officer

at the African Development Bank since 2012. He obtained his PhD in economics from the Indian Institute of Technology, Kanpur, in 1991 and completed postdoctoral training in health economics at the Harvard School of Public Health, Boston, in 2000. He received the Nick-Prescott Prize from the Asia-Pacific Health Economics Network in Dhaka in 2000. After his 15-year career as a researcher and professor in India, Dr. Durairaj joined the World Health Organization as a Health Economist in 2007. Besides contributing to the 2008 and 2010 *World Health Reports, Global Policy Recommendations on Human Resources 2010, Women and Health Report 2009* and *UN Social Protection Floor Initiative Manual,* he has authored seven *World Health Report 2010* background papers. He has also served as an Editorial Adviser to the *Bulletin of the World Health Organization.* His technical contributions spanning over 20 African and Asian countries include topics such as political decentralization, microfinance, social protection, health financing and women's health. His current works focus on public–private partnerships, financial inclusion, safety nets and social protection.

Nawsheen ELAHEEBOCUS

Ms. Nawsheen Elaheebocus is a Senior Human Development Officer at the African Development Bank. She currently serves as AfDB's focal point for Science, Technology and Innovation as well as the Communication focal point for the Human Development Department. Between 2011 and 2013, under the leadership of Agnes Soucat, she coordinated the production of AfDB's first Human Capital Strategy. She also task managed a Middle Income Grant for Mauritius on the application of innovative technologies of education. In April 2012 she organized the Bank's first Science, Technology and Innovation Forum in Africa and is currently planning the 2014 STI forum to be held in Morocco. Prior to joining AfDB, she worked for the World Bank for 13 years. She worked in World Bank's Paris and Washington, DC, offices in the Communications, Health and Education Departments. Her research interests are international education policy and the neuroscience of education. She holds a BA in international business and economics from the American University of Paris (France) and an MA in international education policy and leadership from the University of Maryland, College Park. Of Mauritian nationality, Ms. Elaheebocus speaks fluent English, French and Creole, conversational Spanish, Hindi and Urdu and can read and write Arabic.

Ceyhun ELGIN

Ceyhun Elgin is an Associate Professor of Economics at the Department of Economics of Bogazici University, Turkey. He did his PhD in economics at the University of Minnesota under the supervision of Varadarajan Chari and taught at the University of Minnesota, Boston University and Tilburg University. His research interests include applied macroeconomics, economic growth and political economics.

Atef EL MAGHREBY

Dr. El Maghraby is an expert in global health with an emphasis on human resources, health systems and integrated services delivery. He is a strategic thinker and advocate for health sector reforms, health labor market analysis and public–private partnerships in health. As the Chief Health Analyst of the African Development Bank, he is currently focusing on promoting investments in medical education, institutional capacity building and health policy development in Africa. He is an expert in managing multisectoral technical assistance in major health programs. He has been the team leader in many projects and has influenced health programs in over 25 low- and middle-income countries in Africa, the Middle East and South Asia. Previously, he led the Joint UN Maternal and Neonatal Health Program in Bangladesh and worked as the Health and HIV/AIDS Advisor for Save the Children UK in the South Sudan Postconflict Program. In the Health Sector Reform Program in Egypt, he strategically enabled institutional development and led the Human Resource Capacity Building program

to support the insurance-based family health model.

Dalya ELZINIY

Dr. Dalya Elziniy is a Physician and a Public Health Practitioner. She holds an MD from Mansoura University in Egypt and an MPH from the American University of Beirut, Lebanon. Currently, she is a Health Professional and Cooperation Officer at the African Development Bank. Prior to AfDB, Dr. Elziniy worked with the United Nations Populations Fund in the Philippines. Her experience in public health and development started in 2000, through volunteer work during her medical studies, and now includes many countries in Africa and the Middle East such as Lebanon, Egypt, Nigeria, Tunisia and Libya.

Ali EYEGHE

Mr. Ali Eyeghe is a socioeconomist trained in Gabon and France. He is a specialist of economic and social development, particularly the employment, the promotion and the development of entrepreneurship, and community development. He has worked for the following countries: Gabon, Rwanda, Cape Verde, Senegal, Chad, Congo, Democratic Republic of Congo, Central African Republic, Djibouti, Burundi and Togo. He was the Advisor to the Prime Minister of Gabon. He graduated from the University of Clermond-Ferrand (France).

Borel FOKO

Borel Foko is currently a Senior Education Economist at the African Development Bank, with interest for both education and labor economics. Previously as an education system chief analyst at UNESCO for 10 years, he assisted in defining education policies and strategies in about 15 African countries. He is the author of various thematic or regional publications on higher education, skills development, teacher issues and economic relevance of education and training for the labor market. He has also contributed in the design and the delivery of a master's degree course in education sector analysis and management of education systems, in collaboration with the University of Dakar, Senegal.

