2018 Africa Sustainable Development Report

Towards a Transformed and Resilient Continent

2018

Africa Sustainable Development Report:

Towards a Transformed and Resilient Continent

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Publications Section
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Menelik II Avenue
P.O. Box 3001
Addis Ababa, Ethiopia

Tel: +251 11 544-9900
Fax: +251 11 551-4416
E-mail: ecainfo@uneca.org
Web: www.uneca.org

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Foreword

The *Africa Sustainable Development Report 2018* is the second in a series of reports which provides an integrated assessment of the continent's progress towards implementation of the 2030 Agenda for Sustainable Development and the First Ten Year Implementation Plan of the African Union Agenda 2063: The Africa We Want. The report is currently the only document that simultaneously tracks the continent's performance on both agendas using the *Continental Results Framework* endorsed by the African Union Heads of State and Government.

Consistent with the 2017 report, the 2018 edition is aligned with the theme of the 2018 High-level Political Forum on Sustainable Development (HLPF) "*Transformation towards sustainable and resilient societies*." In line with this theme therefore, the report focuses on five Sustainable Development Goals (SDGs), namely: Goal 6 - Ensure availability and sustainable management of water and sanitation for all; Goal 7 - Ensure access to affordable, reliable, sustainable and modern energy for all; Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable; Goal 12 - Ensure sustainable consumption and production (SCP) patterns; and Goal 15 - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. In addition, the report examines the challenges and opportunities for nurturing science, technology and innovation hubs in Africa.

Africa is making steady progress in building the critical ingredients for sustainable and resilient societies, but the pace is slow. Access to basic infrastructure such as energy, water and sanitation services is improving but falls well below the global average. Furthermore, the aggregate performance of the continent masks wide cross-country disparities.

The rapid pace of urban development in Africa has the potential to advance the continent's industrial development. However, capacities for urban planning need to be strengthened to reverse the current pattern of urbanization which is fueling the proliferation of slums and undermining the potential benefits of urban growth.

African countries must scale up investments in science, technology and innovation (STI) to promote rapid and inclusive green growth. Innovations in mobile money transfers for instance, have spurred financial inclusion by promoting access of the unbanked, to financial markets.

Investments in STI must be underpinned by a coherent institutional architecture that forges seamless collaboration between government, the private sector and the science community to ensure that innovative ideas are transformed into concrete development-oriented solutions.

Effective implementation of Agenda 2063 and the 2030 Agenda for Sustainable Development requires evidence-based policymaking to ensure the realization of multiple policy objectives through catalytic investments in areas such as energy and water. Undertaking such evidence-based policymaking, however, requires a sound database and robust statistical systems, which are often lacking in most African countries. Consequently, it is imperative that governments and development partners strengthen their statistical systems to ensure better informed policymaking.

Strong institutional coordination within countries and among development partners is also vital for the coherent implementation of the two agendas. At the national level, innovations that strengthen inter-sectoral planning and collaboration will be pivotal for effective institutional coordination. Consistent with this approach, a number of countries have adopted a cluster approach

that aggregates line ministries to jointly address cross-cutting development priorities, such as health and employment. In this context, health for instance, is no longer viewed as the sole remit of the health ministry but encompasses related line ministries, such as water, sanitation and the environment.

With respect to development partners, the *Africa Union – United Nations Framework for the Implementation of Agenda 2063 and the 2030 Agenda for Sustainable Development* (Development Framework), which was signed by the Chairperson of the African Union and the Secretary General of the United Nations in January 2018 and the Mainstreaming Acceleration and Policy Support Framework (MAPS) constitute useful mechanisms for coordinated and coherent support to Member States.

The Development Framework commits the African Union and the United Nations to jointly design approaches for harmonized implementation, awareness raising and sensitization about the two agendas. In line with this thinking, the United Nations and the African Union Commission (AUC) have designed common platforms and tools to support implementation of both agendas.

Going forward, the UN system, in partnership with the AUC and the African Development Bank (AfDB) will continue to work closely to leverage and optimize the use of our collective financial and human resources to advance the development objectives of our Member States.

We are hopeful, that the findings of this report will help strengthen regional and national capacities for the coherent implementation of Agenda 2063 and the 2030 Agenda for Sustainable Development.

Victor Harison

Commissioner
for Economic Affairs

African Union
Commission

Vera Songwe

Executive Secretary

United Nations
Economic Commission
for Africa

Akinwumi A. Adesina

President

African Development
Bank Group

Achim Steiner

Administrator

United Nations
Development
Programme

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Preparation of the report was coordinated by a core team led by Bartholomew Armah (ECA), Selamawit Mussie (AUC), Patience Kuruneri (AfDB) and Eunice Kamwendo (UNDP). Chapter contributions came from Selamawit Mussie (AUC); Bartholomew Armah, Edlam Aberu Yemeru, Paul Mpuga, Sandra Zawedde, Benjamin Mccarthy and Wandia Riunga (ECA); Louis Koua Kouakou, Carlos Mollinedo, Jochen Rudolph, Patience Kuruneri and Maurice Mubila (AfDB); and Ojijo Odhiambo, Radhika Lal and Eunice Kamwendo (UNDP).

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The report benefitted from editorial, translation, graphic design, printing, media, communications and secretarial support from Demba Diarra, Ferdos Issa, Charles Ndungu, Kokebe George, Yechi Bekele, Loule Baltcha and Solomon Wedere.

Acronyms and abbreviations

AAAA	Addis Ababa Action Agenda
AAQS	Ambient Air Quality Standards
AFD	Agence Française de Développement
AfDB	African Development Bank
AGEP	Africa Green Economy Partnership
AMV	African Mining Vision
ARSCP	African Roundtable on Sustainable Consumption and Production
AUC	African Union Commission
AWF	African Water Facility
BRT	Bus Rapid Transit
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species
DFID	Department for International Development, UK
DHS	Demographic and Health Survey
DMC	Domestic Material Consumption
DRM	Domestic Resource Mobilization
ECA	Economic Commission for Africa
FAO	Food and Agricultural Organization of the United Nations
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNI	Gross National Income
GRI	Global Reporting Initiative
HIV	Human Immuno-deficiency Virus
HLPF	High-level Political Forum on Sustainable Development
ICT	Information Communication and Technology
IDC	Industrial Development Corporation
IEA	International Energy Agency
IIP	Industrial Innovation Partnership Programme,
ILO	International Labour Organization
IMF	International Monetary Fund
KENIA	Kenya National Innovation Agency
LDCs	Least Developed Countries
LLDCs	Landlocked Developing Countries
MDGs	Millennium Development Goals
MEAs	Multilateral Environmental Agreements
MGCI	Mountain Green Cover Index
MICS	Multi-Cluster Indicator Surveys
NCSTI	National Commission for Science, Technology and Innovation
NEPAD	New Partnership for Africa's Development
NRF	National Research Fund
NSOs	National Statistical Offices

VNRs	Voluntary National Reviews
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
PAGE	Partnership for Action on Green Economy
PGRFA	Plant Genetic Resources for Food and Agriculture
PPP	Purchasing Power Parity
R&D	Research and Development
RECs	Regional Economic Commissions
RLI	Red List Index
RWSSI	Rural Water Supply and Sanitation Initiative
SAG	SWITCH Africa Green
SCP	Sustainable Consumption and Production
SDGs	Sustainable Development Goals
SE4All	Sustainable Energy for All GTF Global Tracking Framework
SIDS	Small Island and Developing States
SMTAs	Standard Material Transfer Agreements
SPII	Support Programme for Industrial Innovation
STI	Science, Technology and Innovation
STISA-2024	Science, Technology and Innovation Strategy for Africa 2024
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNCTAD	United Nations Conference on Trade and Development
UNDP–RBA	United Nations Development Programme–Regional Bureau for Africa
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
UNSD	United Nations Statistics Division
VNRs	Voluntary National Reviews
WASH	Water, Sanitation and Hygiene
WCED	World Commission on Environment and Development
WDI	World Development Indicators
WHO	World Health Organization
WTO	World Trade Organization
WWF	World Wildlife Fund

Executive summary

Executive summary

A Overview

The *Africa Sustainable Development Report 2018* reviews Africa's performance on five goals, and related targets and indicators of the 2030 Agenda, taking into account their correspondence with Agenda 2063. The report uses the latest data from international sources to track performance and highlight lessons learned in the implementation of the two agendas. In line with the theme of the 2018 High-level Political Forum (HLPF), this year's report is aligned with the theme, "Transformation towards sustainable and resilient societies" and Goals 6, 7, 11, 12 and 15 of the 2030 Agenda for Sustainable Development.[1] In addition, the report examines trends in science, technology and innovation (STI) in Africa and its role in advancing implementation of the Sustainable Development Goals (SDGs) on the continent. The key findings, policy recommendations and emerging issues from the report are summarized below.

B Key findings

1 Access to safe drinking water and improved sanitation is improving but remains very low in Africa despite increasing official development assistance (ODA) for the sector.

Access to safe drinking water in Africa is generally low by global standards and characterized by wide disparities between and within countries. Overall, access is higher in North Africa compared with the rest of Africa. In 2015, the proportion of people with access to safely-managed sources of drinking water in Africa, excluding North Africa, was 23.7 per cent, up from 18 per cent in 2000. This was barely a third of the global average of 71 per cent, up from 61.4 per cent in 2000. Coverage varies widely among and within countries. Inter-country variations range from 100 per cent in Mauritius, to 19 per cent in Eritrea. Rural urban disparities persist, particularly in Africa, excluding North Africa. In 2015, approximately 82 per cent of the urban population had access to basic drinking water services compared with only 43 per cent of the rural population.

Emerging challenges including climate change, droughts, floods and water management are major constraints in access to safe drinking water in Africa. North Africa and Central Asia, in particular, are experiencing water stress[2] levels above 112 per cent and 79 per cent, respectively, indicating a high probability of future water scarcity. Addressing these challenges requires better governance of water resources, infrastructure investments, access to appropriate technology and policies to improve management of water scarcity.

With respect to sanitation, access to safely-managed services is rising but remains low in Africa and at the global level in general. At the global level, fewer than four out of 10 (i.e., 39 per cent) individuals have access to safely-managed sanitation services. In North Africa, for which data is

1 Goal 6 – Clean water and sanitation; Goal 7 – Affordable and clean energy; Goal 11 – Sustainable cities and communities; Goal 12 – Responsible consumption and production; and Goal 15 – Life on land.

2 Defined as the ratio of total freshwater withdrawn to total renewable freshwater resources above a threshold of 25 per cent.

available, the proportion of people with access to safely-managed sanitation services was 25.1 per cent in 2015, up from 18.1 per cent in 2005.

Notwithstanding these trends, Africa, excluding North Africa, receives the largest amount of ODA for water supply and sanitation. Funding for this region doubled between 2000 and 2015 and has been rising in all regions, except in Eastern Asia.

2 Access to electricity in Africa is increasing, albeit at a pace lower than the population growth.

Access to electricity is vital for all aspects of socio-economic development. However, for most of Africa, the transformative power of electricity remains unharnessed due to limited production and access. The continent has experienced a slow but steady increase in access to electricity, rising from 39.7 per cent in 2008 to 45.9 per cent in 2014 and 53 per cent in 2016 (covering some 660 million people). Despite progress, access remains much lower than the global average and is less than half the corresponding figures for East Asia and the Pacific. Moreover, rural-urban disparities in access are stark, particularly in Africa, excluding North Africa, where the electrification rate in the rural areas averaged 17 per cent in 2014, compared with 70 per cent in urban areas.

3 Africa's renewable energy potential remains largely untapped.

Renewable energy resources are abundant in Africa. Meanwhile, demand is growing and technology costs are falling. Hydro power generation, a renewable source of energy, is the single largest source of electricity in Africa, contributing to slightly over 60 per cent of the continent's supply. However, despite its strong potential, solar power remains largely untapped. And, notwithstanding rapid progress in few selected African countries, such as Morocco, Egypt and South Africa, the share of renewable energy in total energy consumption has fallen in recent years, declining slightly from 63 per cent in 2010 to 62 per cent in 2014.

4 Efficiency in energy use is improving but reliance on biomass poses a challenge to progress.

Decreases in energy intensity signal an improvement in the efficiency of a national economy's consumption of energy or a shift to less energy-intensive sectors, such as services. Energy-intensity levels in Africa have been decreasing at an annualized rate of 1.6 per cent between 2004 and 2014, thanks to Burundi, Ethiopia, Mali, Seychelles, Sierra Leone and Uganda, which have made the greatest strides. However, intensity levels remain significantly higher than the world average.

There are wide energy efficiency variations by sub region. Overall, North Africa, has the lowest energy-intensity levels due to the adoption of energy efficiency strategies with ambitious goals and targets, regulatory framework and specific programs that are supported by incentive measures. On the other hand, East Africa is the most energy-intensive sub-region (10.4 mJ per unit of output), followed by Southern Africa (9.7 mJ per unit of output), West Africa (8.6 mJ per unit of output) and Central Africa (7.5 mJ per unit of output). The average level of energy intensity in East Africa is particularly skewed by Ethiopia and Somalia, which rely largely on traditional biomass for their energy needs and have inadequate transmission and distribution infrastructure.

Energy inefficiency can mostly be attributed to inadequate infrastructure, poorly designed buildings, lack of enforceable policy on energy-efficient appliances and technologies (i.e., persistent use of incandescent lightbulbs or inefficient cooking stoves) and inefficient generation and transmission processes. Cooking, in particular, comprises approximately 80 per cent of residential energy in Africa, excluding North Africa. Indeed, the absolute number of people without access to energy-efficient cooking stoves continues to rise in Africa, with around 780 million people cooking with solid biomass.

Ambitious regional grid integration projects, such as the East and Southern Africa Clean Energy Corridor, have the potential to significantly transform Africa's energy landscape. Sustained investments and inclusive policy reforms are required to sustain progress.

5 Africa is the fastest urbanizing region globally, but the potential benefits are not yet fully exploited.

Africa's urban transition is unprecedented in terms of scale and speed. The continent is 40 per cent urban today. By 2040, however, it will become majority urban at 51.5 per cent – five times that of the total urban population in 2030. Africa is also urbanizing faster than any other world region; the urban growth rate is projected at 3.4 per cent between 2015 and2020. By 2030, all the continent's sub-regions, except East Africa, will have more than half of their populations living in urban areas. However, much of the urbanization currently unfolding in Africa is unplanned and poorly managed. Many African cities are characterized by informality, severe service and infrastructure deficits, social and spatial segregation, and limited opportunities for employment in productive sectors of manufacturing and modern services.

The region's cities have also made limited progress on issues prioritized in Goal 11 (e.g., access to public transport, urban sprawl, loss and damage from disasters, air pollution and solid waste collection), thereby constraining efforts to achieve inclusive growth. The proliferation of slums in African cities is perhaps the most significant manifestation of the externalities associated with rapid and unplanned urbanization. Africa continues to have a much higher proportion of slum dwellers compared to other world regions.

The region's cities have also made limited progress on issues prioritized in Goal 11 (e.g., access to public transport, urban sprawl, loss and damage from disasters, air pollution and solid waste collection), thereby constraining efforts to achieve inclusive growth. The proliferation of slums in African cities is perhaps the most significant manifestation of the externalities associated with rapid and unplanned urbanization. Africa continues to have a much higher proportion of slum dwellers compared to other world regions. Between 2010 and 2014, the proportion of slum dwellers in Africa declined from 37.5 per cent to 34 per cent but accounted for almost one quarter (24 per cent) of the global slum population.

For these reasons, the potential of Africa's rapidly growing cities and urban settlements to drive broad-based economic growth and social inclusion has not been fully tapped. Historical experience demonstrates that urbanization is closely associated with and can drive economic growth. Yet, in Africa, urban growth has been delinked from economic growth, and has not been accompanied by a commensurate increase in jobs in productive sectors of industry and modern services, with the bulk of urban employment being informal.

African cities need to be well planned and managed if they are to significantly advance the reduction of poverty and inequality, and foster job-rich growth and transformation. Consequently, it is critical that national governments and urban authorities focus on and invest in addressing core urban barriers, including infrastructure and service deficits, as well as weak and poorly functioning institutions and capacities for planning, legislation and governance.

6 Implementing national disaster strategies reduces the vulnerability of cities to the impact of disasters.

Cities are becoming increasingly vulnerable to the impact of disasters. With the growing concentration of Africa's population in cities, such vulnerability will continue to intensify. In response to the threat posed by natural disasters, an increasing number of African countries are adopting and implementing national disaster strategies. In 2016, thirty African countries had adopted and/or were implementing national disaster risk-reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030. This represents more than double the number of countries that had adopted and/or were implementing similar strategies in 2013.

7 The air quality in most African cities is poor and poses health risks, particularly for children.

Most African cities do not meet the minimum air quality standards established by the World Health Organization. Of the 52 African countries with data for 2012, only Liberia met the guidelines. And only 8 per cent of African cities/towns in the database meet the required standards. Pollution is linked to the use of solid fuel used for cooking, with long term consequences of acute respiratory infections among children under 5 years of age.

8 Africa, excluding North Africa, wastes over 30 per cent of its approximately 230 million tons of annual food production (equivalent to more than US$4 billion), due to large post-harvest losses.

Rapid population growth, rapid urbanization, a growing middle class and resource-intensive production patterns are the key drivers of increased global resource use. At the global level, material extraction increased significantly, due largely to the extraction of industrial and construction minerals.

In terms of per capita consumption, despite the declining trends between 2000 and 2017, developed regions required at least 25 to 40 tons of materials per capita per annum, which is very high and unsustainable. The levels of domestic material consumption (DMC) for growth in Africa are still low. However unlike developed countries where food losses and waste occur at the level of consumption, the bulk of such losses in Africa happen at the level of production and are largely due to post harvest losses. The World Food Programme estimates that Africa, excluding North Africa, wastes over 30 per cent of its approximately 230 million tons of annual food production (equivalent to about more than US$4 billion), caused primarily by poor post-harvest handling. Given the rapid population increase, rising incomes and changing consumption patterns, Africa requires technology improvements and awareness creation to reduce resource-intensive production and limit food waste.

9 Africa outperforms most of the world's regions in the conservation and sustainable use of its mountain resources.

Mountain ecosystems are important reservoirs of biological diversity, especially for endemic plants and animals. However, mountain ecosystems are rapidly changing and under threat of habitat degradation. Nevertheless, all regions are increasing the coverage of protected mountain resources. Africa, excluding North Africa, has a Mountain Green Cover Index[3] (MGCI) of 90 per cent, well above the global average of 76 per cent and only second to Oceania and South East Asia, at 96 per cent and 98 per cent, respectively.

3 The Mountain Green Cover Index is an indicator of the extent to which mountains are efficiently managed, taking into consideration the delicate balance between conservation and sustainable use of resources.

10 Africa is losing forest cover at a rate that is much higher than the global average.

Globally, forest area as a proportion of total land area has been declining over the past two and a half decades, with the fastest decline registered in Africa, excluding North Africa, and least- developed countries (LDCs). From 2000 to 2015, Africa, excluding North Africa, was one of the two global regions to record a decline of at least two percentage points in relative forest cover. The rapid rate of deforestation in the region can be attributed, in part, to increased exploitation of forest resources for commercial purposes, encroachment of forest land by local communities for agricultural activities and a dearth of long-term management plans for most of the region's forests. For instance, in 2010, the forest area with long-term management plans in Africa, excluding North Africa, amounted to 15.3 per cent (23 per cent for Northern Africa), which is far below the global average of 52.6 per cent and Europe's figure of 95 per cent. A few countries including Ghana and The Gambia, however, have been successful in increasing forest cover as a percentage of its land area.

In addition to the decline in forest cover, Africa, like other regions of the world, faces the risk of extinction of major animal species.

11 A robust STI system requires a sound infrastructure and a vibrant innovation system that connects the science community and researchers to the private sector and government.

The development of science, technology and innovation (STI) is vital for the achievement of the SDGs and Agenda 2063. However, a robust STI system requires a sound infrastructure and a vibrant innovation system that connects the science community and researchers to the private sector and government. Africa's STI infrastructure, as measured by internet access and access electricity, is improving but is still relatively weak.

Furthermore, the institutional architecture for STI is generally weak in Africa and characterized by low investments in Research and Development (R&D) and fragmented innovation systems; most of the entities responsible for STI policymaking have operated in isolation from other policy agencies with weak links to the private sector and academia. Moreover, investments in R&D average 0.5 per cent of GDP, which is well below the 1 per cent of GDP stipulated in the Agenda 2063. Consequently, the benefits of technological innovation have not accrued to large segments of society, and there are wide disparities in STI development across the continent.

Countries such as Kenya, South Africa, Morocco and Tunisia, which rank high on STI indicators in Africa, invest a relatively greater share of their GDP in research and development and also provide incentives for private sector involvement in the funding and carrying out of R&D. These countries also effectively implement strategies to strengthen their innovation systems by establishing dedicated agencies specifically for that purpose.

The operationalization of a Technology Bank by the United Nations in September 2017 is a step in the right direction and can revitalize STI in least developed African countries. The bank aims to support least development countries build STI capacities, ecosystems and regulatory frameworks that can harness the benefits of new technologies by: attracting outside technology and facilitating technology transfer on voluntary and mutually agreed terms; supporting homegrown innovation and research; and bringing imported and indigenous technologies to market. Africa accounts for the majority of LDCs, hence stands to benefit from the establishment of the bank.

C Policy recommendations

The report identifies the following perspectives for policymakers:

1 African countries need to prioritize investments in water and sanitation to improve access, enhance health outcomes and leverage the productive capacities of the population. Improved governance of water resources, infrastructure investments, policies for management of water scarcity and use of modern technology are required to address water scarcity in Africa as a whole, particularly in North Africa.

2 Strengthen capacities for and integrate urban planning into national development planning to unleash the transformative potential of African cities to drive inclusive and sustainable economic prosperity. Coherence is needed among urban, spatial, sectoral and macro-economic policies. The increasing share of Africa's population living in urban areas calls for increased investment in both physical and social infrastructure to provide basic social services and amenities, including affordable and quality education, healthcare, water and sanitation and public transportation. To achieve these, investing in data and analysis on urban trends and impacts of social, economic and environmental dimensions of sustainable development is needed. The role that urbanization can play in addressing other SDGs should also be a subject of further research by Member States and the UN system.

3 Invest in technologies and infrastructure that reduce post-harvest losses. In particular, improvements in farm-based technologies, infrastructure, warehousing facilities, as well as inclusive rural financial markets and measures to reduce food contamination, are required to achieve the Malabo Declaration to halve food waste in Africa.

Sustainable consumption and production (SCP) offers opportunities for Africa to move toward more sustainable development pathways and improved well-being of its people. However, it ranks low on Africa's policy agenda, in part because of the relatively low level of material use and low levels of income. It is, therefore, important to mainstream the SCP in the Agenda 2063 indicators as methodologies are being clarified and develop SCP-related plans at the national and sub-national levels.

4 African countries need to design and implement long-term management plans for forest areas, and establish partnerships with the private sector and individual owners of large proportions of forested areas that are legally outside protected areas. African governments should rally all stakeholders: political leaders, non-state actors, and private and local communities to implement urgent actions to conserve and preserve the ecosystem. The centrality of the issues covered under this goal to livelihoods and sustenance of life in the region and elsewhere cannot be overstressed.

5 Improve rural access to modern energy to address rural-urban disparities. This is important to eliminate the harmful health impacts of using carbon-based fuels as the main source of lighting and cooking as well the adverse environmental impacts. African governments, supported by partners, need to provide incentives to drive investments in renewable energy that improve access to electricity and boost economic activity and growth. Additional measures are needed to improve access to energy-efficient cooking stoves to enhance energy efficiency, reduce pollution and improve health outcomes.

6 Strengthen the science, technology and innovation ecosystem and leverage investments in research and development by building institutions that coordinate government, the private sector and the science community.

D Emerging issues

An important new development with significant impact on the implementation of the two agendas is the signing of the *Africa Union – United Nations Framework for the Implementation of Agenda 2063 and the 2030 Agenda for Sustainable Development* (Development Framework), by the Chairperson of the African Union and the Secretary General of the United Nations, in January 2018. The Development Framework is expected to strengthen coordination and collaboration between the two organizations and their entities as well as the pan-African institutions (including the African Development Bank (AfDB)) and the Regional Economic Communities to coalesce efforts and financing for harmonized adaptation, implementation, monitoring and progress reporting on the two agendas. It builds on and will be implemented alongside the *United Nations – African Union Joint Framework on Enhanced Peace and Security* to strengthen the nexus between development work, on the one hand, and peace, security and humanitarian work, on the other.

In 2018, eleven African countries participated in Voluntary National Reviews (NVRs) of their progress on the Sustainable Development Goals organized in the context of the HLPF. The country-led NVRs are an important mechanism for measuring progress towards the realization of the goals and targets of Agenda 2030 at the national and sub-national levels.

About the report

Overview

The "Africa Sustainable Development Report 2018" is the second in a series of annual regional reports documenting progress on the 2030 Agenda and Agenda 2030. The report tracks the performance of the continent in implementing both agendas, highlights lessons and offers recommendations to policymakers. The report uses the latest data obtained from a broad range of sources, including the Economic Commission for Africa (ECA), the United Nations Conference on Trade and Development (UNCTAD), United Nations Statistics Division (UNSD) and the World Bank's World Development Indicators (WDI). These are complemented by review of the latest literature on the 2030 Agenda and Agenda 2063 and other pertinent analytical works, especially for the goals where data availability is limited.

As underscored in the *Africa Sustainable Development Report 2017*, data gaps remain a major challenge for adequate reporting of Africa's progress towards the realization of the two agendas. Statistical capacity and systems for reporting on the two agendas need to be strengthened.

Scope and methodology

The *Africa Sustainable Development Report* 2018 covers all African countries with relevant data on the 2030 Agenda and Agenda 2063 along the three dimensions of sustainable development (economic, social and environment), as well as the means of implementation. It focuses on the five goals of the High-level Political Forum on Sustainability (HLPF) for 2018:

- Goal 6 - Ensure availability and sustainable management of water and sanitation for all.
- Goal 7 - Ensure access to affordable, reliable, sustainable and modern energy for all.
- Goal 11 - Make cities and human settlements inclusive, safe, resilient and sustainable.
- Goal 12 - Ensure sustainable consumption and production (SCP) patterns.
- Goal 15 - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Chapter 6 focuses on the status of science, technology, and innovation (STI) in Africa and its potential contribution to the implementation of the two agendas. Chapter 7 concludes and provides pertinent policy recommendations.

Data Sources

To ensure cross-country comparability, the report uses data from international sources including the United Nations Statistical Division (UNSD), the World Health Organization, the International Labour Organization and the World Bank. Where relevant, international data is supplemented by national data to illustrate best practices. To the extent possible, the report disaggregates data by age, gender and geography (along the five regions of the continent: Central, East, North, West and Southern Africa region) in all the sections. Where data permits, Africa's performance (North Africa and the rest of Africa) is compared with other regions of the world.

Preparation process

The report is prepared jointly by the staff of the African Development Bank (AfDB), the African Union Commission (AUC), the Economic Commission for Africa (ECA) and the United Nations Development Programme-Reginal Bureau for Africa (UNDP-RBA). The report was validated by Member States during an Expert Group Meeting (EGM) organized in Maputo, Mozambique. The drafting teams were responsible for gathering and analysing data, writing specific chapters and leading discussions during the EGM.

New developments

In January 2018, the *Africa Union – United Nations Framework for the implementation of Agenda 2063 and the 2030 Agenda for Sustainable Development* (Development Framework) was signed by the Chairperson of the African Union and the Secretary General of the United Nations. This is an important development that is expected to strengthen coordination and collaboration between the two organizations and their entities, as well as with the pan-African institutions (including the AfDB) and the Regional Economic Communities (RECs) to coalesce efforts and financing for harmonized adaptation, implementation, tracking and reporting on the two agendas. The Development Framework covers nine thematic areas[1] of importance to harness and realize sustainable development in Africa. The Development Framework builds on and will be implemented alongside the *United Nations – African Union Joint Framework on Enhanced Peace and Security*, to strengthen the nexus between development work, on the one hand, and peace, security and humanitarian work, on the other.

It is also important to note that during 2018, eleven African countries, including Benin, Cabo Verde, the Democratic Republic of Congo, Egypt, Guinea, Mali, Namibia, Niger, Senegal, Sudan and Togo prepared Voluntary National Reviews (VNRs) of their progress on the Sustainable Development Goals which were submitted to the HLPF. The country-led NVRs are a mechanism for measuring progress toward the realization of the goals and targets of Agenda 2030 at the national and sub-national levels (United Nations, 2018). The HLPF serves as the central platform for international follow-up of progress of the Sustainable Development Goals (SDGs) with the VNRs, forming the basis for peer learning and experience sharing. In 2018, a total of 47 countries undertook VNRs.

1 These include: (i) Advocacy and awareness-raising about the 2030 Agenda and Agenda 2063; (ii) Coherent integration of the two Agendas into national development plans; (iii) strengthening Capacity for analytical work; (iv) Data ecosystems for performance tracking and evidence-based policymaking; (v). Integrated monitoring, evaluation and reporting; (vi) Trade and the regional integration agenda; (vii) Peace and security, human rights and development nexus; (viii) Africa's global representation and voice; and (ix). Integrated financing mechanisms.

CHAPTER 1

Clean Water and Sanitation

1.1 Introduction

Sustainable Development Goal (SDG) 6 calls on governments and all stakeholders to: **Ensure availability and sustainable management of water and sanitation for all.** This goal goes beyond drinking water, sanitation and hygiene and also addresses the quality and sustainability of water resources. The target for the first Ten-Year Implementation Plan of Agenda 2063 is to reduce the 2013 levels of the proportion of people without access to safe drinking water and poor sanitation by 95 per cent. Access to water and sanitation are considered core socio-economic and health indicators, as well as key determinants of child survival, maternal and children's health, family well-being and economic productivity. Improved drinking water, sanitation and hygiene play a major role in the progress in health, education and poverty reduction, and are thus used in constructing wealth indexes in household survey analyses of inequalities between rich and poor.

At the continental level, there are several initiatives and commitments to scale up efforts to increase availability and sustainable management of water and sanitation for all. These include the N'gor Declaration on Sustainable Water Management and Sanitation, the 2014 Dakar Ministerial Declaration on Water Security and Sanitation, and the 2015 N'gor Declaration on Sanitation and Hygiene. Another commitment is the Rural Water Supply and Sanitation Initiative (RWSSI), a regional effort launched in 2003 to improve access to water, sanitation and hygiene (WASH) in rural Africa.

This goal goes beyond drinking water, sanitation and hygiene and also addresses the quality and sustainability of water resources.

As a regional cooperation framework, the RWSSI supports the attainment of the African Water Vision and the Millennium Development Goals (MDGs) – now SDGs – and contributes to poverty reduction through improved and sustained access to and use of water and sanitation services by rural communities in Africa. According to the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) 2017 Update[1] and SDG Baselines, substantial progress was made to increase accessibility of WASH services in rural Africa; about 263 million people used at least a basic drinking water service; 129 million used at least a basic sanitation service; and 67 million people had a basic hand-washing facility with soap at home.

However, large numbers of people in the rural areas of Africa still do not have access to WASH services: about 339 million people lacked basic drinking water, 473 million people lacked basic sanitation service and 535 million lacked basic hand-washing facilities, with soap at home.

The continental programmes, such as the: Kigali Action Plan; African Water Resources Management Priority Action Programme; Programme for Universal Access to Water Supply and Sanitation in Africa (2M4M Initiative); African Clean Village Programme; pan-African Productive Sanitation Programme; African Water Facility (AWF); and RWSSI will serve as tools for implementing Africa Water Vision 2025, Agenda 2063, and Agenda 2030 for sustainable development on Water and Sanitation (AMCOW and AUC, 2015).

1 Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP), Progress on Drinking Water, Sanitation and Hygiene - 2017 Update and SDG Baselines.

I.2 Alignment with Agenda 2063

SDG 6 has eight targets with 11 indicators and is aligned with two goals of Agenda 2063: Goal 1 – **A high standard of living, quality of life and well-being for all**; and Goal 7 – **Environmentally sustainable climate-resilient economies and communities** (TABLE I.I).

TABLE I.I ALIGNMENT OF AGENDA 2030 GOAL 6 WITH THAT OF AGENDA 2063

AGENDA 2030 FOR SDGS	CORRESPONDING AGENDA 2063 GOALS
6 Ensure availability and sustainable management of water and sanitation for all.	**1** A high standard of living, quality of life and well-being for all.
	7 Environmentally sustainable climate-resilient economies and communities.
AGENDA 2030 TARGETS	**AGENDA 2063 TARGETS**
6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.	Reduce 2013 level of proportion of the population without access to safe drinking water by 95%.
6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.	Reduce 2013 level of proportion of the population with poor sanitation facilities by 95%.
6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	At least 10% of waste water is recycled for agricultural and industrial use.
6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.	Increase 2013 levels of water productivity from rain-fed agriculture and irrigation by 60%.
	At least 10% of rain water is harvested for productive use.
	At least 10% of waste water is recycled for agricultural and industrial use.
6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.	Increase 2013 levels of water demand satisfaction by 25%.
6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.	At least 5% of the budget is allocated to water and sanitation by 2016.

Source: African Union (2017) Agenda 2063 – Sustainable Development Goals. Copy of mapping exercise. https://au.int/en/ea/statistics/a2063sdgs.

I.3 Progress tracking

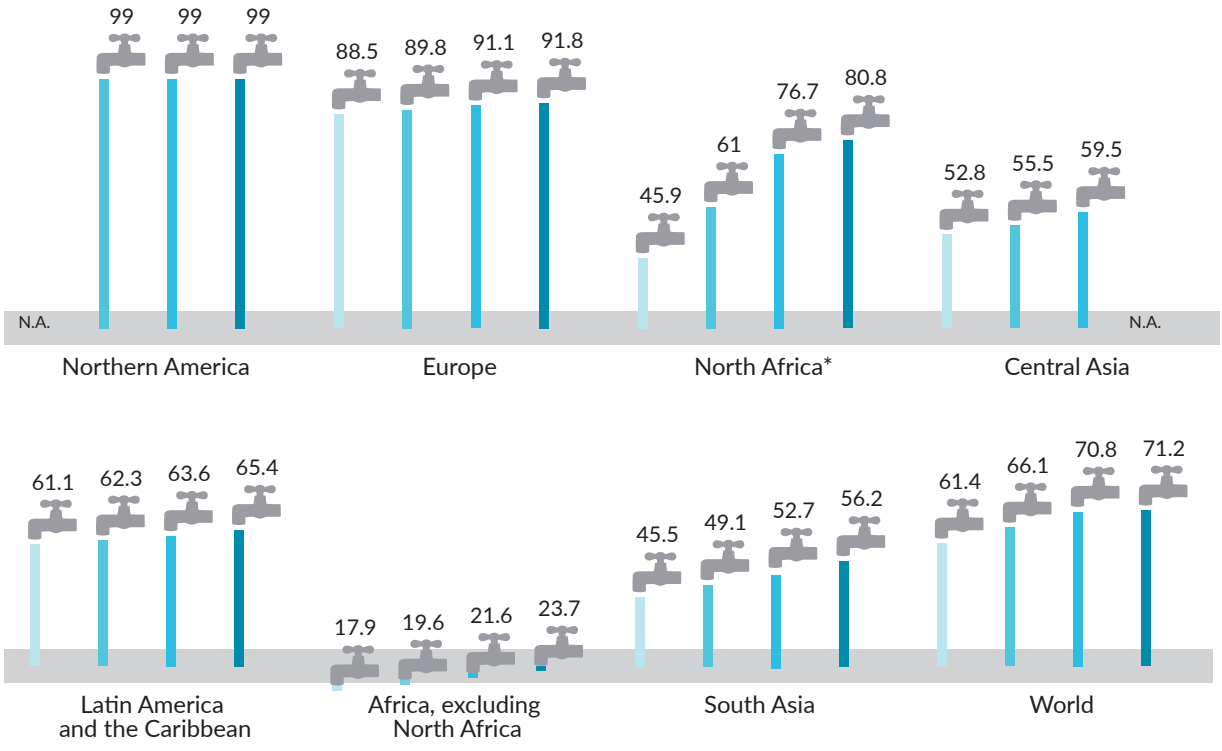
Target 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Indicator 6.1.1 Proportion of population using safely managed drinking water services.

Agenda 2063 calls for a reduction of the 2013 level of the proportion of the population without access to safe drinking water by 95 per cent in 2023. Safely-managed drinking water services is defined as an improved water source located on premises, available when needed and free from fecal and chemical contamination. Improved drinking water sources include: piped water into dwelling, yard or plot; public taps or standpipes; boreholes or tube wells; protected dug wells; protected springs; packaged water; and rainwater. Coverage of safely-managed drinking water varied widely among different regions globally (FIGURE I.I). In 2015, about 71 per cent of the global population used safely-managed drinking water sources as compared to 61.4 per cent in 2000. In Africa, excluding North Africa, coverage in 2015 was only 23.7 per cent, up from 18 per cent in 2000. Coverage of safely-managed water services in urban areas was 46.2 per cent in Africa, excluding North Africa, 85 per cent globally and above 50 per cent in the other regions. Data for safely-managed drinking water services is not yet available for rural Africa, where so far only the two categories 'basic services' and 'not safely-managed are captured (JMP, 2017).

Data gaps make it difficult to carry out country-level analysis. For example, data on the proportion of the population using safely-managed drinking water services are available only for eight African countries. To improve the monitoring and progress reporting of drinking water, the JPM, supported by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), has developed a new service ladder (TABLE I.2). This builds on the established source type classification by providing conti-

FIGURE I.I PROPORTION OF POPULATION USING SAFELY-MANAGED DRINKING WATER SERVICES BY REGION



Source: United Nations Statistics Division (2017); World Bank (2018).

***Average for Morocco and Tunisia, only countries with data in North Africa.**

TABLE I.2 THE NEW JMP LADDER FOR HOUSEHOLD DRINKING WATER SERVICES

SERVICE LEVEL	DEFINITION
Safely managed	Drinking water from an improved water source, which is located on premises, available when needed and free of fecal and priority contamination.
Basic	Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip, including queuing.
Limited	Drinking water from an improved source where collection time exceeds over 30 minutes for a roundtrip to collect water, including queuing.
Unimproved	Drinking water from an unprotected dug well or unprotected spring.
No service	Drinking water collected directly from a river, dam, lake, pond, stream, canal or irrigation channel.

Source: World Health Organization; United Nations Children's Fund (2017).

nuity with the MDG monitoring mechanism and introduces additional criteria for accurate measurement of accessibility, availability and quality.

Achieving universal and equitable access to safe and affordable drinking water for all is still challenging in Africa. In 2015, 66 per cent of the countries had less than 75 per cent coverage of basic drinking water services, with wide variation among countries. Achieving safely-managed services is even more daunting. In 2015, the proportion of population with access to basic drinking water sources ranged from 19 per cent in Eritrea to 100 per cent in Mauritius (FIGURE I.2, see page 10). There are also wide intra-country variations, especially between the rural and urban households. Excluding North Africa, an estimated 82 per cent of the urban population had access to at least basic drinking water services compared to 43 per cent of the rural population.

Some of the reasons for the wide variation include the rapid urbanization and population growth, a rising share of informal settlements, inadequate infrastructure, governance and institutional weaknesses and deteriorating water sources. Environmental risks arising from the natural degradation of water sources (e.g., lakes, springs and boreholes drying up) and/or increased environmental stress, such as variability in water flows, also affect the supply of water and accessibility.

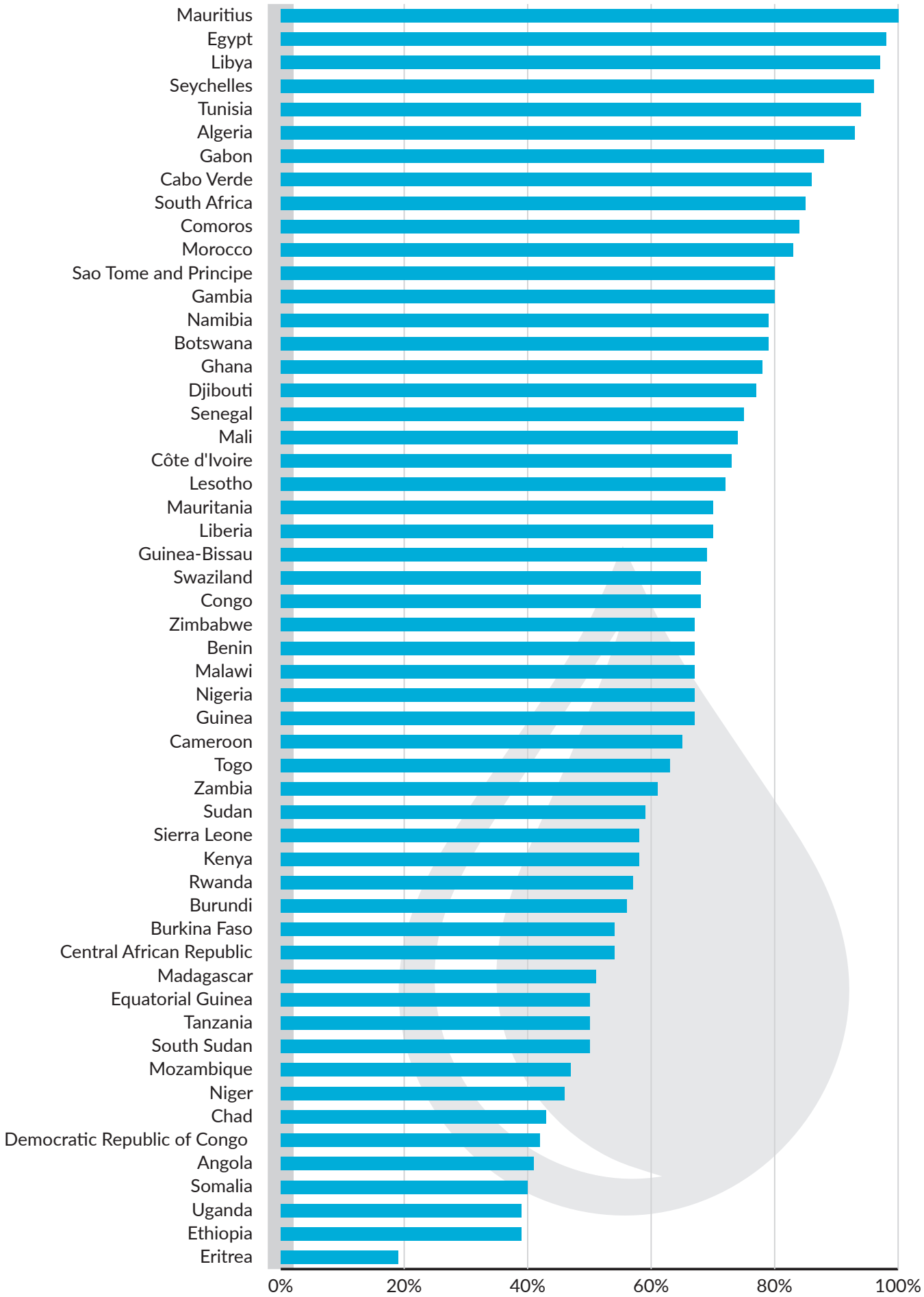
Environmental risks arising from the natural degradation of water sources (e.g., lakes, springs and boreholes drying up) and/or increased environmental stress, such as variability in water flows, also affect the supply of water and accessibility.