Sylvain FRANC DE FERRIERE

Sylvain Franc de Ferrière is responsible for heading the Yunus Social Business's activities in Africa. Prior to the Yunus Social Business, he worked in Argentina for Endeavor, an NGO dedicated to identifying and supporting high-impact entrepreneurs, as a consultant, and then as General Manager of one of the Endeavor entrepreneurs, a fashion design business. Previously, he was a consultant for the Boston Consulting Group in Paris. He holds a MSc in mathematics from Imperial College in London and an MSc in management from HEC in Paris.

Corbin Michel GUEDEGBE

Dr. Corbin Michel Guedegbe just retired from the African Development Bank headquarters on April 1, 2014, as Chief Education Specialist. He has taught at Benin University Polytechnic and at the Catholic Institute of West Africa, Benin. Prior to AfDB, he held various senior positions at the ministries in charge of education in Benin and was staffed at USAID and UNDP. His major areas of interest include the effectiveness and sustainability of higher education systems; the development of skills and research in science, technology and engineering; and the use of innovative technologies in education and training. For the past 14 years, he has been a task team leader for the design and implementation of several AfDB–financed national and regional projects and programs in STEM. He holds a PhD in comparative education and educational policy and organization from the State University of New York, Buffalo.

Samy GUESMI

Samy Guesmi is an Assistant Professor of Management at Idrac Business School in Paris. He did his PhD in information systems management in a joint program between the University of Paris-Sud and Orange Labs under the supervision of Alain Rallet. His research interests lie in information systems adoption and appropriation and especially

the diffusion of web 2.0 within companies, the relationship between ICT diffusion and organizational change and the emergent business models of the digital economy.

Mouhamed GUEYE

Mouhamed GUEYE joined the African Development Bank in 2011 as an Education Economist. Currently, he is working under the Education Division as project/program manager in North African countries. He is contributing to the expansion of the human development portfolio especially in the area of skills development for competitiveness and youth employment. Prior to AfDB, he worked as an Education Specialist with USAID for three years and as a Monitoring and Evaluation Officer with Plan International for two years. He contributed to the institutionalization of results-based management in the Ministry of Education in Senegal, where he worked for nine years as Head of the Monitoring and Evaluation Division. He holds a master's degree in development policy management and evaluation from the University of Antwerp, a master's degree in contracting and management support for public works from the University of Auvergne/CERDI, a postgraduate degree in training engineering nd a professional certificate in early childhood care and development from the University of Victoria.

Salal HUMAIR

Salal Humair is a Research Scientist in the Department of Global Health and Population, Harvard School of Public Health. Previously, he has served as an Associate Professor and as Associate Dean at the School of Science and Engineering, established in 2008 at the Lahore University of Management Sciences in Pakistan; and as a Principal Software Engineer at Optiant, Inc., a startup that focused on supply chain optimization software. He obtained his doctorate in operations research from the Massachusetts Institute of Technology in 2001. His current work spans a range of public health policy questions, as well as traditional operations areas such as supply chain optimization theory and practice.

Budali ISSAHAKU

Budali Issahaku is a Social Development Practitioner with over 15 years of experience. He is currently a Principal Social Protection Specialist with the African Development Bank where he works as an Operations Task Manager for various poverty reduction and social protection projects in East Africa. Prior to AfDB, he worked as a Social Development Specialist for the UK Department for International Development (now UKAid) in Ghana and Ethiopia and also with international NGOs such as Actionaid International and CARE International (UK). He has a master's degree in development studies from the University of London.

Caroline JEHU-APPIAH

Caroline Jehu-Appiah holds a PhD from the Radboud University, Netherlands and an MSc in health economics from University of York, UK, and is an MD at Friendship University, Moscow. Since 2011, she works for the African Development Bank as a Principal Health Economist. She is responsible for advancing private–public partnerships in health, improving hospital management performance and mainstreaming green growth in AfDB's regional member countries. Prior to AfDB, she was a deputy director of policy in the Policy, Planning, Monitoring and Evaluation Division of the Ghana Health Service. She has over 20 years of extensive experience in public health, health economics, health financing, health systems and policy development. She has published in the areas of health insurance, equity analysis, impact evaluation and poverty in several international peer-reviewed journals.

Crispus Makau KIAMBA

Professor Crispus Makau Kiamba is a former Permanent Secretary in the Ministry of Higher Education, Science and Technology. He also served as a member of the Kenya National Economic and Social Council and the National NEPAD Coordinating Committee. He is currently a professor at the University of Nairobi and a consultant with the World Bank Group. He has a PhD in land

economics from the University of Cambridge and an MSc from University of Reading. Professor Kiamba was also the Chief Executive of the Commission for Higher Education in Kenya and Vice Chancellor University of Nairobi. He has several publications in various topics such as growth profile of small cities; dynamics of urbanization and urban development policy; and regeneration of low-income housing and squatter settlements. In recognition of his commendable contribution to society, he has been conferred two Presidential Awards: Moran of the Order of the Burning Spear and Chief of Burning Spear.