Target 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

Indicator 6.2.1 Proportion of population using safely-managed sanitation services, including a hand-washing facility with soap and water.

Safely-managed sanitation service is defined as the use of an improved sanitation facility that is not shared with other households and where excreta are safely disposed in situ or transported and treated offsite (WHO and UNICEF, 2017). While access to safely-managed sanitation services continues to increase across the world, the proportion of the population accessing these services remains low, especially in Latin America and the Caribbean, North

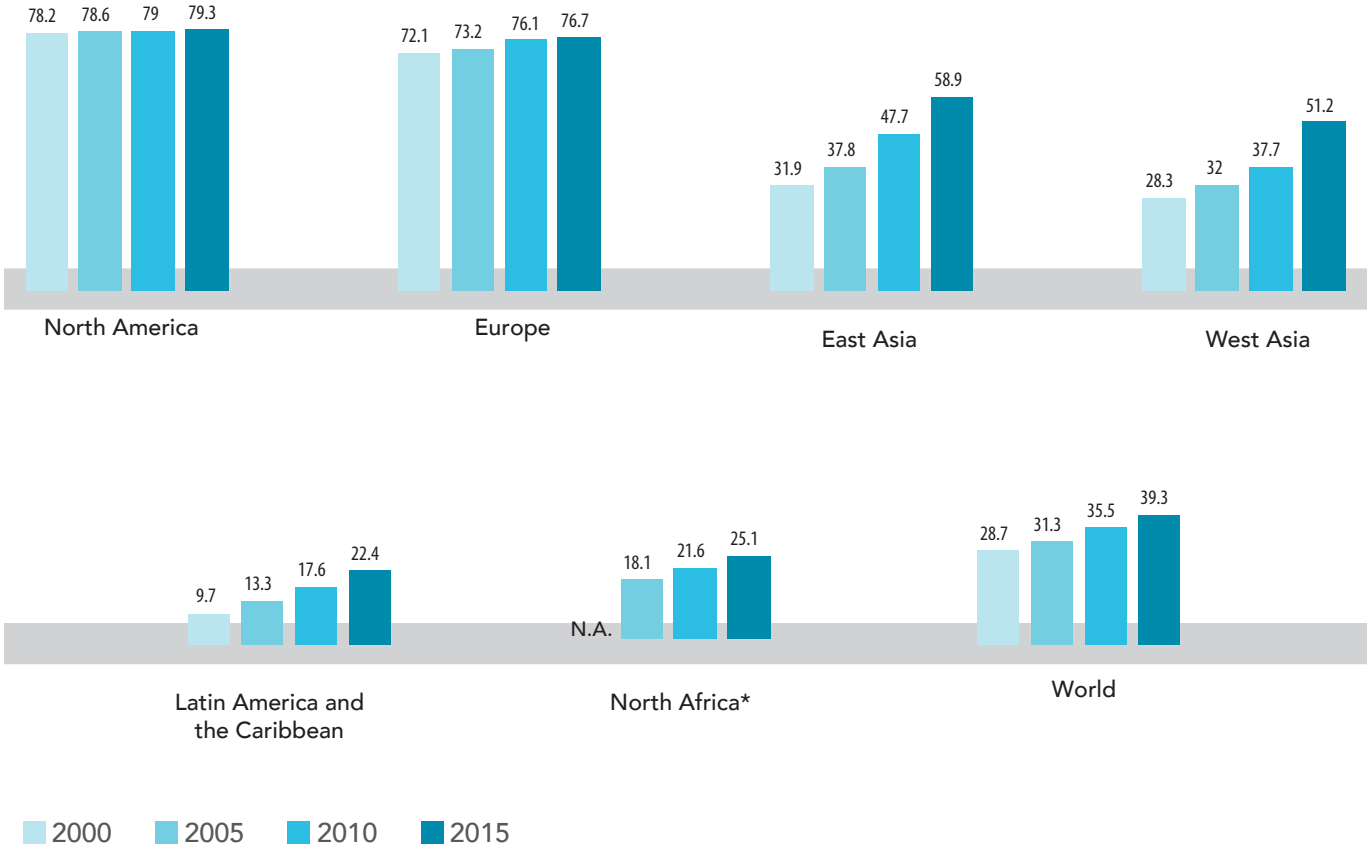
FIGURE I.2 POPULATION WITH ACCESS TO AT LEAST BASIC DRINKING WATER SERVICES, 2015



Source: World Health Organization, United Nations Children's Fund (2017).

Note: Based on national data, Morocco has 91.4% of people with access to drinking water according to the 2015 National Employment Survey.

FIGURE 1.3 PROPORTION OF POPULATION USING SAFELY-MANAGED DRINKING WATER SERVICES BY REGION



Source: United Nations Statistics Division (2017); World Bank (2018).
**Average for Morocco and Tunisia, only countries with data in North Africa.*

TABLE 1.3 THE NEW JMP LADDER FOR HOUSEHOLD SANITATION SERVICES

SERVICE LEVEL	DEFINITION
Safely managed	Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite.
Basic	Use of improved facilities that are not shared with other households.
Limited	Use of improved facilities shared between two or more households.
Unimproved	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines.
Open defecation	Disposal of human faces in fields, forests, bushes, open bodies of water, beaches, or other open spaces or with solid waste

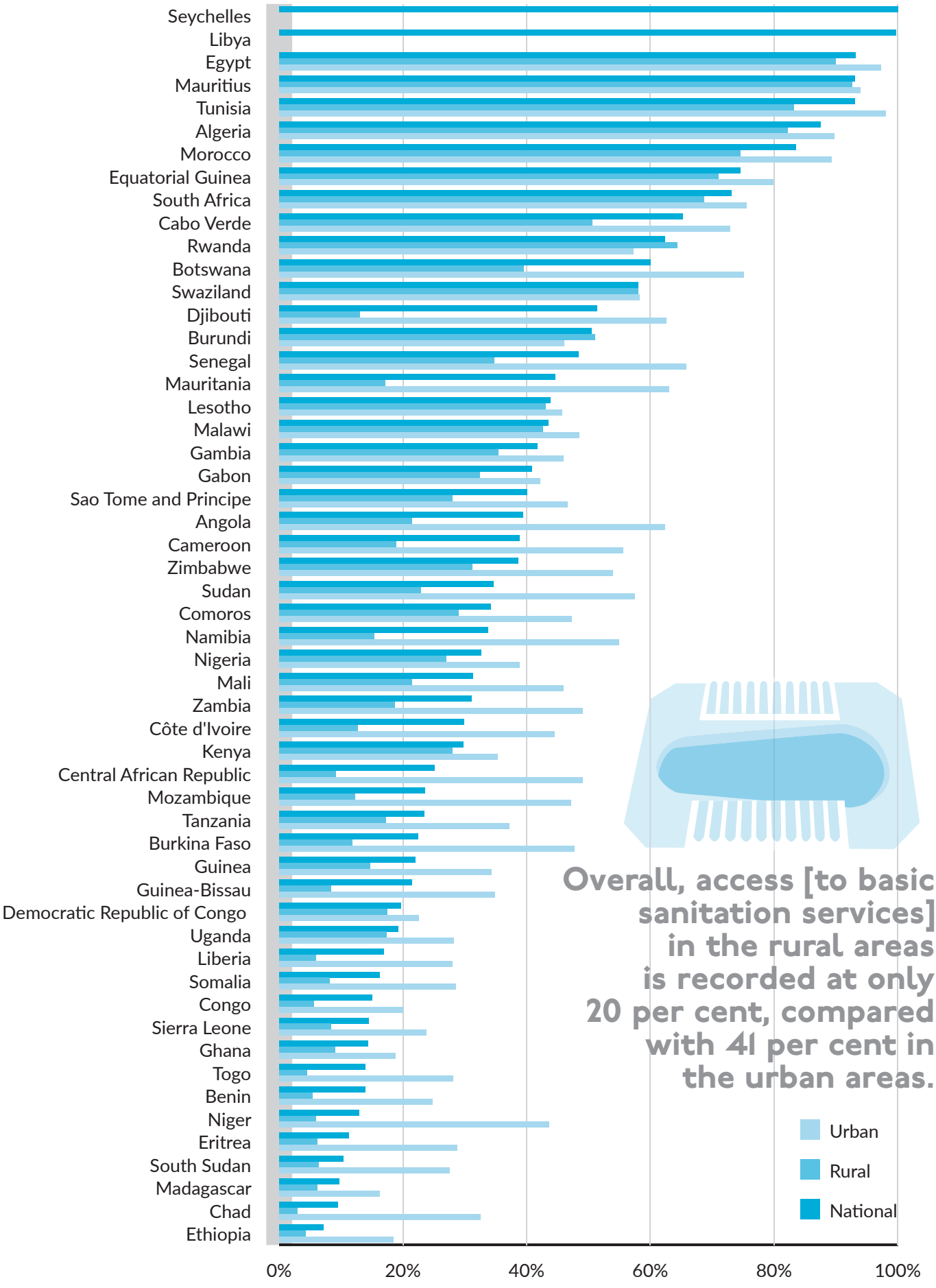
Source: World Health Organization, United Nations Children's Fund (2017).

Africa and West Asia (FIGURE 1.3). Globally, only 39 per cent of the population used safely-managed sanitation services globally in 2015. In North Africa, the proportion of the population with access to safely-managed sanitation services increased from 18.1 per cent in 2005 to 25.1 per cent in 2015. Data gaps are a major constraint to measuring progress on this indicator. Only eight African countries (Algeria, Egypt, Libya, Morocco, Niger, Senegal, Somalia and Tunisia) have data on this indicator for 2015.

A new service ladder for sanitation services has been developed by the JMP to benchmark and compare progress across countries and facilitate enhanced monitoring of access to sanitation services (TABLE 1.3).

According to the JMP 2017 Update and SDG Baselines, the use of basic sanitation services globally increased faster than the use of basic drinking water services – at an average of 0.63 percentage points per year between 2000 and 2015. However, coverage of

FIGURE I.4 POPULATION WITH ACCESS TO BASIC SANITATION SERVICES BY PLACE OF RESIDENCE, 2015



Overall, access [to basic sanitation services] in the rural areas is recorded at only 20 per cent, compared with 41 per cent in the urban areas.

Source: World Health Organization, United Nations Children's Fund (2017).

basic sanitation services remains lower than for basic water services. In Africa, excluding North Africa, the proportion of the population with access to at least basic sanitation services increased from 25 per cent in 2000 to 28 per cent in 2015, based on the new definition of 'service ladder.' Intra-country disparities are also present in access to basic sanitation services. In 39 African countries, the proportion of the population with access to at least basic sanitation services is below 50 per cent in 2015, and access ranges from 7.1 per cent in Ethiopia to 100 per cent in Seychelles (FIGURE 1.4). Only five countries (Seychelles, Libya, Egypt, Mauritius and Tunisia) had more than 90 per cent access to basic sanitation services. Overall, access in the rural areas is recorded at only 20 per cent, compared with 41 per cent in the urban areas. Population growth, urbanization, inadequate financing and inadequate sanitation infrastructure are some of the reasons for the very low access to basic sanitation services in the majority of African countries.

Target 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

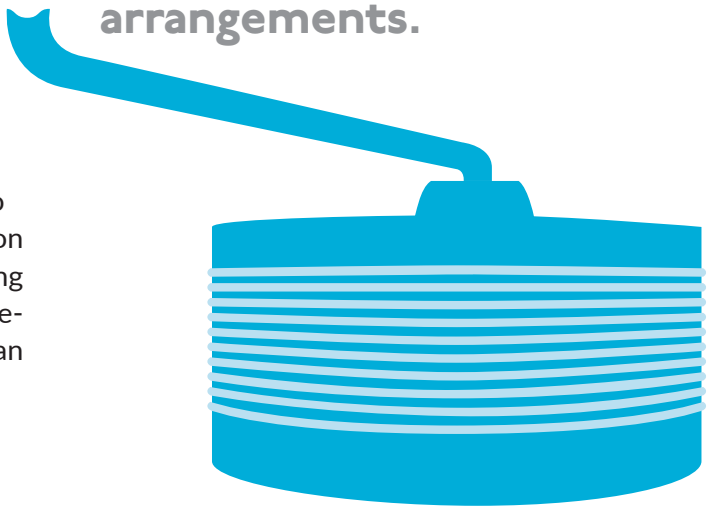
Indicator 6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources.

Water stress is defined as the ratio of total freshwater withdrawn to total renewable freshwater resources withdrawn by all major sectors and total renewable freshwater resources, after taking into account environmental water requirements (United Nations Statistics Division (UNSD), 2018). According to the Sustainable Development Goals Report 2017, more than two billion people globally live in countries with excess water stress (UNSD, 2018). North Africa and Central Asia experience water stress levels of 112 per cent and 79 per cent, respectively, which indicates a high probability of future water scarcity (FIGURE 1.5 see page 14).[2] The major factors leading to the depletion of water resources include population growth, economic growth, urbanization, increasing consumption and inadequate governance arrangements. Failure to address excessive water use can lead to the depletion and degradation of both surface and groundwater resources, compromising livelihoods and development opportunities for future generations.

For a long time, water scarcity has been a challenge in North Africa. Emerging issues, including climate change, frequent and prolonged droughts, floods and poor water management, are aggravating the problem. Addressing these challenges requires better governance of water resources, infrastructure investments, policies for management of water scarcity and use of improved technology. Many technologies are currently available to treat and reuse waste water for productive purposes, including for agriculture.

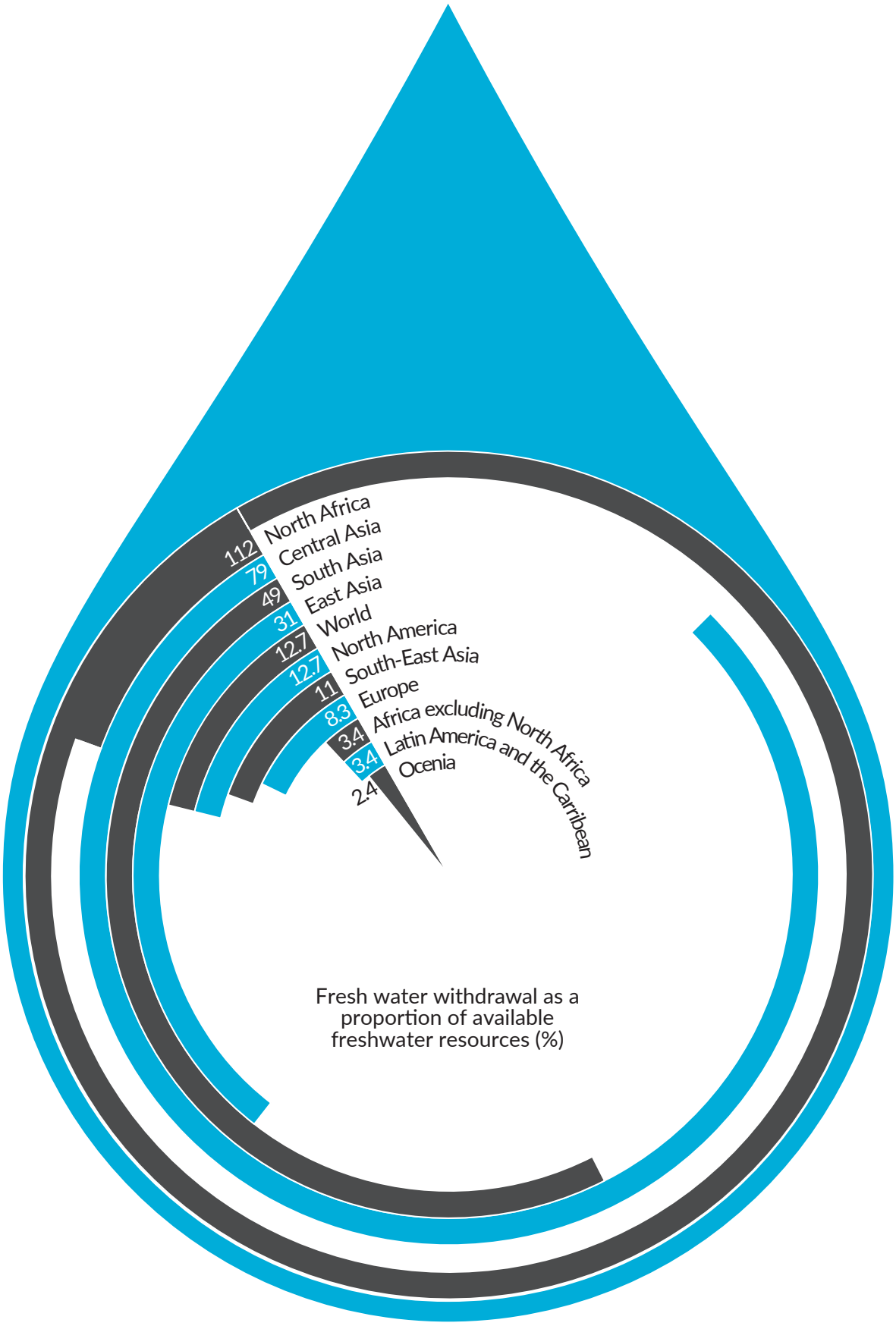
Recognizing the importance of managing and protecting water resources, and in line with the Africa Water Vision 2025, African Member States committed themselves to develop national water efficiency plans by 2015 and to increase the share of rainwater use in total municipal water. According to the 2015 Africa Water and Sanitation Report, 26 African countries have developed national water efficiency plans and two African countries (Kenya and Sudan) were on track to increase the share of rainwater use in the total municipal water consumption by 10 per cent (AMCOW and AUC, 2015).

The major factors leading to the depletion of water resources include population growth, economic growth, urbanization, increasing consumption and inadequate governance arrangements.



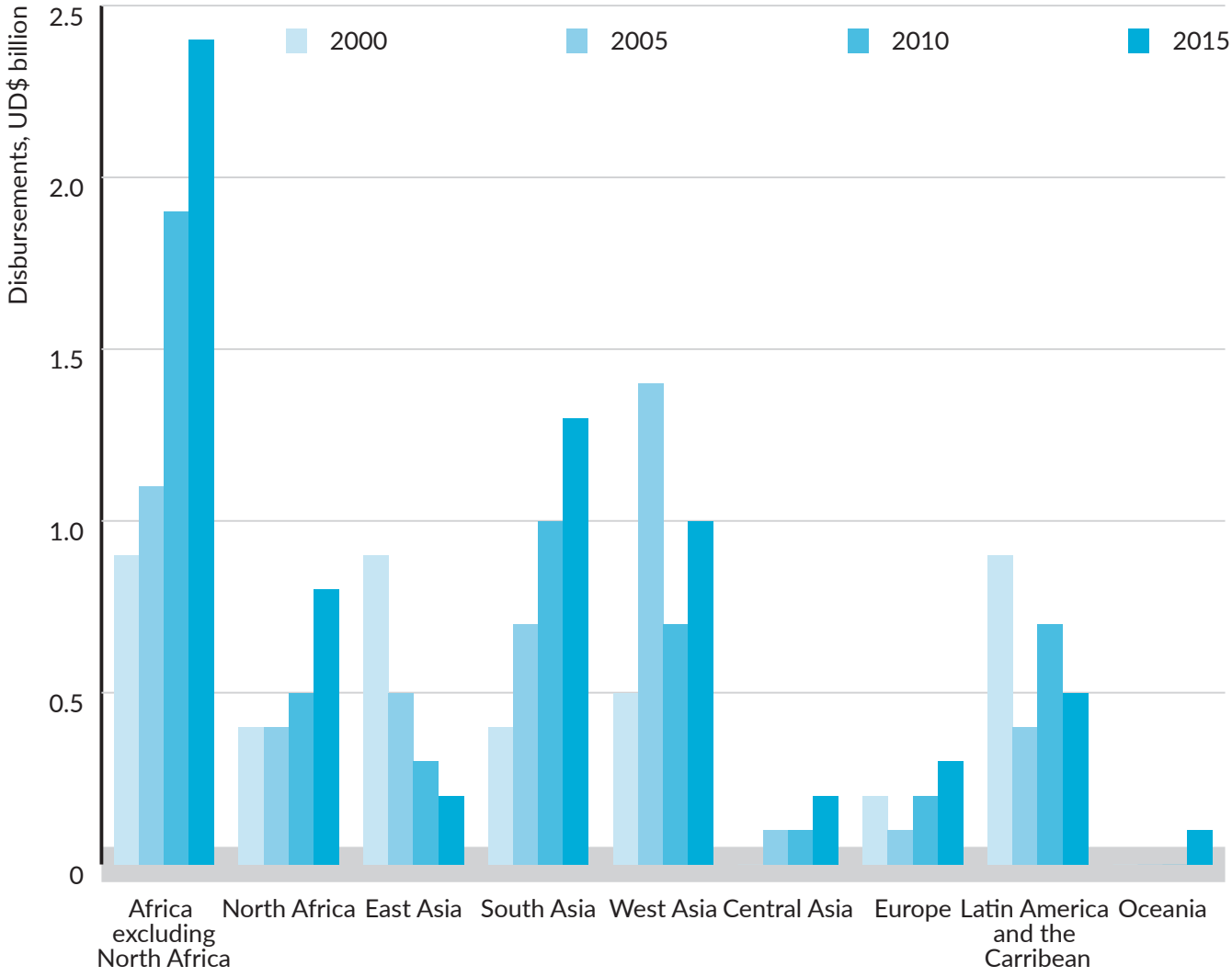
2 Withdrawal of more than 100 per cent of their renewable freshwater resources implies that countries are either depleting their renewable groundwater resources or using fossil non-renewable groundwater or non-conventional sources of water, such as desalinated water or wastewater.

FIGURE I.5 FRESH WATER WITHDRAWAL AS A PROPORTION OF AVAILABLE FRESHWATER RESOURCES, 2014



Source: United Nations Statistical Division (2017).

FIGURE I.6 TOTAL ODA FOR WATER SUPPLY AND SANITATION (CONSTANT 2015, US$)



Source: United Nations Statistical Division (2017).

Target 6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

Indicator 6.a.1 Amount of water- and sanitation-related official development assistance (ODA) that is part of a government-coordinated spending plan.

Africa, excluding North Africa, is a major recipient of ODA for water supply and sanitation since 2000. While, ODA disbursements have been increasing in all the regions between 2000 and 2015 (except in East Asia) disbursements to Africa, excluding North Africa, more than doubled (FIGURE I.6).

At the continental level, AWF and RWSSI are hosted and managed by the AfDB. The AWF has mobilized more than Euro 1.4 billion from bilateral and multilateral financial institutions, foundations and African governments to fund the development of water resources and sanitation projects in Africa. The RWSSI Trust Fund has, since its creation in 2003, mobilized significant additional financial resources for rural water supply and sanitation from multilateral and bilateral institutions, local communities, non-governmental organizations (NGOs)and African governments.

1.4 Conclusions

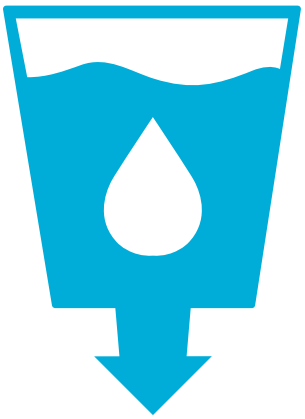
Improvements in access to safe drinking water supply, sanitation and hygiene services are critical to realizing basic human rights and international commitments. They also are essential for reducing multidimensional poverty, improving nutrition, health and education, achieving gender equality, and work opportunities, and reducing inequalities. Although African countries are making progress in increasing access to and use of safe drinking water supply and improved sanitation and hygiene facilities and services, much more needs to be done. Some of the factors constraining progress on this goal are climate change and desertification, rapid and unplanned urbanization, population growth, inappropriate management practices, poor agricultural practices and surface mining.

Appropriate institutional and policy reforms; innovative financing and private sector engagement; and monitoring, evaluation, learning and knowledge management, among others, are required if everyone, everywhere in Africa, is to have access to sustainable and affordable water, sanitation and hygiene services.

African countries need to develop sustained and resilient infrastructure for water and sanitation, as well as to balance the use of water resources for domestic use, production and other purposes. It is essential to appropriately manage competing demands for water resources and to exploit synergies between water uses, such as reuse and recycling, and ecosystem protection.

African countries also need to employ mitigation measures in response to climate change to maintain the gains made in the past. In light of climate change and variability, the issue of sustainable and integrated water resources management is critical for ensuring universal access to water, sanitation and hygiene services, as well as food security.

Although African countries are making progress in increasing access to and use of safe drinking water supply and improved sanitation and hygiene facilities and services, much more needs to be done.



CHAPTER 2

Affordable and clean energy

2.1 Introduction

Goal 7 of the 2030 Agenda for Sustainable Development – **Ensure access to affordable, reliable, sustainable and modern energy for all** – addresses the underlying barriers to the provision of reliable, environmentally-sustainable and efficient energy solutions. Modern energy is vital to sustainable human development. The services that energy makes possible – from heating and lighting, to manufacturing, agriculture and mobility – are omnipresent in developed countries, and commonly taken for granted. Not everyone, however, enjoys the benefits that modern energy forms can provide. This is because energy resources are unevenly distributed around the world, and more so in the sub-regions of Africa, which accounts for almost 17 per cent of the world's population, but only 4.5 per cent of global primary energy demand.[1] Achieving the targets of Goal 7 is crucial, as it has potential impact on nine other goals: ending poverty in all forms (Goal 1); eliminating hunger (Goal 2); improving health and well-being (Goal 3); achieving gender equality and empowering all women and girls (Goal 5); decent work and economic growth (Goal 8); boosting industry, innovation and infrastructure development (Goal 9); reducing inequalities among countries (Goal 10); boosting sustainable cities and communities (Goal 11); and combating climate change and its impact (Goal 13).

2.2 Alignment with Agenda 2063

Goal 7 comprises five targets (three of them on specific outcomes and two on priority interventions required to realize the goal) and six indicators. Target 7.1 focuses on ensuring universal access to energy services and has two indicators: 7.1.1 Proportion of population with access to electricity and 7.1.2 Proportion of population with primary reliance on clean fuels and technology.

Target 7.2 focuses on increasing the share of renewables in the energy mix, with one indicator: 7.2.1 Renewable energy share in the total final energy consumption. Target 7.3 focuses on improving energy efficiency, with one indicator: 7.3.1 Energy intensity measured in terms of primary energy and gross domestic product (GDP).

The two strategic priorities for implementing Goal 7 are Target 7.a: Enhance international cooperation, and promote investments, with one indicator 7.a.1 Mobilized amount of US$ per year, starting in 2020 accountable towards the US$100 billion commitment; and Target 7.b: Expand infrastructure and upgrade technology in developing countries, with one indicator 7.b.1 Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services. SDG 7 is aligned with goals 4 (transformed economies and job creation), 6 (blue/ocean economy for accelerated growth) and 7 (environmentally sustainable climate resilient economies and communities) of Agenda 2063 (TABLE 2.1).

1 International Energy Agency; Energy Access Outlook, From Poverty to Prosperity (2017).

TABLE 2.1 ALIGNMENT BETWEEN GOAL 7 AND AGENDA 2063

SDG 7 TARGETS	ALIGNMENT TO AGENDA 2063: GOALS	TARGETS
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.	**1** A high standard of living, quality of life and well- being for all.	**1.1.4.6** Access and use of electricity and internet is increased by at least 50% of 2013 levels.
	7 Environmentally- sustainable climate-resilient economies and communities.	**1.7.3.4** Reduce proportion of fossil fuels in total energy production by at least 20%.
	10 World class infrastructure crisscrosses Africa.	**2.10.1.4** Increase electricity generation and distribution by at least 50% by 2020.
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	**6** Blue/ocean economy for accelerated economic growth.	**1.6.1.4** At least 10% of renewable energy sources is from wave energy.
	7	**1.7.3.4** Reduce proportion of fossil fuel in total energy production by at least 20%.
7.3 By 2030, double the global rate of improvement in energy efficiency	**1**	**1.1.4.7** Increase the efficiency in energy usage by households by at least 30%.
7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.	**1**	**1.1.4.6** Access and use of electricity and internet is increased by at least 50% of 2013 levels.
		1.1.4.7 Increase the efficiency in energy usage by households by at least 30%.
	6	**1.6.1.4** At least 10% of renewable energy sources is from wave energy.
	7	**1.7.3.4** Reduce proportion of fossil fuel in total energy production by at least 20%.
	10	**2.10.1.4** Increase electricity generation and distribution by at least 50% by 2020.
7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least-developed countries, small island developing states and land-locked developing countries, in accordance with their respective programs of support.	**1**	**1.1.4.6** Access and use of electricity and internet is increased by at least 50% of 2013 levels.
		1.1.4.7 Increase the efficiency in energy usage by households by at least 30%
	6	**1.6.1.4** At least 10% of renewable energy sources if from wave energy.
	7	**1.7.3.4** Reduce proportion of fossil fuel in total energy production by at least 20%.
	10	**2.10.1.4** Increase electricity generation and distribution by at least 50% by 2020.

Source: African Union (2017) Agenda 2063–Sustainable Development Goals mapping exercise. https://au.int/en/ea/statistics/a2063sdgs.

2.3 Progress tracking

2.3.1 Overview

The discovery of electricity as an invaluable technology at the start of the nineteenth century has since transformed peoples' lives, society and industry in innumerable ways – from providing lighting, heating and transportation, to the way we manage production, healthcare, education and more. Today, electricity is at the heart of modern technologies and communication, as a source of fuel and power to run many electronic devices. Improvements in the provision and lower costs of electricity over the past two decades to 2014 have led to almost 85 per cent of the world's population enjoying access to electricity (BOX 2.1). However, for most of Africa, this transformative power of electricity remains unharnessed due to limited production and access.

2.3.2 Analysis of progress by target

Target 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.

Related Agenda 2063 target:

i 1.1.4.6 Access and use of electricity and internet is increased by at least 50 per cent of 2013 levels.

ii 1.7.3.4 Reduce proportion of fossil fuels in total energy production by at least 20 per cent.

iii 2.10.1.4 Increase electricity generation and distribution by at least 50 per cent by 2020.

BOX 2.1 GLOBAL ENERGY ACCESS STATUS: MOST RECENT OVERVIEW

Far more global progress in every area of sustainable energy is needed to achieve SDG Goal 7 targets; business as usual is not an option. About 87 per cent of the global population had access to electricity in 2016, an increase of only 9 percentage points since 2000. That means that about one billion people still function without electricity. Likewise, the access rate to clean fuels and technologies for cooking improved only slightly in recent years (from 49 per cent globally in 2000 to 59 per cent in 2016), meaning that about 3 billion people are still cooking without clean fuels and more efficient technologies. In particular, Africa is still home to 53 per cent of the global population that has no access to electricity. Only about a quarter of the population in Africa, excluding North Africa, has access to electricity, versus about half in South Asia and more than 80 per cent in Latin America, the Middle East and North Africa. Only 19 per cent of the African population has access to clean cooking technologies – when excluding North Africa it drops to 14 per cent.

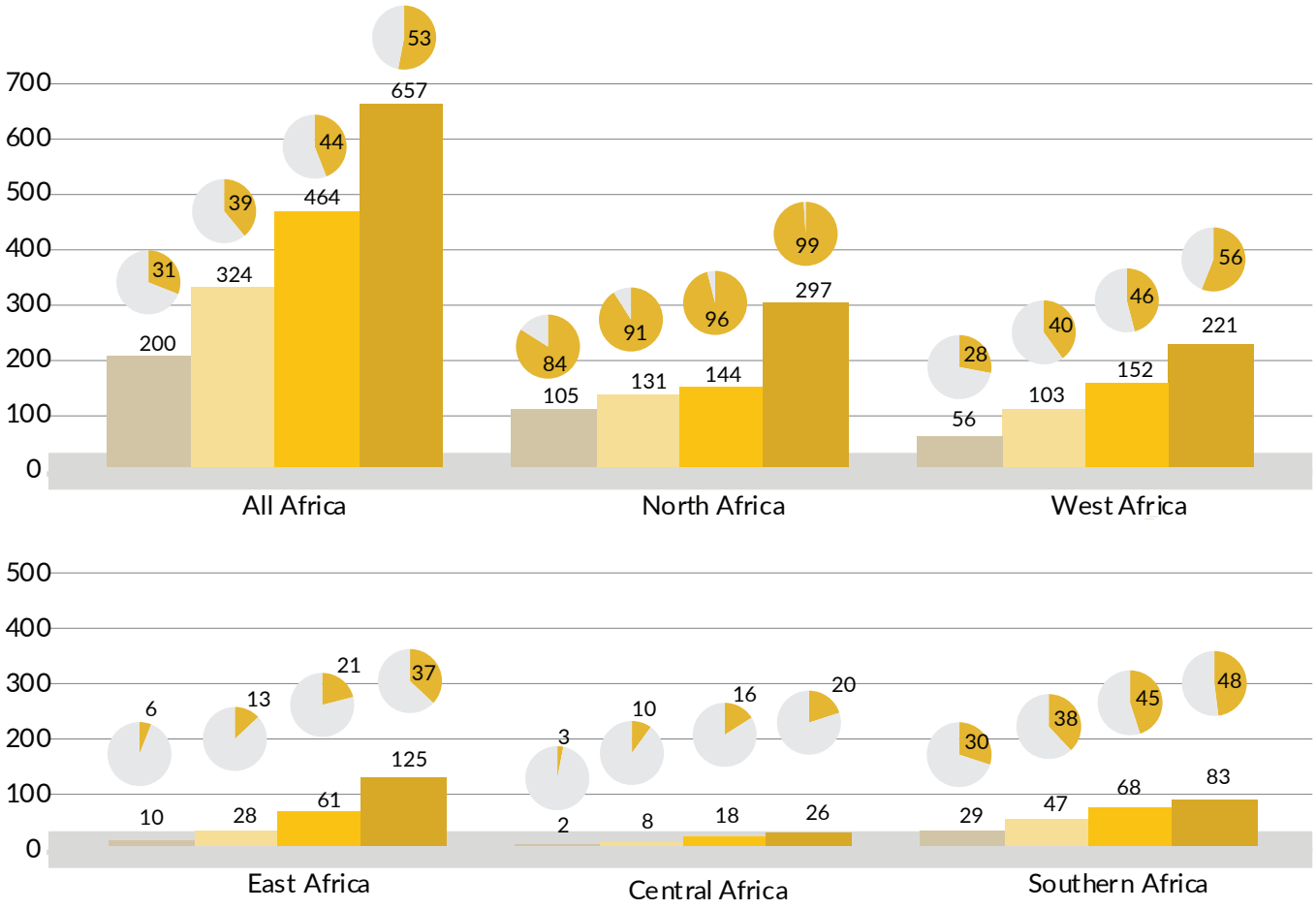
Despite having abundant reserves of fossil fuel and renewable energy resources, Africa faces many energy-related challenges, whether they are measured in generation capacity, transmission capability, electricity consumption or security of supply. In 2014, the 48 African countries, excluding North Africa – with approximately 1.1 billion people – generated only 147 gigawatts (GW), and the average electricity consumption per capita in the rest of Africa, excluding South Africa, was equal to 160KWh or 1.3 per cent of that in the United States. More than 30 African countries faced power shortages over the past five to ten years, which affects various facets of development through load shedding and inadequate supply.

However, a rising commitment in Africa from the government and the private sector, as well as from the development partners and the civil society, is emerging to support energy sector development in order to unlock its potential. There is now a widespread recognition of the importance of affordable and reliable energy for the future of Africa: of the 53 African countries that submitted Nationally Determined Contributions (NDCs) at the 2015 United Nations Climate Change Conference (COP 21), 34 mention energy access as a key enabler for development. Furthermore, there are many African energy investment initiatives, including the New Deal on Energy for Africa developed by the AfDB, which aims to achieve universal access by 2025 by mobilizing up to US$50 billion of additional funding in that sector.

Source: Tracking SDG7 – The Energy Progress Report 2018, United Nations Economic and Social Council Progress towards the Sustainable Development Goals. Report of the Secretary-General (2018)..

Access to electricity in Africa is increasing, albeit unevenly across the continent's sub-regions. For the first time in Africa, excluding North Africa as of 2016, the electrification rate growth is higher than demographic growth. In 2016, about 657 million people in Africa – about 53 per cent of the continent's approximately 1.2 billion people – had access to electricity. North Africa is the sub-region with the largest access to electricity (in absolute terms and by proportion) – some 297 million people (99 per cent of the population) have access. However, access rates decrease rapidly in the rest of Africa, where the majority of Africa's population live: 56 per cent and 48 per cent, respectively, in West and Southern Africa; 37 per cent in East Africa; and only 20 per cent in Central Africa (FIGURE 2.1 and FIGURE 2.2). This is the lowest rate of access to electricity globally (International Energy Agency, 2016). Despite positive trends in access to electricity, more people live without electricity today compared with 25 years ago: in 1990, approximately 445 million people in Africa (around 69 per cent of the population) had no access to electricity compared with 583 million people (47 per cent) in 2016. This represents an increase of 138 million people with no access to electricity in a quarter of a century, mainly because electricity generation and distribution efforts often have been outpaced by the region's rapid population growth, estimated at 2.5 per cent annually on average over the past 10 years (World Bank, 2017). In addition, the cost of electricity in Africa is very high, in part due to reliance on thermal generation using heavy fuel oil and diesel fuel (e.g., in Madagascar, BOX 2.2), higher generation and distribution inefficiencies and losses – many countries record losses of over US$0.25 per kWh sold – as well as high connection fees and tariffs (World Bank, 2016).

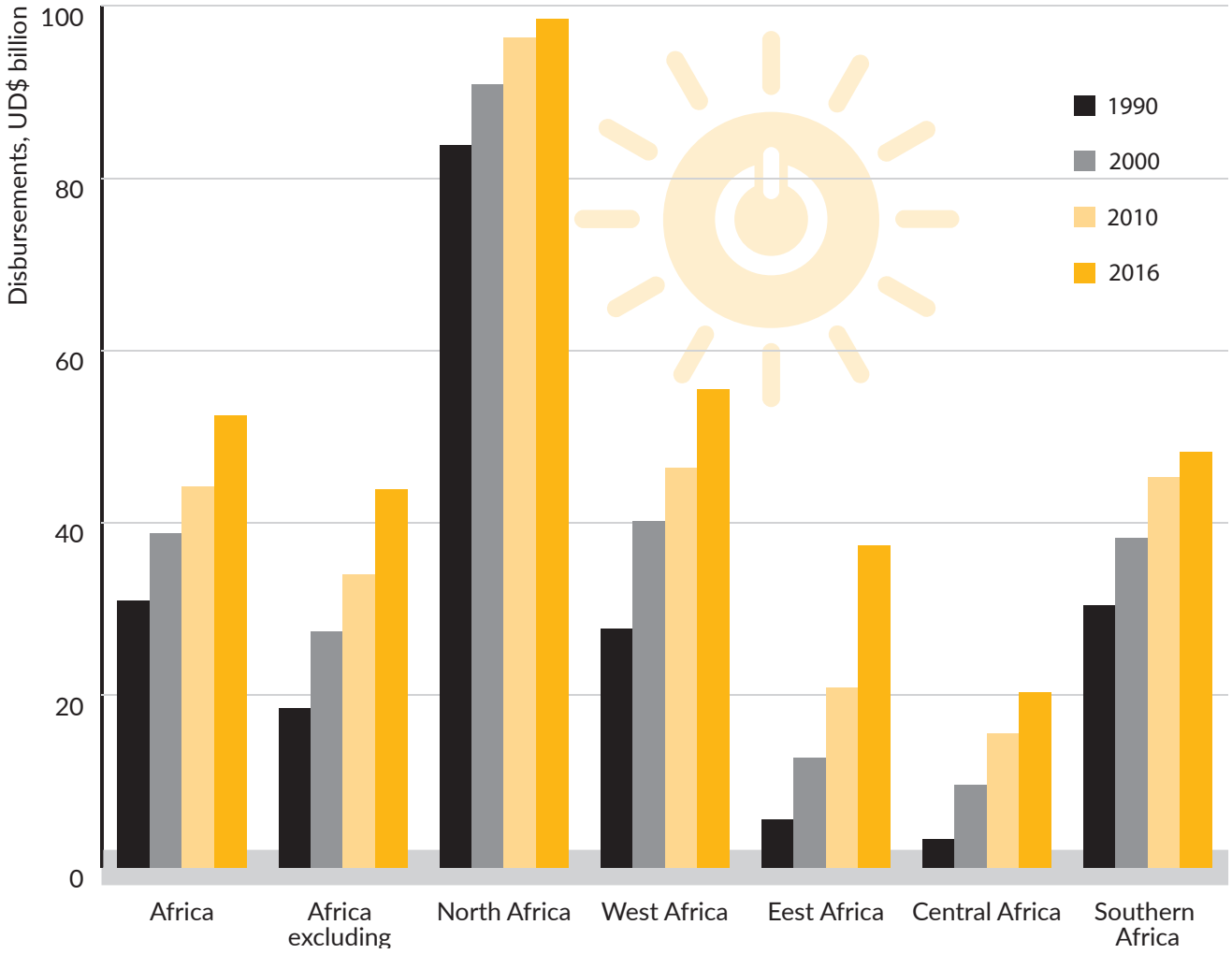
FIGURE 2.1 POPULATION WITH ACCESS TO ELECTRICITY



** Figures for North Africa do not include Sudan. For the AFDB, North African countries include: Morocco, Mauritania, Tunisia, Algeria, Libya and Egypt*

Data source: Sustainable Energy for All - Global Tracking Framework - Progress toward Sustainable Energy for All GTF Global Tracking Framework 2017 and African Development Bank.