Laurence LANNES

Laurence Lannes joined the Human Development Department Health Division at the African Development Bank in November 2011. In this capacity, she has served as the task manager for the health division's work in Tunisia and Morocco, as well as for all e-health and pharmaceutical operations. She is responsible for undertaking impact evaluations and Economic and Sector Work and building relationships with major partners. She is also a core member of the team focused on implementing results-based financing mechanisms. Her expertise is in health financing, data analysis, impact evaluation as well as in the e-health and pharmaceutical industries. She has been working in the human development field for over a decade. Prior to AfDB, she worked on the Health Equity and Financial Protection in Asia Project in Cambodia, and spent five years at the World Bank Group undertaking health systems strengthening and health sector financing projects throughout Africa and East Asia. She is currently a PhD candidate in social policy at the London School of Economics; she holds a master's in health economics in developing countries from CERDI in France and a master's in international development from the Institute of Political Science, also in France.

Tomas LIEVENS

Tomas Lievens is a health economist with expertise in quantitative research, health financing, health labor markets and health insurance. Much of his work is concerned with issues of access, financial protection and equity in health. He has carried out several health expenditure reviews, tracking surveys and costing studies, often to inform health financing strategies. He has done extensive work on fiscal space analysis for health and AIDS services and on health worker motivation and behavior to improve health labor market outcomes. He is Director of the Social Policy Programme at Oxford Policy Management.

Xin LONG

Xin Long is a Senior Financial Economist at the African Development Bank. She obtained her PhD in economics from University of Rome, Tor Vergata, in 2009. She has solid experience in policy analysis, inclusive finance, social business, research on economic growth, program management and policy dialogues with government and key stakeholders. She has worked before at the Bank of China and International Monetary Fund.

Beverley MALAN

Dr. Malan is an educationist with 43 years of experience. She has a doctorate in curriculum studies and has been lecturing extensively in the field of values and human rights in education. During the course of her career she has served on numerous ministerial committees focusing on the review and development of school and university curricula, the development of teacher qualifications and the development of a national qualifications framework for South Africa. She has also developed a range of materials for training teachers as well as managers at different levels of the education system. She is currently contracted to develop a curriculum on information ethics in Africa for the African Centre of Excellence in Information Ethics in South Africa.

Keita MAMADI

Having joined the African Development Bank at the end of 2011, Keita is currently coordinating the replication of Souk At-tanmia, the recent AfDB initiative on promoting

employment through entrepreneurship, at the continental level. He was the coordinator of the joint UNIDO-ILO Youth Employment Program in Mano River Union countries. Before that, he worked as auditor for LNA International (Guinea)/KPMG (Paris), then as Finance Manager of Intercel Guinea (a cellphone company), contributing to multiplying fivefold in three years the turnover of this nascent business at the time. He also worked as Operation Manager of the Cotton Company in Guinea, spearheading the restructuring program of the business, which turned this ailing company for the first time into a profitable dealing. He was a scholar at the University of Conakry (Guinea), where he gained, with honor, an advanced degree in economics. He is halfway through the qualification for the membership of the Association of Chartered Certified Accountants for which he read papers in London.

Maria MDACHI

Maria Mdachi is an Education Specialist with over 28 years of experience in the sector, ranging from policy dialogue to project management in early childhood, primary education, secondary education, technical and vocational education and training to higher education. She has also worked with ardent interest in pro-poor strategies developed by African countries, particularly in Eastern and Southern Africa. She is currently working with the African Development Bank in the Human Development Department, as an Education Analyst. Prior to this position, she has worked with international NGOs and the UN, as a Social Sector Programme Officer, Education Programme Coordinator and Deputy Education Section Chief. She has competencies in social and economic planning, implementation, monitoring and evaluation of human development projects, with particular emphasis on education.

Hatem MHENNI

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Building human capital for the next African generation is not just a challenge—it is a duty for the current generation and policymakers. While Africa's economic growth has been praised, little is said about its sustainability and inclusiveness, which depends greatly of the continent's ability to consolidate, strengthen and build human capital.

This book contains more than an analysis of current trends in building human capital in Africa—it gives excellent guidelines and policy options to policymakers in order to address these challenges.

The thirty chapters discuss each piece of the human capital puzzle in Africa with details about how innovative solutions can be implemented in health insurance, microfinance, social business, social protection, hospitals, higher education, science and innovation, and so on.

I have no doubt that this magisterial book will serve as an indispensable reference!

Donald Kaberuka
President
African Development Bank