FIGURE 2.2 PROPORTION OF POPULATION WITH ACCESS TO ELECTRICITY



** Figures for North Africa do not include Sudan. For the AFDB, North African countries include: Morocco, Mauritania, Tunisia, Algeria, Libya and Egypt*

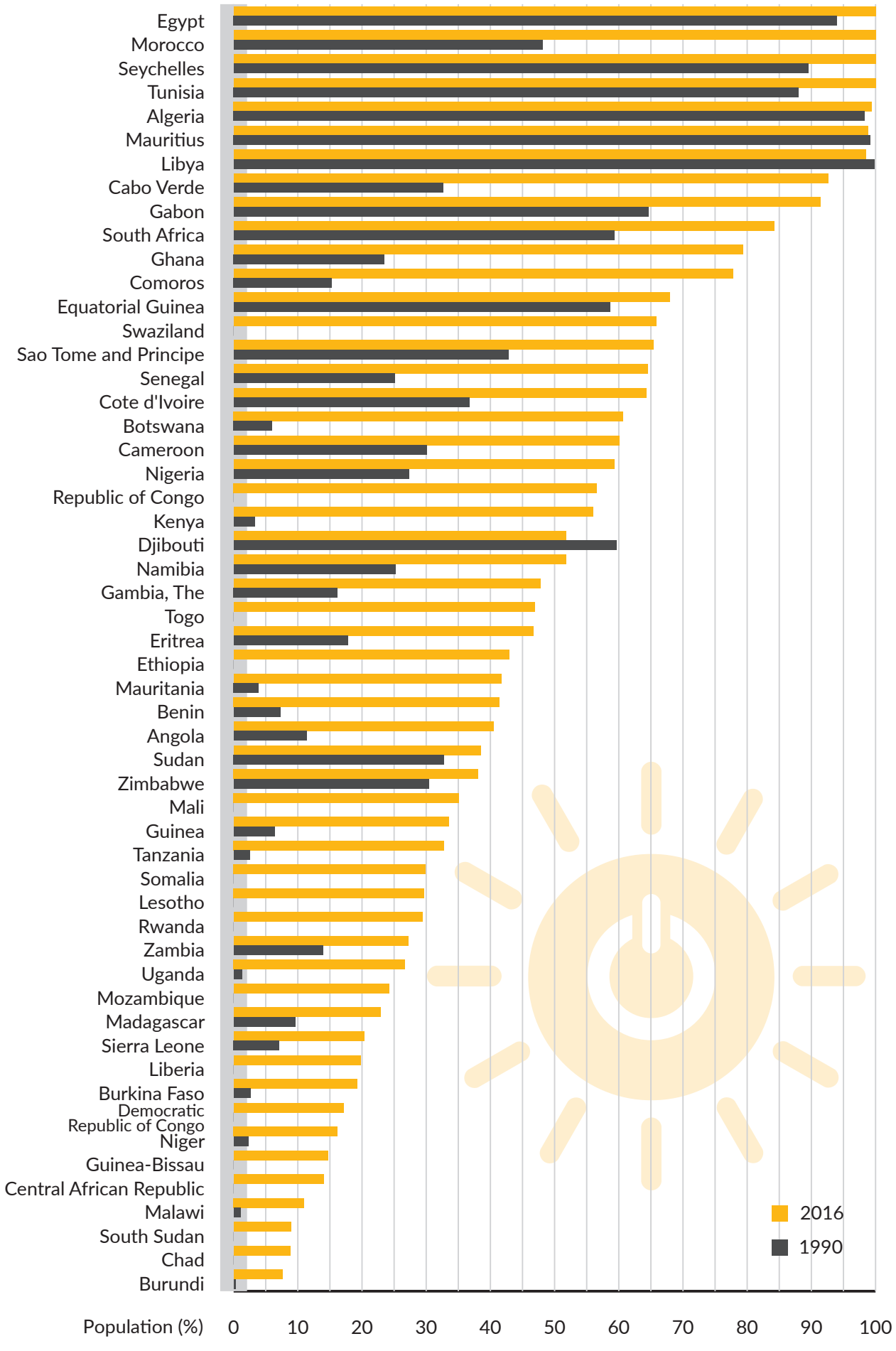
Data source: Sustainable Energy for All - Global Tracking Framework - Progress toward Sustainable Energy for All GTF Global Tracking Framework 2017 and African Development Bank.

FIGURE 2.3 presents a summary of electricity access in Africa in 1990 and 2016 by country. Again, the report notes that countries in North Africa have higher access to electricity, at close to 100 per cent, compared with the rest of Africa. The exception is Seychelles, which has electricity access figures comparable to those of North Africa.

Since 2013, the proportion of people without access to electricity in Africa, excluding North Africa, has been declining, led notably by strong efforts in Nigeria (from 43 per cent access to electricity in 2000 to 58 per cent in 2014); Kenya (from 16 per cent to 36 per cent); Ethiopia (from 13 per cent to 27 per cent); and Tanzania (from 10 per cent to 16 per cent) (World Bank, 2017). East Africa, in particular, has made significant progress, with the percentage of people with access increasing from 13 per cent in 2000 to 37 per cent in 2016 Rural areas, where about 60 per cent of the population live, are still underserved, with an average electrification rate of 17 per cent in 2014, compared with 70 per cent in urban areas.

The absolute number of people without access to clean cooking continues to rise, with around 780 million people cooking with solid biomass. This number has grown by nearly 50 per cent since 2000, as population growth has outpaced the number of people gaining access to clean cooking. Only around 25 per cent of the African population has access to clean cooking solutions (FIGURE 2.4). While 32 per cent of urban dwellers in Africa, excluding North Africa, have access to cleaner fuels for cooking, the use of biomass is deeply rooted in rural areas where around 90 per cent of the population cooks with charcoal.

FIGURE 2.3 ACCESS TO ELECTRICITY BY COUNTRY, PER CENT OF POPULATION



Data source: Sustainable Energy for All - Global Tracking Framework - Progress toward Sustainable Energy for All GTF Global Tracking Framework 2017 and African Development Bank.

Renewable energy, particularly hydro power generation, is the single largest source of electricity in Africa, contributing to slightly more than 60 per cent of the continent's electricity supply. Although not fully exploited, the second major source of renewable energy in Africa is solar power. Solid biomass makes up over half of total primary energy demand, mainly for household cooking. Coal and oil account for broadly equal shares and together meet a third of total primary demand. Coal demand is largely concentrated in South Africa for power generation, while oil demand is more evenly distributed across the region (around two million barrels per day). Modern renewables, including modern use of biomass, contribute to 18 per cent of total primary demand, while natural gas makes up 4 per cent, around two-thirds of which is used in Nigeria.

There are notable ongoing efforts to increase the use of renewable energy sources across the continent (e.g., Malawi is boosting rural electrification with renewable energy solutions). However, more efforts are needed to promote renewable energy. Despite good progress in few selected African countries, such as Morocco, Egypt and South Africa, the share of renewable energy in total energy consumption has been slightly decreasing from 2010 to 2014 – from 63 per cent to 62 per cent. Although this represents an important value, the strong growth in the renewable share of electricity is yet to be matched to the increasing demand in consumer sectors, such as heating and transportation.

Likewise, speeding up electrification of the transport sector – supported by improved urban planning and increased public transportation – as well as integrating grid-edge technologies, will require major technological developments, infrastructure investment and policy support. Addressing this problem starts by identifying renewable energy resources that are available at large scale, but as of 2016, only half of African countries had undertaken national resource assessments for one or more renewable energy sources, according to the International Renewable Energy Agency (IRENA). Solar and wind assessments have been undertaken in at least 21 countries, while biomass assessments have been done in at least 14 countries. Geothermal assessments are on-going in seven countries. The moment for a rapid scale-up of renewable energy in Africa has never been better. Renewable resources are plentiful, demand is growing, technology costs are falling and the political will has never been stronger. One of the biggest challenges will be to increase the share of renewable energy in the industry and transport sectors, which together accounted for 65 per cent of the energy consumption in Africa in 2010 (McKinsey and Company, 2015). Ambitious regional grid-integration projects, such as the East and Southern Africa Clean Energy Corridor, have the potential to significantly transform the African energy landscape for infrastructure, but they must be backed by strong political commitment, sound technical rationale and substantial levels of financing.

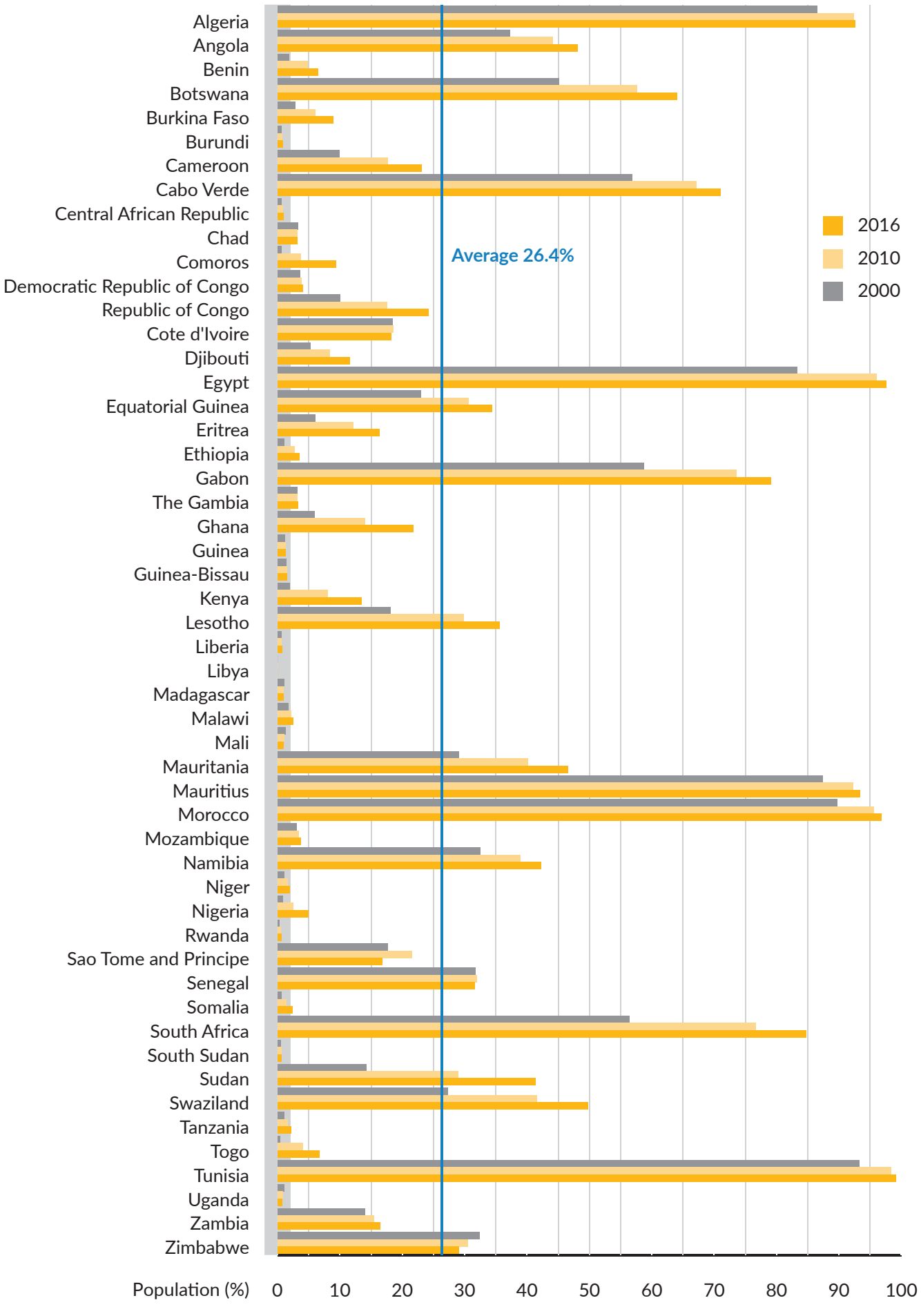
Target 7.3 By 2030, double the global rate of improvement in energy efficiency.

Related Agenda 2063 target 1.1.4.7 Increase the efficiency in energy usage by households by at least 30 per cent.

Energy intensity is a commonly used measure, albeit an imperfect one, of the energy efficiency of a national economy. As measured by the World Bank, which collects country-level statistics on energy intensity as part of its Global Tracking Framework (GTF), energy intensity is the ratio between energy supply in mega-Joules (mJ) per unit of output or GDP measured at purchasing power parity. It aims to measure the amount of energy required to produce one unit of GDP. Low levels of energy intensity are indicative of a lower cost of converting energy into economic output. Higher levels of energy intensity imply that an economy incurs higher costs in converting energy into output, suggesting that the economy is not efficient in the way it uses its energy.

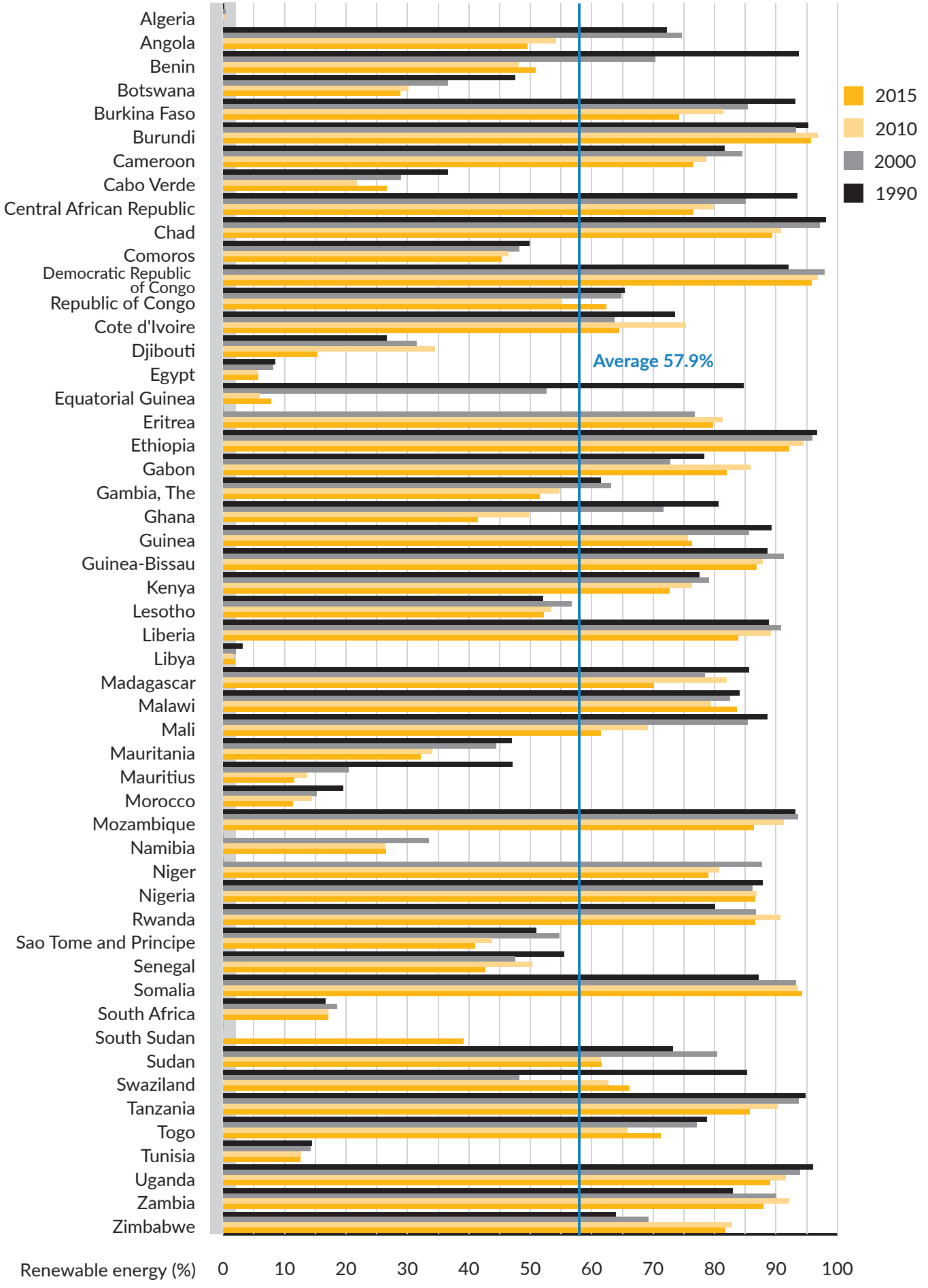
Decreases in energy intensity can signal an improvement in the efficiency of a national economy's consumption of energy. However, an economy's energy intensity can also decrease when the structure of the relevant economy shifts away from energy-intensive industries, such as manufacturing, towards less energy-intensive service industries. Decreasing levels of energy intensity among developed and Organization for Economic Cooperation and Development (OECD) countries are a combination of increasing efficiency in consumption and the gradual shift from manufacturing to service industry-focused economies. Similarly, decreasing levels of energy intensity over the period 2004-2015 (with some exceptions) are indicative of the gradual adoption of more efficient consumption practices and technology, particularly with regard to cooking in African countries, excluding North Africa, and the growth of service sectors generally throughout the continent.

FIGURE 2.4 PROPORTION OF POPULATION RELYING ON CLEAN FUELS AND TECHNOLOGY AS PRIMARY SOURCE



Data source: Sustainable Energy for All - Global Tracking Framework - Progress toward Sustainable Energy for All GTF Global Tracking Framework 2017 and African Development Bank.

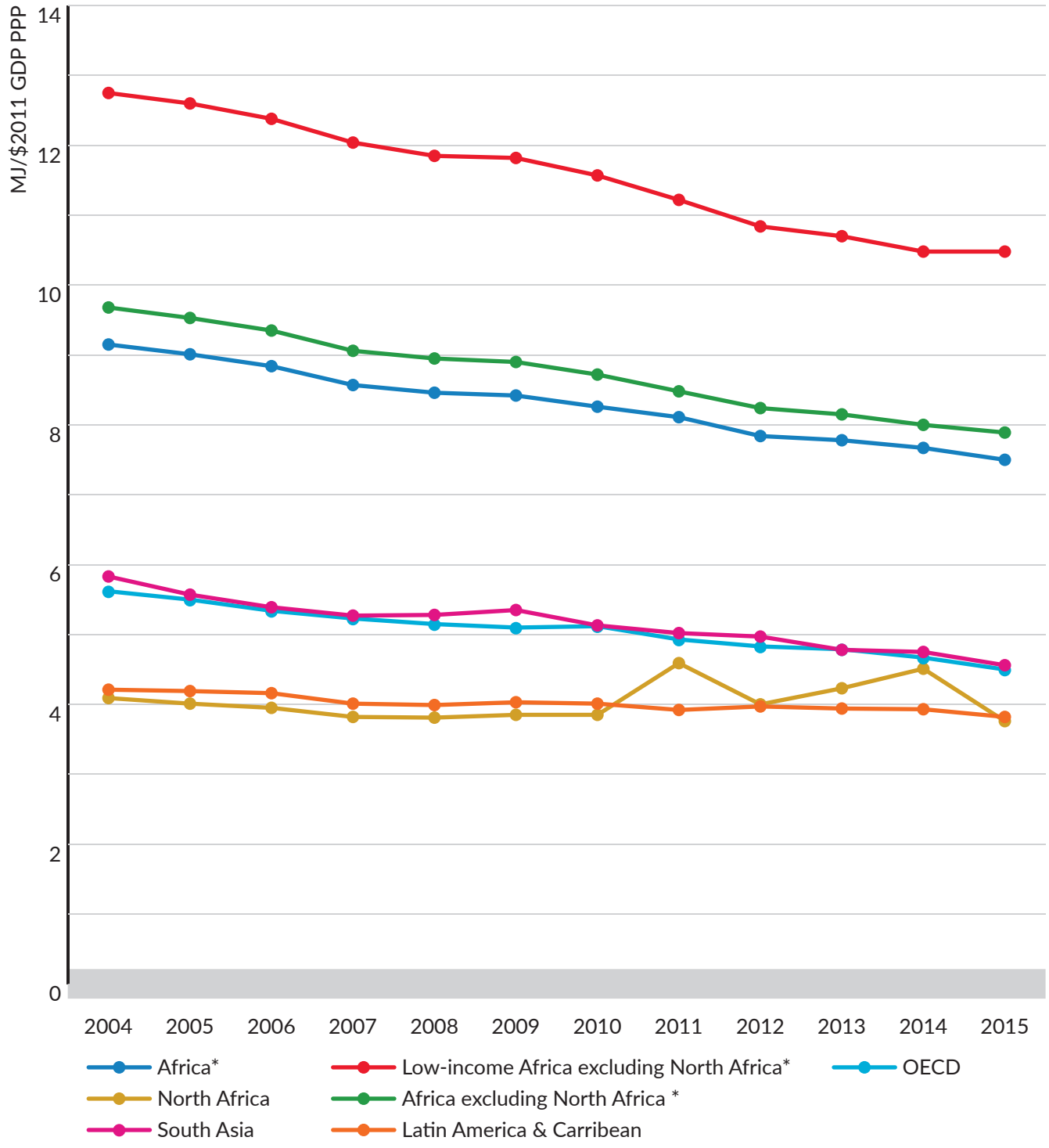
FIGURE 2.5 SHARE OF RENEWABLE ENERGY IN THE TOTAL FINAL ENERGY CONSUMPTION



Data source: Sustainable Energy for All - Global Tracking Framework - Progress toward Sustainable Energy for All GTF Global Tracking Framework 2017 and African Development Bank.

As FIGURE 2.5 demonstrates, while overall energy-intensity levels in Africa have been decreasing during the last decade, they still remain significantly higher than the world average. In particular, energy intensity, registered at 7.9 mJ/US$2011 PPP GDP in 2015, remains exceptionally high in Africa, excluding North Africa. This is about 73 per cent higher than the average level of energy intensity among OECD countries, where the average energy intensity level is approximately 4.5 mJ/US$2011 PPP GDP. Among low-income African countries, an average of 10.5 mJ is required to produce a unit of output – almost 134 per cent higher than the OECD average.

FIGURE 2.6 ENERGY INTENSITY MEASURED IN TERMS OF PRIMARY ENERGY AND GDP, 2004-2015

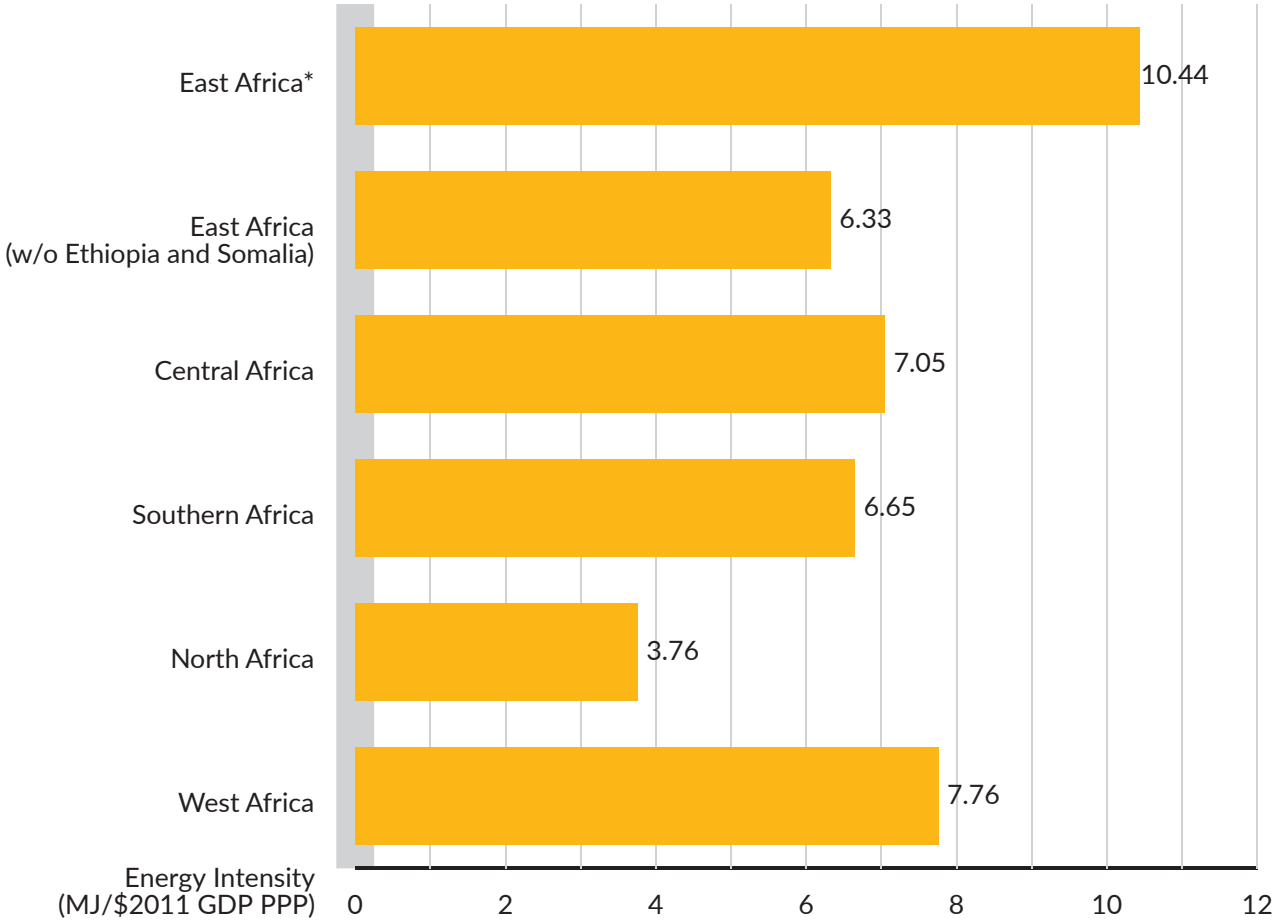


** Figures for North Africa do not include Sudan. For the AFDB, North African countries include: Morocco, Mauritania, Tunisia, Algeria, Libya and Egypt*

Data source: Sustainable Energy for All - Global Tracking Framework - Progress toward Sustainable Energy for All GTF Global Tracking Framework 2017 and African Development Bank.

**Excluding South Sudan.*

FIGURE 2.7 AVERAGE ENERGY INTENSITY IN AFRICA (MJ/$2011 GDP PPP) BY REGION, 2015



** Figures for North Africa do not include Sudan. For the AFDB, North African countries include: Morocco, Mauritania, Tunisia, Algeria, Libya and Egypt*

Data source: Sustainable Energy for All - Global Tracking Framework - Progress toward Sustainable Energy for All GTF Global Tracking Framework 2017 and African Development Bank.

**South Sudan is not factored into the average level of energy intensity for East Africa, because AfDB does not include Sudan as part of North Africa.*

With an average of 3.8 mJ per unit of output in 2015, North Africa, has the lowest energy intensity levels in Africa, and is generally on par with energy-intensity levels in Latin America and the Caribbean (FIGURE 2.7). Compared with Africa, North Africa's lower levels of energy intensity are partially due to increased access in the region to more efficient sources of energy for general consumption, as well as cooking, and to overall higher living standards that are associated with greater access to energy-efficient technologies. East Africa is the most energy-intensive sub-region at 10.4 mJ per unit of output, followed by West Africa (7.8 mJ per unit of output), Central Africa (7.1 mJ per unit of output) and Southern Africa (6.6 mJ per unit of output). The exceptionally high levels of energy intensity in Ethiopia and Somalia skew the East Africa data considerably, as FIGURE 2.6 demonstrates. In 2015, the average level of energy intensity in Ethiopia was 13.7 MJ per unit of output, and in 2014, energy intensity in Somalia registered at 40.1 MJ per unit of output.[2] Both of these countries rely almost entirely on traditional biomass for their energy needs, and have generally inadequate transmission and distribution infrastructures. Electricity losses through transmission and distribution in Ethiopia were estimated at 20 per cent in 2014, which is substantially higher than the international average of 12 per cent to 13 per cent (REEP, 2014). In Somalia, small private firms supply their clients' homes with electricity directly with wires, often at a low voltage and without any transformation (African Development Bank, 2015).

Energy inefficiency in Africa, excluding North Africa, can be attributed mostly to the following: inadequate infrastructure; poorly designed buildings; lack of enforceable policy on energy-efficient appliances and technologies (i.e., persistent use of incandes-

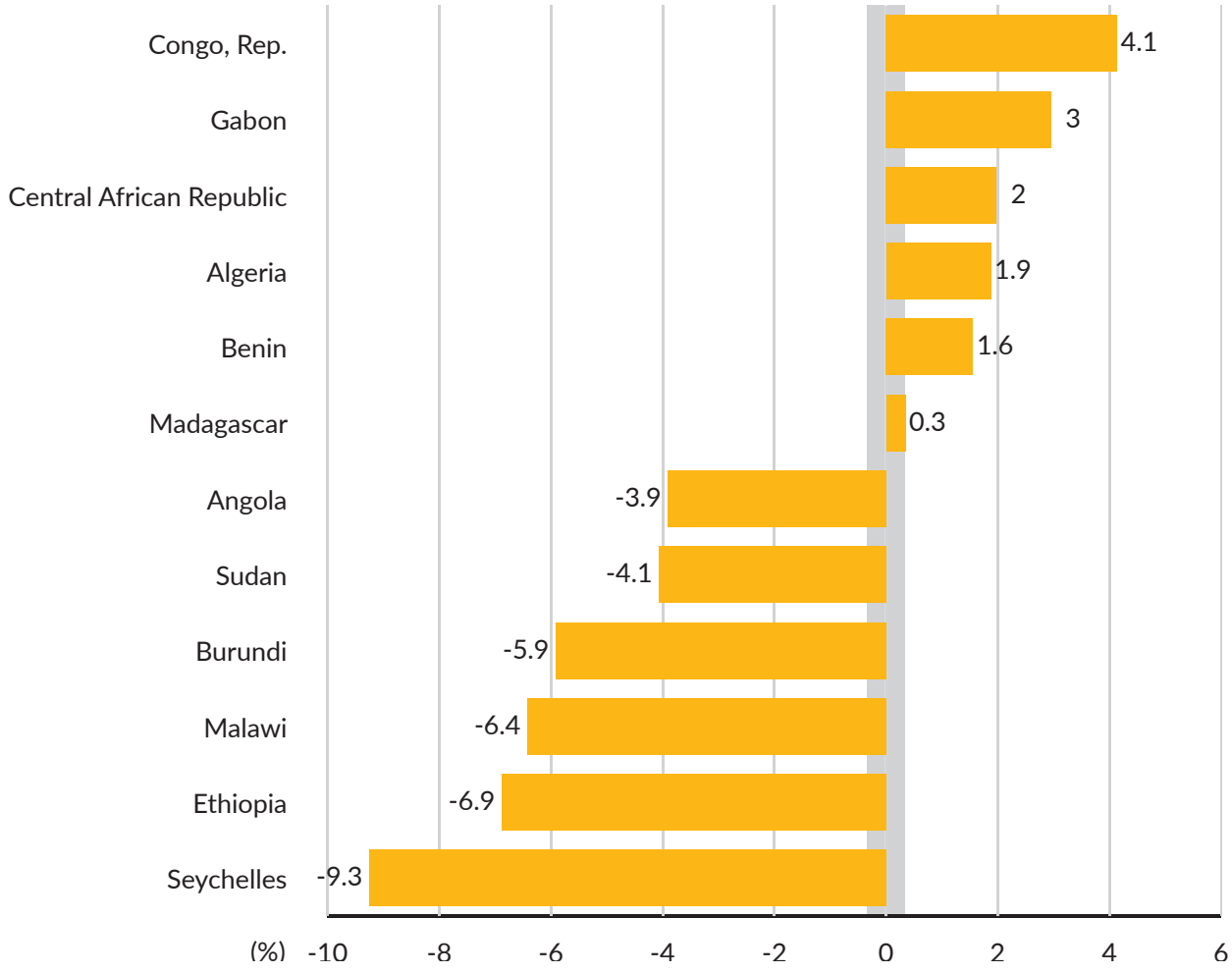
2 Data on energy intensity in Somalia is unavailable for 2015.

cent lightbulbs or inefficient cooking stoves); and inefficient generation and transmission processes. Cooking, in particular, comprises approximately 80 per cent of residential energy in Central, East, and Southern and West Africa, where the vast majority of the population use inefficient cooking stoves that consume twice as much energy as the more efficient charcoal- or wood-based cooking stoves and nearly ten times as much energy as natural gas (McKinsey and Company, 2017). Moreover, the use of basic inefficient cooking technologies has drastic health implications. Nearly 790 million people in Africa, excluding North Africa, cook with inefficient forms of traditional biomass (i.e., traditional wood) on inefficient stoves, causing nearly 600,000 lives lost per year due to exposure to harmful fumes. Apart from health risks, the economic costs of relying on traditional biomass in Africa, excluding North Africa, is substantial – approximately US$36.9 billion per year, or 2.8 per cent of GDP, including US$29.6 billion from productive time lost from inefficient means of gathering fuel and cooking (SEI International, 2015).

Energy-intensity levels in Africa, which have been dropping at an annualized rate of 1.6 per cent between 2004 and 2015, are expected to continue dropping in the long run. The countries making the most progress in reducing their energy-intensity levels are the Seychelles, Ethiopia, Malawi, Burundi, Sudan and Angola (FIGURE 2.8). In contrast, The Republic of Congo, Gabon, Central African Republic, Algeria, Benin and Madagascar recorded increasing energy-intensity levels during this period.

African countries have been increasingly quick to adopt energy efficiency policies and strategies. Ghana, for example, launched a 'rebate and turn in' program in September 2012, with the support of the United Nations Development Program (UNDP) and the Global Environment Facility (GEF). The scheme, which encourages consumers to exchange their old

FIGURE 2.8 AVERAGE ANNUALIZED CHANGE IN ENERGY INTENSITY, 2004-2015 (PER CENT)



Data source: Sustainable Energy for All - Global Tracking Framework - Progress toward Sustainable Energy for All GTF Global Tracking Framework 2017 and African Development Bank.

refrigerators for new and efficient ones at a discount, is expected to free up an estimated 9,000 Mwh (UNDP, 2015). South Africa has published energy efficiency standards for buildings and mandated building codes for new buildings. However, while initiatives and legislation on energy efficiency throughout Africa are promising, capacity for implementation remains generally low, and compliance with energy efficiency standards in most cases remains voluntary. While sustained economic growth should likely lead to the gradual phase-out of more inefficient technologies, as has been the case in other developing regions (most notably South Asia), Africa, excluding North Africa, is still expected to lag behind, without additional private and/or public sector intervention. McKinsey Energy Insights projections estimate that approximately 65 per cent of Africa, excluding North Africa, or more than 1.8 billion people, will remain dependent on inefficient sources of energy, such as wood or charcoal for their cooking by 2050. This will undoubtedly perpetuate high levels of energy intensity in the region.

African countries have been increasingly quick to adopt energy efficiency policies and strategies.

Targets 7.a and 7.b

Target 7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.

Related Agenda 2063 target:

- **i** 1.1.4.7 Increase the efficiency in energy usage by households by at least 30%.
- **ii** 1.1.4.6 Access and use of electricity and internet is increased by at least 50% of 2013 levels.
- **iii** 1.6.1.4 At least 10% of renewable energy sources is from wave energy.
- **iv** 1.7.3.4 Reduce proportion of fossil fuel in total energy production by at least 20%.
- **v** 11.10.1.4 Increase electricity generation and distribution by at least 50% by 2020.

Target 7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least-developed countries, small island developing States and land-locked developing countries, in accordance with their respective programmes of support.

Related Agenda 2063 target:

- **i** 1.1.4.6 Access and use of electricity and internet is increased by at least 50% of 2013 levels.
- **ii** 1.1.4.7 Increase the efficiency in energy usage by households by at least 30%.
- **iii** 1.6.1.4 At least 10% of renewable energy sources is from wave energy.
- **iv** 1.7.3.4 Reduce proportion of fossil fuel in total energy production by at least 20%.
- **v** 2.10.1.4 Increase electricity generation and distribution by at least 50% by 2020.

Foreign direct investment (FDI) into energy and power infrastructure projects is on the rise in Africa. According to the AfDB estimates, approximately US$ 12.2 billion in FDI was invested in African alternative/renewable energy projects in 2015, an 83 per cent rise year-on-year compared with 2014. Investments into alternative/renewable projects comprised 18

per cent of the market share for FDI in 2015, ranking second behind FDI for capital investment in coal, oil and natural gas projects (24 per cent market share, or US$15.7 billion). More generally, capital investment in electricity comprised 23 per cent of all incoming FDI into Africa (US$15 billion), with a 91 per cent year-on-year increase in project numbers (FDI Markets, 2015). Most of this FDI is targeted at South Africa, which has attracted substantial amounts of foreign capital after implementing its Renewable Energy Independent Power Producer Procurement Program in 2011. Between 2011 and 2015, more than 6.3 GW from 102 renewable energy projects were awarded through this program, with wind energy comprising half of total capacity (IRENA). Nevertheless, FDI and local investment for developing the continent's energy and power infrastructure, excluding North Africa, remain insufficient.

While data on investment – foreign and local – in energy efficiency initiatives and projects in Africa are scarce, investment levels in this sector are presumed to be generally low, especially in terms of private financing. This is mostly due to a combination of factors, including:

- Limited awareness and understanding of the benefits of relevant technologies that boost energy efficiency.
- Poor regulatory environments that undermine economic incentives to conserve electricity or use energy-efficient appliances (i.e., tariffs that are not cost-reflective).
- Limited capacity among the local workforce to undertake new energy efficiency projects.
- Lack of affordable, low-cost local commercial financing for energy efficiency projects (USAID).

Because of these factors, investment in energy efficiency projects and initiatives is generally undertaken by national governments, international donors and development finance institutions. South Africa is the continental leader in leveraging public and private investment in energy efficiency, particularly for green building programs. Among other recent developments, South Africa's state-owned Industrial Development Corporation (IDC) plans to inject US$1.2 billion into green industries in the next year. Meanwhile, Agence Française de Développement (AFD) has extended a EUR 120 million line of credit to three South African financial institutions – IDC, Nedbank and Absa Bank – for on-lending to private sector companies engaged in small energy efficiency and renewable energy projects (AFD) (IFC). As underscored in BOX 2.2, smaller countries like Madagascar are also investing heavily in low-cost and improved energy-consuming equipment at household and community levels to promote efficiency.

BOX 2.2 BOOSTING ENERGY EFFICIENCY IN MADAGASCAR

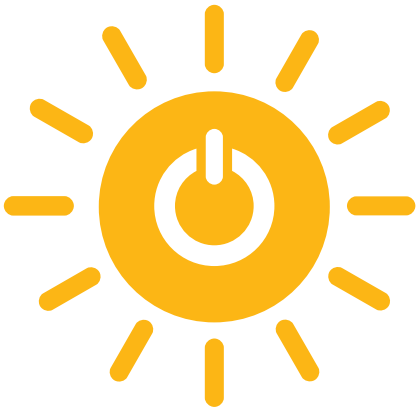
In September 2013, the World Wildlife Fund (WWF), JIRAMA (the national electricity company of Madagascar) and the Telma Foundation signed a Memorandum of Understanding to implement the LUMITSITS initiative, a project to distribute high quality, low-consumption lamps in Madagascar's capital city of Antananarivo. Electricity costs in Madagascar are high, as more than half of the country's electricity supply is based on thermal generation using heavy fuel oil and diesel fuel. This requires substantial imports of requisite fuel every year at very high cost.

In addition, approximately 50 per cent of the total number of incandescent lamps used by households are considered inefficient, as they transform 95 per cent of energy into heat and only 5 per cent into light. With the use of incandescent lamps accounting for 10-20 per cent of the household electricity bill, there was substantial scope for cost-savings by using technology that is more efficient. Through the LUMITSITS initiative, 518,000 high-quality, low-consumption lamps were distributed to 120,000 households in Antananarivo, between September 2013 and December 2014. Use of these lamps over the inefficient incandescent lamps, is estimated to reduce CO_2 emissions by 9,000 tons annually and help lower electricity bills by 18 per cent per household (WWF).

Source: World Wildlife Fund (2018).

2.3.3 Required investments

For Africa to realize the 2030 Agenda and Agenda 2063 goals and targets on electricity access, business as usual is not an option. Based on the **new policies scenario** of the IEA (World Energy Outlook, 2014), the business as usual expansion scenario projects that by 2030, 618 million of people will still have no access to electricity. According to AfDB estimates, the average annual investment required to achieve universal access by 2025, is between US$ 65 billion and US$ 90 billion (Bank Group Strategy for the New Deal on Energy for Africa 2016-2025, African Development Bank, June 2016).



... the average annual investment required to achieve universal access by 2025, is between US$ 65 billion and US$ 90 billion

2.4 Conclusions

Access to electricity, and especially the modern and renewable sources of energy is a fundamental priority to sustainable human development. The services that energy makes possible – heating, lighting, supporting increased productivity and mobility – are key to improving the quality of life of the population. In particular, the use of clean energy for cooking is critical for achieving gender equality and empower women.

While access to electricity is near universal in the developed countries, access in Africa is limited, despite the large potential for increased production. Overall, about half of the people in Africa have access to electricity (the other half, about 580 million Africans, still rely on inefficient and expensive energy sources). However, there are large gaps and inequalities by income groups and geographical location, with more people in urban areas having access compared with those in rural areas. In 2016, the average urban electrification rates in Central, East, Southern and West Africa were about 71 per cent compared with the rural electrification rates of about 22 per cent. Despite widespread progress, the global population living without electricity will become increasingly concentrated in this region (International Energy Agency, 2016). Urgent measures are required to increase production and expand access to electricity across Africa.

ACCESS TO MODERN ENERGY SERVICES IS FUNDAMENTAL TO FULFILLING BASIC SOCIAL NEEDS. The electricity deficit in Africa hampers social and human development. In Africa, excluding North Africa, only 35 per cent (UNICEF, 2015) of schools have access to electricity; this represents 90 million children who attend school without electricity (Practical Action, 2013). African hospitals are unable to utilize life-saving equipment and services, putting lives at risk. High maternal mortality rates are common as a result of poor electrification, especially in rural areas. The use of traditional biomass for cooking, lighting and heating has a very negative influence on the health and quality of life of many Africans. Approximately 600,000 Africans, mostly women and children, die every year from inhalation of toxic fumes due to the use of wood or feedstock (WHO, 2018).

Overall, about half of the people in Africa have access to electricity (the other half, about 580 million Africans, still rely on inefficient and expensive energy sources).

AFRICAN CHILDREN AND WOMEN BEAR THE BRUNT OF THE ENERGY DEFICIT. Women and children make up the majority of those without access. Time lost by women and girls to the stress of poverty, which is compounded by their disproportionate lack of access to affordable and sustainable sources of energy, could be used for more productive pursuits, including education.

ACCESS TO MODERN ENERGY SERVICES AS PREREQUISITE FOR ECONOMIC GROWTH. Limited, unreliable and costly power supply is a major impediment to continued economic progress. The World Bank Enterprise Surveys found that half of all African firms perceive electricity to be a significant constraint; 13 per cent of companies interviewed in Central, East, Southern and West Africa cited the lack of reliable electricity as the biggest obstacle to their business. About 48 per cent of surveyed companies owned a generator to substitute their electricity supply, and 4 per cent of their losses in annual sales were due to electrical outages. Econometric studies have underscored the importance of access to reliable sources of energy to national economies. A recent study commissioned by Steward Redqueen (2016) shows that a 10 per cent increase in generation capacity leads to 0.07 per cent increase in GDP and 0.4 per cent increase in employment. Electrification is also found to be associated with higher household incomes.

ACCESS TO ENERGY SHOULD RELY ON INNOVATIVE SOLUTIONS. Until recently, nearly all of those who had gained access to electricity worldwide did so through new grid connections, and about 70 per cent of those receiving power since 2000 have done so via fossil fuels. Over the past five years, large-scale renewables (mainly hydro and geothermal) have been the source of over one third of new grid connections, while decentralized resources, such as solar home systems and micro-grids, have supplied 6 per cent of new electricity access over that same period. This trend is expected to accelerate, and all stakeholders should support it. Furthermore, technology improvements are creating new opportunities to make significant progress on universal electricity access. The combination of declining costs for solar and decentralized solutions, cheaper and more efficient lighting and appliances, and new business models that make use of digital and mobile-enabled platforms have increased the number of available solutions for those currently without access. Realizing the broader social and economic benefits of electrification will require looking beyond household connections and taking into account electricity for productive uses, such as business, agriculture and industry.

THE ROLE OF REGIONAL INSTITUTIONS IN PROMOTING ACCESS TO ENERGY IN AFRICA. The AfDB is taking the lead in the electrification of the continent by rolling out its New Deal on Energy for Africa, a US$12 billion commitment over the period 2016-2020. This will leverage an additional US$45-50 billion, add 160 GW capacity and connect more than 200 million households to the on-grid and off-grid systems. In 2017, the AfDB channelled US$1.4 billion to Africa and crowded in US$5 billion in external co-financing. All these investments contributed to adding 1.4 GW in new generation capacity exclusively from renewable energy sources, the creation of 7,000 km of transmission and distribution lines and the provision of electricity to an additional 4 million people. Moreover, about 10,000 jobs were created, and three million tons of CO_2 were avoided.

Furthermore, the AfDB hosts the African Hub of the United Nations Secretary-General's Sustainable Energy for All (SE4All) initiative in partnership with the African Union Commission (AUC), the NEPAD Planning and Coordination Agency (NPCA) and the United Nations Development Programme (UNDP). The SE4ALL Africa Hub is dedicated to supporting the continent's progress towards the SE4All initiative's three main objectives by 2030: (i) universal energy access, (ii) improved energy efficiency and an (iii) increased share of renewable energy in the continental energy mix. The SE4All Africa Hub promotes the development of SE4All Action Agendas and Investment Prospectuses. The SE4All Action Agendas are an umbrella energy sector development document that set out the long-term objectives for both electricity and clean cooking and the strategy to achieve them. The AfDB – through the Hub – has been leading the design and roll-out of SE4All Action Agendas and Investment Prospectuses in more than 20 African countries.

CHAPTER 3

Sustainable Cities and Communities

3.1 Introduction

Goal 11 of the 2030 Agenda for Sustainable Development: **Make cities and human settlements inclusive, safe, resilient and sustainable** calls for better planning and investment in cities and informal settlements to improve the quality of lives of people living in urban areas. Africa's urbanization process is a transformative force and a development priority for the region. Africa's speed and scale of urbanization, compared with other world regions, will position the continent as an urban region in less than two decades. Urbanization can be a vehicle to create wealth, generate employment and drive human progress by harnessing agglomeration forces and industrialization for inclusive and sustainable development. Nonetheless, African cities are not coping with adequate planning and managing the rapid urban growth occurring in many countries. Effective implementation strategies and tracking mechanisms are critical for achieving targets that countries have committed to as outlined in: SDG 11; Aspiration 1 and Priority 4, of Agenda 2030, The Africa We Want; and the New Urban Agenda.

Currently, Africa's level of urbanization is estimated at about 43 per cent, with 22 countries (FIGURE 3.1), already in the urban age and with the majority of the continent estimated to become urbanized, i.e., 51.5 per cent by 2030. The equally large rural population requires strengthening of rural-urban linkages. By 2018, Central Africa and North Africa had the highest rates of urbanization at about 60 per cent, followed by West Africa and Southern Africa at 45 per cent and 43 per cent, respectively (FIGURE 3.2).[1] The drivers of Africa's rapid urban growth include high fertility, rural-to-urban migration and urban reclassification of rural settlements (ECA 2017). Most of the urban growth is happening in the medium-sized cities of 300,000 to 500,000 inhabitants (UNDESA, 2018).

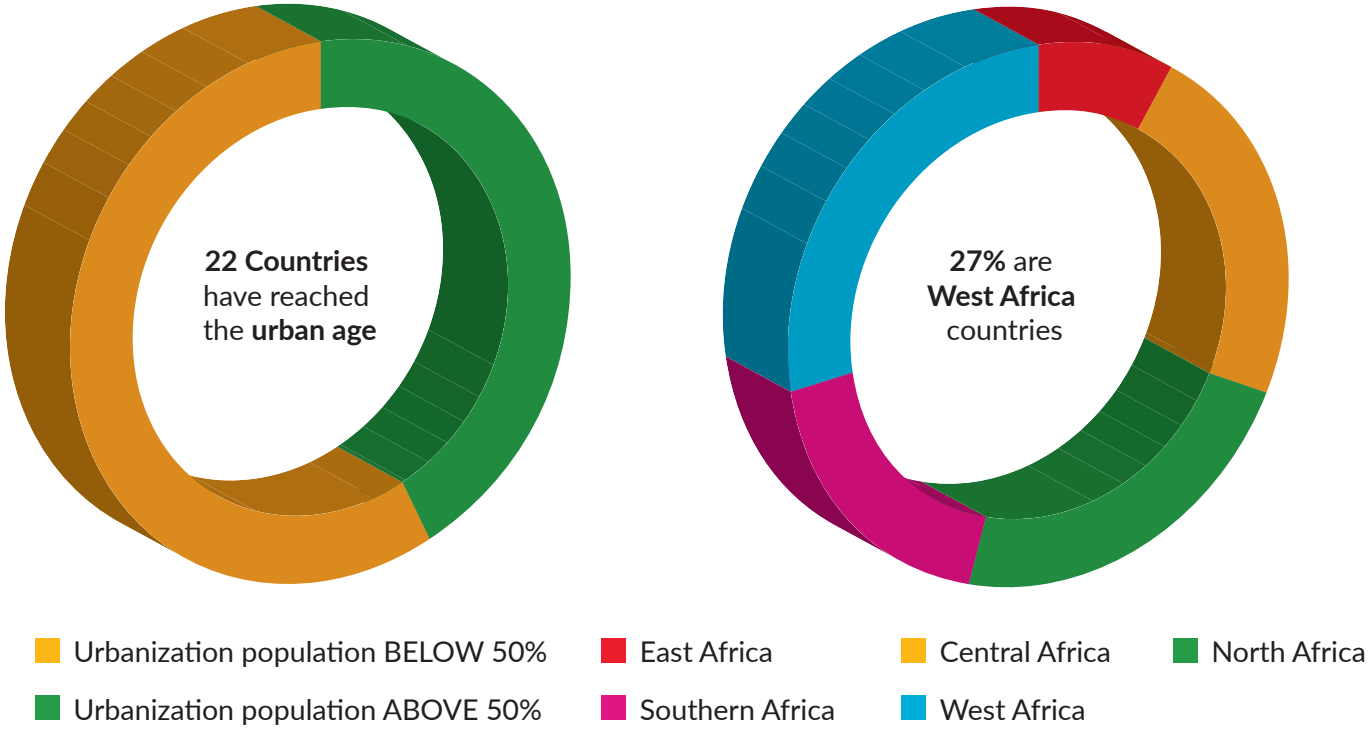
The enormity of Africa's urban population growth is outpacing service delivery in many countries, especially with regard to housing, water and energy supply, sanitation, transport, education, health facilities and food. In addition, other mega trends, such as the demographic transition and climate change, exacerbate the challenges faced by African countries.

The contribution of urbanization to growth cannot be overstressed -- **most countries achieve urbanization rates of 50 per cent before realizing middle-income status (Commission on Growth** and Development, 2009). The expansion of urban populations, new economic activities and changes in consumption patterns have implications for economic and social transformation. Urbanization creates new sources of employment and income, which are followed by increases in demand for existing and new products. Cities and urban centres achieve faster increases in productivity, leading to greater overall growth (Commission on Growth and Development, 2009). The increased demand for food leads to higher prices in the rural areas. On the other hand, the population agglomeration that comes with urban living results in lower unit costs of services, greater access to basic social services (Lall and others, 2017) and expansion of the scope for market-driven business and entrepreneurship (Nalevanko, 2015).

This inherent economic dynamism of cities is demonstrated by the positive correlation between the level of urbanization and income. The urbanization-income correlation has many contributing factors for socio-economic opportunities in cities, stimulating urban population growth and benefits from clustering of populations and economic activities in cities, which bring further socio-economic benefits. FIGURE 3.3 underscores the positive correlation between urban growth and GDP per capita. Countries that highly urbanized, such as Gabon (88.1 per cent urban), Libya (79.3 per cent urban), Equatorial Guinea (70.6 per cent urban), Botswana (67.2 per cent urban), South Africa (64.8 per cent urban) and Seychelles (55.4 per cent urban), have high GDP per capita. However, the positive impact of rapid urbanization and agglomeration on industrialization and economic development

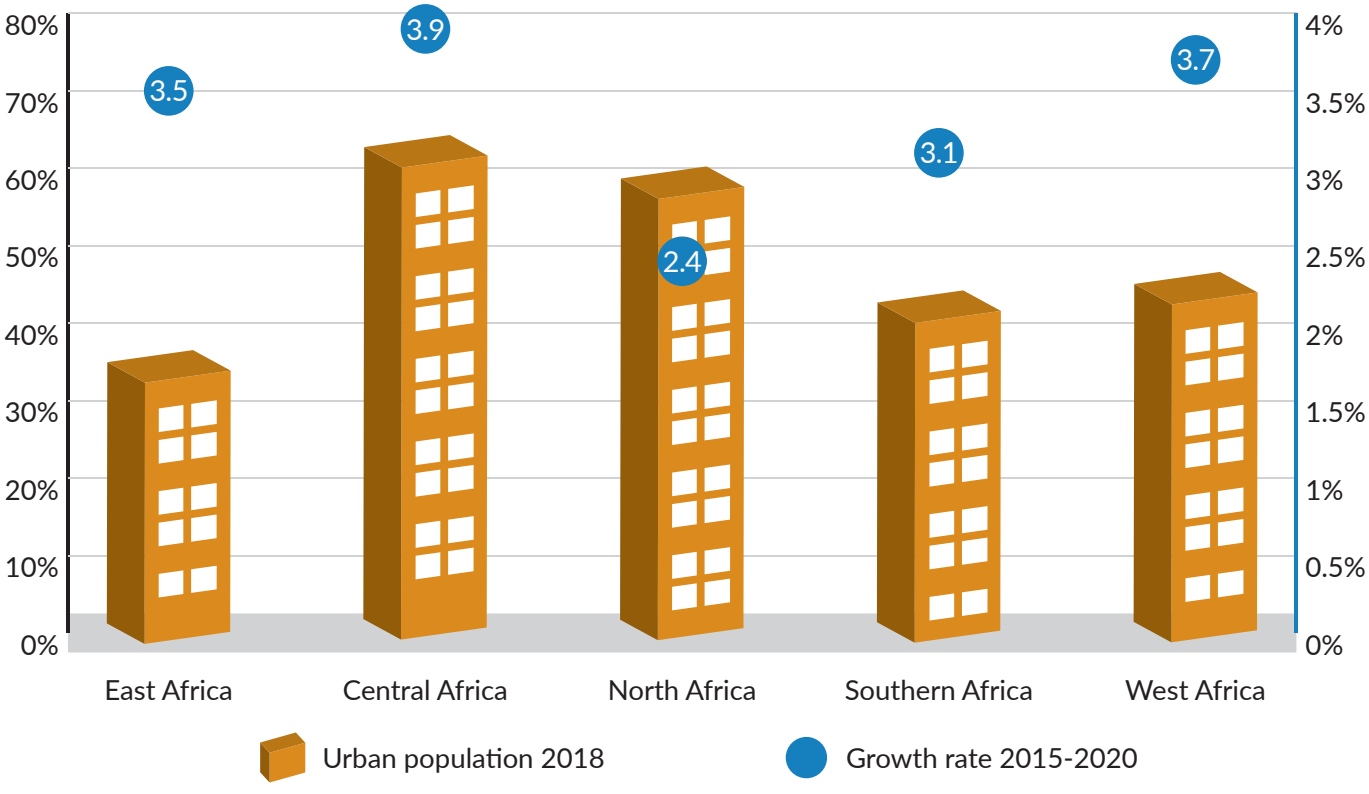
1 The high rate of urbanization in Central Africa is driven by Gabon, Sao Tome and Principe and Equatorial Guinea with rates of 89.4 per cent, 72.8 per cent and 72.1 per cent, respectively.

FIGURE 3.1 AFRICA URBAN POPULATIONS BY SUB-REGIONS, 2018



Many countries are the urban age in Africa.
Data source: United Nations Department of Economic and Social Affairs (2018).

FIGURE 3.2 URBAN POPULATION BY SUB-REGION AND ESTIMATED URBAN POPULATION GROWTH, 2015-2020

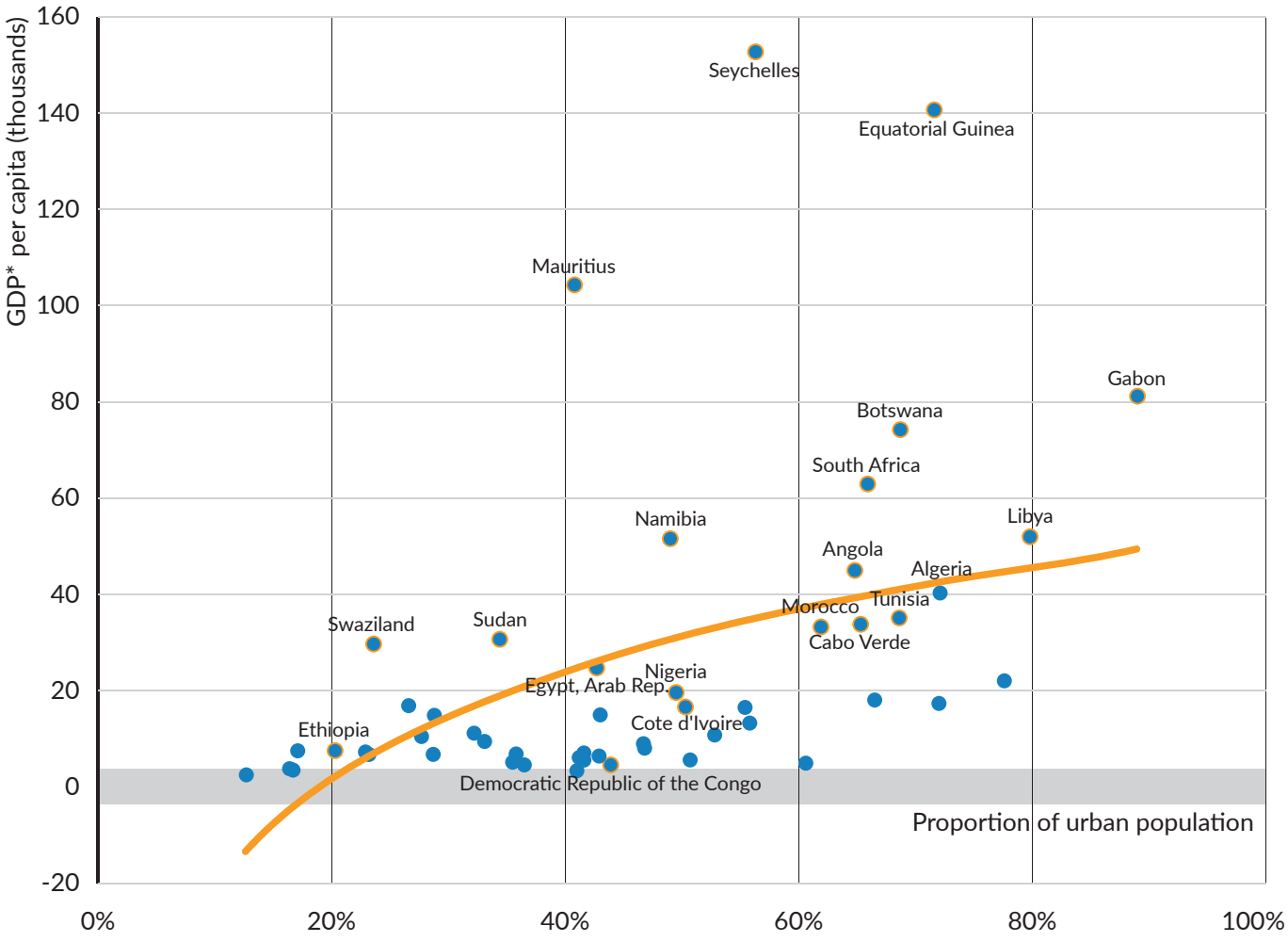


Data source: United Nations Department of Economic and Social Affairs (2018).

recorded in other regions remains elusive in Africa (Lall and others, 2018; ECA, 2017). African countries are beginning to promote cities and urbanization for socio-economic development by prioritizing urban planning and development. This is expected to enhance economic diversification at the local levels, leading to employment and wealth creation, increased opportunities for knowledge and skills transfer and innovation. Effective and accelerated implementation of Goal 11 and its corresponding Agenda 2063 targets will go a long way in leveraging the urban transition to propel economies into middle income status countries (ECA, 2017). Through Agenda 2063, Africa is committed to prioritizing urban housing, water, sanitation, energy, waste and rapid transit systems (AUC 2015) over the next five years, as stipulated in the first Ten-Year Implementation Plan (2014-2023) of Agenda 2063.

FIGURE 3.3 PROPORTION OF URBAN POPULATION BY GDP PER CAPITA, AFRICA 2017

THE NEED TO HARNESS THE ADVANTAGES OF URBANIZATION TO ACHIEVE SUSTAINABLE CITIES



Source: Economic Commission for Africa, 2018; Population figures from United Nations Department of Economic and Social Affairs 2018 Revision; gross domestic product per capita, from National Accounts, derived from the Africa Statistical Yearbook 2017.

**Gross domestic product.*

3.2 Alignment with Agenda 2063

Goal 11 and the New Urban Agenda lay out a global vision for cities and human settlements that enable the achievement of inclusive and sustainable development. The realization of Goal 11, is linked with Goals 1, 4 and 7 (Aspiration 1 - A prosperous Africa based on inclusive growth and sustainable development); Goal 10 (Aspiration 3 - An Africa of good governance, democracy, respect for human rights, justice and the rule of law); Goal 12 (Aspiration 2 - An integrated continent, politically united and based on the ideals of pan Africanism and vision of African renaissance); and Goal 16 (Aspiration 5 - Africa with a strong cultural identity, common heritage, values and ethics) of Agenda 2063 (TABLE 3.1 see page 41).

By expanding modern infrastructure and services, including shelter, water, sanitation, energy, public transport, and information, communication and technology (ICT), African cities are expected to contribute to the continent's transformation agenda (AUC, 2015). This is the basis of the first Aspiration of Agenda 2063 that envisions a prosperous Africa based on inclusive growth and sustainable development, with cities and urban settlements as hubs for cultural and economic activities. As a continent with the fastest rate of urbanization, implementation of Goal 11 and its related Agenda 2063 goals and targets – through effective planning, resource mobilization, monitoring and reporting – is critical to promoting sustainable urban living and sustainable development at all levels; local, national and global.

3.3 Progress tracking

3.3.1 Overview

Data gaps on Goal 11 are particularly large. Out of the 15 indicators, only six (40 per cent) have data and sufficiently-defined methodologies to measure progress (UNDESA, 2018; ECA and others, 2017). This implies that African countries and development partners need to invest more resources in gathering data and refining the methodologies to establish baselines and monitor progress.

3.3.2 Analysis of progress by target

Target 11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.

Indicator 11.1.1 proportion of urban population living in slums, informal settlements or inadequate housing. Data and metadata for this indicator are available, and latest data for the majority of African countries are from 2014.

Corresponding Agenda 2063 target

i 1.1.4.1 Reduce the 2013 national housing deficit by at least 10%.

ii 1.1.4.2 Reduce urban slums by at least 20%.

According to the latest available data, the proportion of the urban population living in slums[2] in the developing regions of Africa, Asia, and Latin America and the Caribbean declined to 29.7 per cent in 2014 – a 2.9 per cent reduction compared with 32.6 per cent in 2010 (TABLE 3.2). For Africa, the proportion of the urban population living in slums declined to about 34 per cent in 2014, from 37.5 per cent in 2010 – a 3.6 per cent. The decline in the proportion of people living in slums can be attributed to the slum redevelopment and affordable housing programmes that several countries in the developing regions, including in Africa, have rolled out in the past years.

2 In its assessment of progress in the living conditions of slum dwellers, the United Nations Human Settlements Programme (undated) defines a slum as an urban household in which the inhabitants suffer one or more of the following deprivations: lack of access to improved water source, lack of access to improved sanitation facilities, lack of sufficient living area, lack of housing durability and lack of security of tenure.

TABLE 3.1 ALIGNMENT BETWEEN GOAL 11 TARGETS AND AGENDA 2063 GOALS AND TARGETS

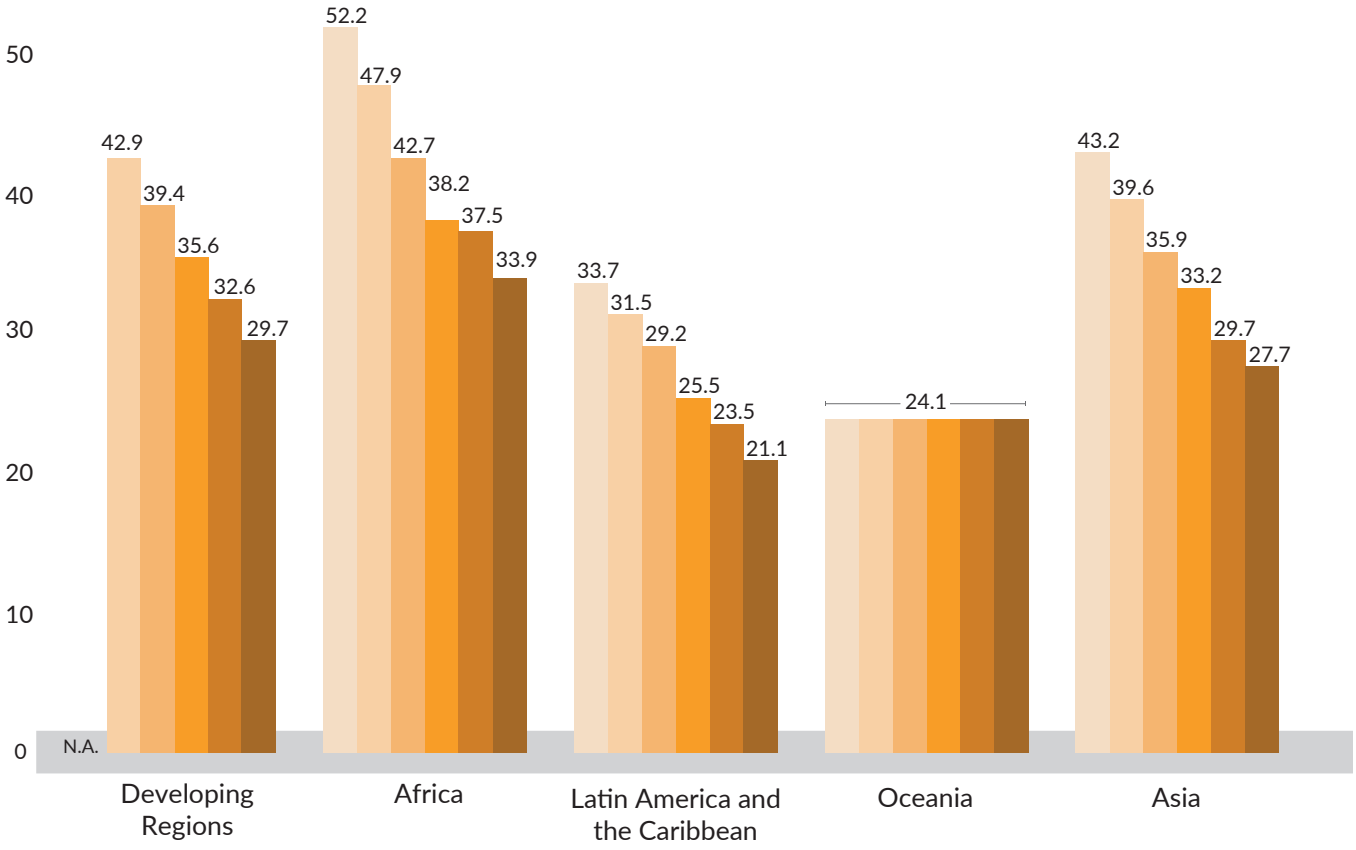
GOAL 11 TARGETS	ALIGNMENT TO AGENDA 2063	
	GOALS	RELATED TARGETS
11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.	**1** A high standard of living, quality of life and well-being for all.	**1.1.4.1** Reduce the 2013 national housing deficit by at least 10%.
		1.1.4.2 Reduce urban slums by at least 20%.
11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.		**1.1.4.8** At least detail technical and financial feasibility report for rapid transit system for all cities above 2 million people is completed.
11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.		
11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage.	**7** Environmentally sustainable climate resilient economies and communities.	**1.7.1.3** All national parks and protected areas are well managed on the basis master and national plans.
	12 Capable institutions and transformed leadership in place at all levels.	**3.12.2.4** Culture, values and norms of local communities are respected and protected
	16 African cultural renaissance is pre-eminent.	**5.16.3.2** National Agency / focal point for the promotion of creative art businesses is in place by 2017.
		5.16.3.3 At least 20% of technical and vocational institutions have programmes on the creation / generation of cultural artifacts, skills development for the generation / preservation of cultural assets and the creation and management of micro-cultural enterprises.
		5.16.3.5 At least 30% of all national cultural treasures that are identified are retrieved, protected, archived and valued.

TABLE 3.1 (CONT)

GOAL 11 TARGETS	ALIGNMENT TO AGENDA 2063	
	GOALS	RELATED TARGETS
11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.	**7** Environmentally sustainable climate resilient economies and communities.	**1.7.3.3** Reduce deaths and property loss from natural and man-made disasters and climate extreme events by at least 30%.
		1.7.3.3 Reduce deaths and property loss from natural and man-made disasters and climate extreme events by at least 30%.
11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	**1** A high standard of living, quality of life and well-being for all.	**1.1.4.9** At least 50% of urban waste is recycled.
	7 Environmentally sustainable climate resilient economies and communities	**1.7.3.5** All Cities meet the World Health Organization's Ambient Air Quality Standards by 2025.
11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.		
11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.		
11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels.	**7** Environmentally sustainable climate resilient economies and communities.	**1.7.3.3** Reduce deaths and property loss from natural and man-made disasters and climate extreme events by at least 30%.
11.c Support least-developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.	**10** World class infrastructure crisscrosses Africa.	**2.10.1.1** At least national readiness for implementation of the trans African Highway Missing link is achieved.

Sources: United Nations Department of Economic and Social Affairs 2018; Economic Commission for Africa and others (2017); Source: African Union (2017) Agenda 2063–Sustainable Development Goals mapping exercise. https://au.int/en/ea/statistics/a2063sdgs.

FIGURE 3.4 PROPORTION OF URBAN POPULATION LIVING IN SLUMS

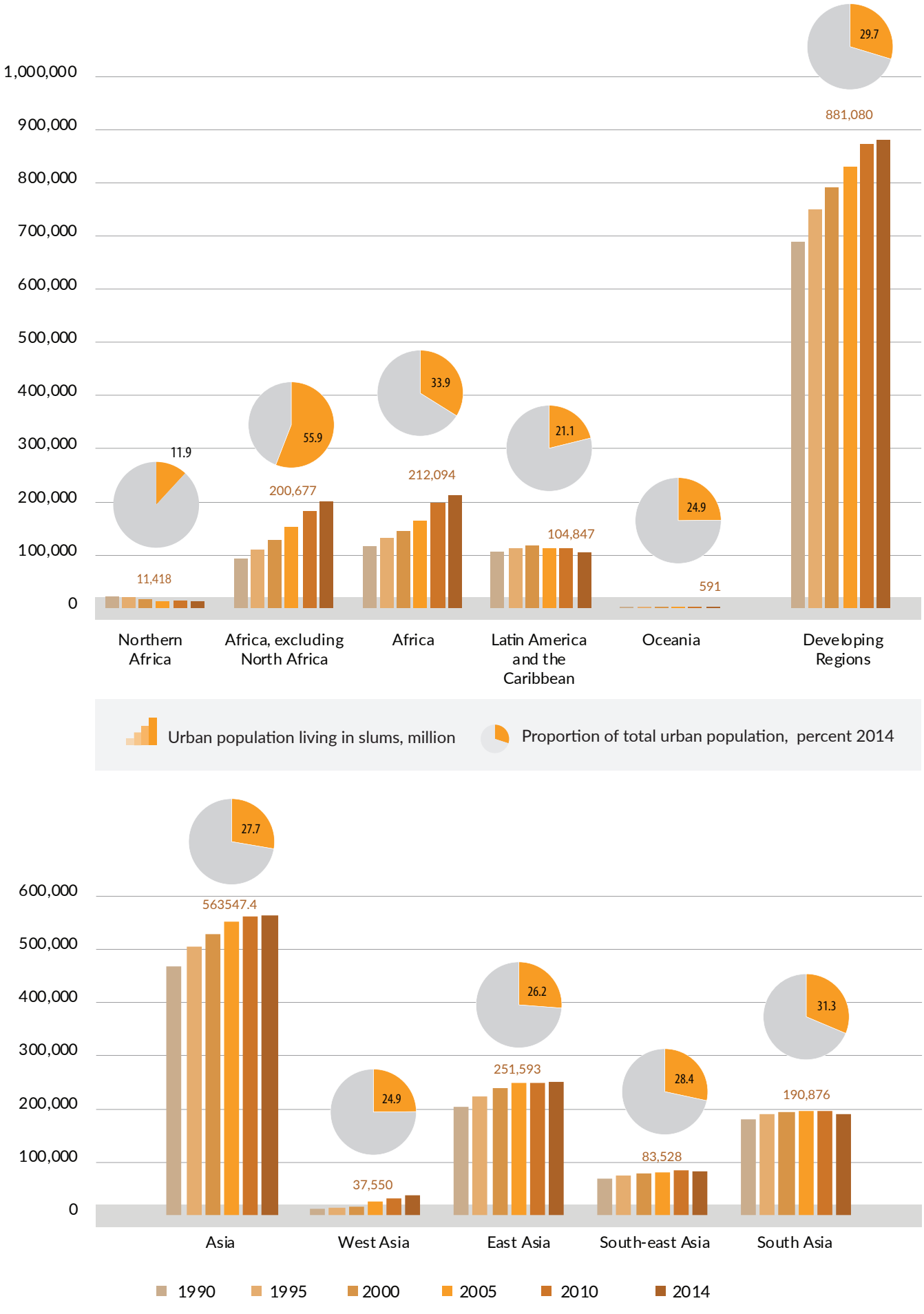


Data sources: United Nations Human Settlements Programme, Global Urban Indicators Database 2015. United Nations Department of Economic and Social Affairs Population Division - World Urbanization Prospects: The 2014 Revision.

However, between 2010 and 2014, the absolute numbers of people living in slums increased by an estimated 9.2 million people globally, due to the higher natural population growth rate in urban slums and continued rural-urban migration. In this period, the absolute number of people living in Africa's slums increased by 14.8 million to about 212 million people (FIGURE 3.5). The commendable housing interventions of reducing slum population and improving living conditions, including bridging the housing gaps still fall short of demand. The proliferation of slums in African cities is the most significant manifestation of rapid and unplanned urbanization outpacing demand for services. Living conditions in the urban slums and informal settlements are particularly dire. The limited access to education, health, water and sanitation result in endemic and high levels of poverty, inequality and deprivation. In most cases, the slum dwellers live on marginal lands and are often exposed to life-threatening conditions United Nations Human Settlements Programme (UN-Habitat, undated). For example, in Kenya, 60 per cent of Nairobi's urban population live in slums that occupy only 6 per cent of the city's land (African Population and Health Research Centre, 2012). FIGURE 3.4 underscores the state of the living conditions in Nairobi's Kibera slum.

The good news is that during 2010-2014, progress in reducing the absolute numbers of people living in slums was registered in at least seven countries,

FIGURE 3.5 SLUM POPULATION IN AFRICA AND OTHER WORLD REGIONS



Source: United Nations Human Settlements Programme, World Cities Report 2016.

BOX 3.1 LIVING CONDITIONS IN KIBERA, NAIROBI – AFRICA'S LARGEST SLUM

Nairobi's urban slum dwellers represent 60 per cent of the city's population, but occupy only 6 per cent of the land. Kibera slum is one of the biggest informal settlements in Africa, with a total population estimated at between 1.2 million to 2 million people. Abject poverty is the norm in Kibera, and people have limited access to basic social services. The land on which Kibera slum stands is owned by the government; 90 per cent of residents are tenants and only 10 per cent of residents are shack owners and many of these people own other shacks that they rent out. The average size of a shack in Kibera is less than 14 sq. metres – almost equivalent to the size of an average twin bedroom. They are built with mud walls and a corrugated tin roof and have a dirt or concrete floor. These shacks house up to eight or more people.

Limited access to basic social services. Only about 20 per cent of Kibera's population has electricity at home. Until recently, the main source of water was the Nairobi dam. The dam water is not clean, leading to high incidences of typhoid and cholera. Currently, there are two main water pipes into Kibera, one from the municipal council and one provided through World Bank funding. Toilet facilities, among the most important needs of the population, are lacking. Estimates show that there are only 1,000 public toilets to serve the entire slum population; one latrine is shared by up to 50 households. The unfortunate concept of 'flying toilets' – in which people defecate in plastic bags and throw the contents in the street or in water streams and open sewer lines, emptying effluent in the alleys – are common. There are no government clinics or hospitals, and major health providers serve as charitable organizations: Amref Health Africa (Amref), Doctors Without Borders/Médecins Sans Frontières (MSF) and faith-based organizations. All residents are encouraged to have a free human immuno-deficiency virus (HIV) test and if positive to take free generic antiretroviral (ARV) medicine.

Employment. Slum life is associated with vulnerability to low-paid and hazardous jobs and poor livelihood options. Kibera's proximity to Nairobi's industrial area helps to ensure that at least 50 per cent of the workforce is employed, mainly in menial and unskilled jobs. However, the other half of the adult population is unemployed.

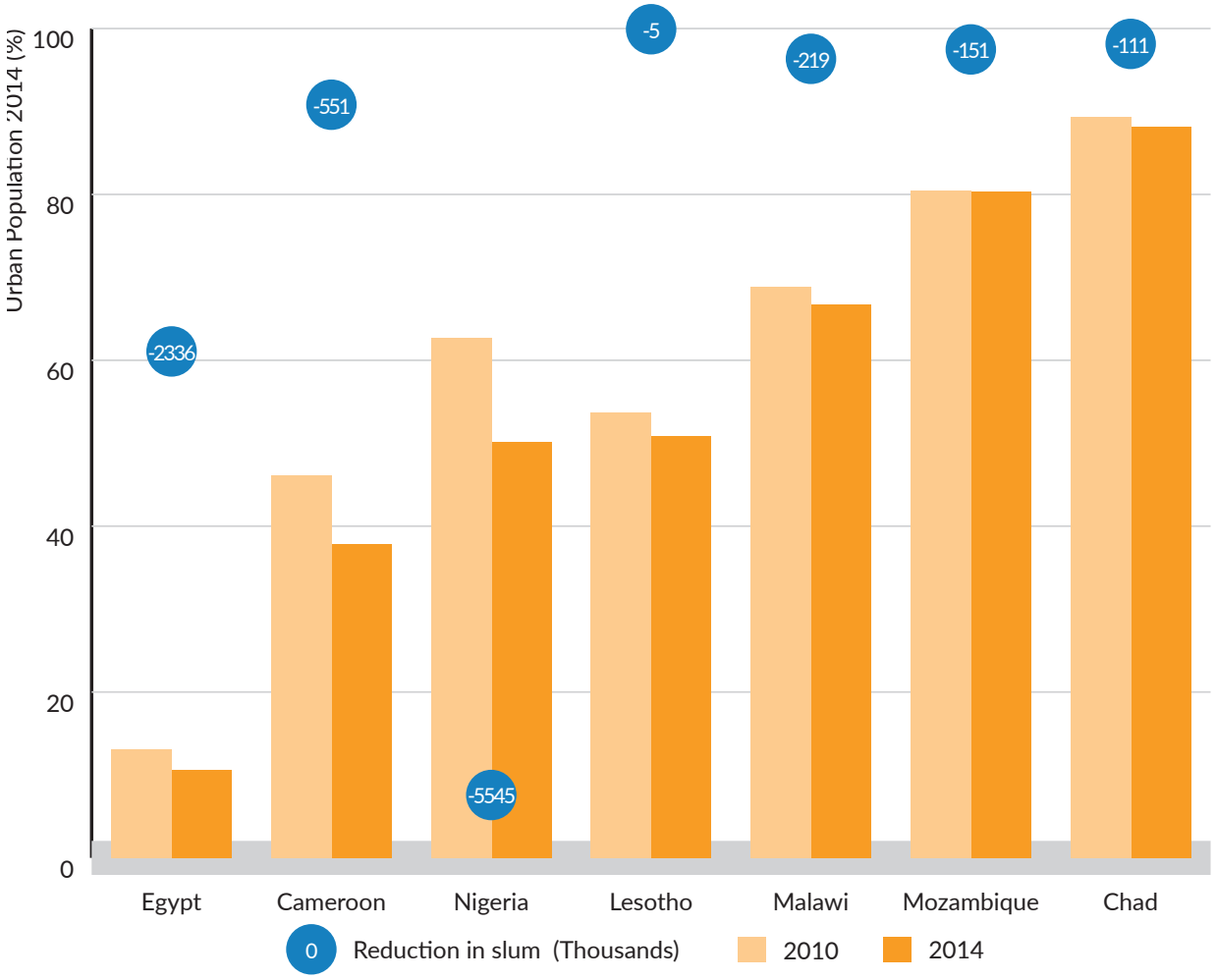
Alcohol and drug abuse are a common practice, especially among the youth. Most young people in Kibera lack sports arenas to engage them, and yet they are out of school and are not working. Changaa, a local potent brew, is the most popular drink because of its low price and strong alcohol content (over 50 per cent). With over a 50 per cent unemployment rate in Kibera, many people start drinking early in the morning leading to problems of violence, crime, rape and more. Taking cheap drugs and glue sniffing are increasing problems. Initially done to alleviate boredom, these behaviours eventually addict users.

Rampant unsafe sex and abortion in Kibera. Many young men and girls start experimenting with sex at a very early age, due in part to poor living conditions, absence of parents, lack of guidance, and high rates of unemployment. Many young people engage in sex while high on alcohol and drugs, thus use of condoms is limited. At any given time, about 50 per cent of 16-25 year-old girls are pregnant. Most of these pregnancies are unwanted, resulting in many abortions. While women in slums are more likely to be married, compared with the rest of Nairobi residents, marital instability and high divorce and separation rates are common.

Ray of hope and yet more to be done. The recent government initiatives led by the National Youth Service programmes to clean up and provide essential social services to residents of Kibera slum and other poor areas are beginning to bear fruit. The youth are helping to build health centres and community toilets and to unclog drainage systems. The initiatives are expanding access to basic social services (e.g., education, health, family planning, housing and water and sanitation), which is critical to improving the living conditions of people in Kibera, other slums in Kenya and in Africa generally. Counselling, skills development and sports facilities could help to keep the people living in slums engaged and productive.

Sources: African Population and Health Research Center (2012); Wanga (2014); Kibera.org.uk (2017); United Nations Human Settlements Programme (undated).

FIGURE 3.6 PROGRESS IN REDUCING SLUMS IN SELECTED AFRICAN COUNTRIES, 2010-2014



Source: UN-Habitat, World Cities Report 2016.

including Cameroon, Chad, Egypt, Lesotho, Malawi, Mozambique and Nigeria (FIGURE 3.6).[3] In Cameroon and Nigeria, the population living in slums declined by at least 2.2 million and 5.5 million, respectively. Efforts to address the deprivation associated with slum settlements included: increasing the supply of affordable housing, improving access to water and sanitation, and enhancing security of tenure and housing. Specific countries demonstrated progress in these areas (BOX 3.2).

Linking housing policies with other sectoral policies will ensure a lasting and sustained response to the housing needs of Africa's urban population and will contribute to job creation, industrialization, private sector development and wealth creation. Such interventions will minimize the large disparities between the up-market suburbs of Africa's cities and urban centres, and the slums and other informal settlements that currently present a stark contradiction of the continent's urbanization process.

3 Calculated from United Nations Human Settlements Programme, Urban Indicators Database. Accessed 2 March 2018.

BOX 3.2 PROGRESS IN ADDRESSING SLUMS AND DEPRIVATION ASSOCIATED WITH HOUSING SETTLEMENTS

Improved access to sanitation: During 2000 to 2015, at least four African countries recorded double-digit improvements in access to sanitation: Angola 48 per cent to 62 per cent, Lesotho 19 per cent to 46 per cent, Mauritania 40 per cent to 63 per cent and the United Republic of Tanzania 12 per cent to 37 per cent (JMP/WHO, 2017).

Security of Tenure: In Rwanda, where 97 per cent of households report having documented rights to land, nearly 77 per cent of women in those households say they held documented rights, either individually or jointly (WDI, 2017).

Housing: In Algeria, Morocco, South Africa and Tunisia, more than 60 per cent of households own their homes (Ncube, Lufumpa and Kayizzi-Mugerwa, 2011). In Botswana, housing finance to cover the low-income earners was initiated both in rural and urban areas. Commercial banks also offer products for housing development. Through the Botswana Building Society (BBS), the government assists citizens qualifying to purchase or develop properties by guaranteeing 25 per cent of each loan secured through the BBS. In addition, the government guarantees 80 per cent of mortgage loans for all public officers, with repayment periods of up to 20 years. In Ethiopia, over 500,000 condominiums for low-income groups have been constructed, creating more than 200,000 jobs, boosting the construction industry, regenerating former inner-city slum areas and promoting home-ownership for low-income households. South Africa has provided more than 3.7 million subsidized housing opportunities for very poor households, and housing for 12.5 million people. In Mauritius, housing development for the economically less- advantaged population groups has increased the proportion of homeowners to 93 per cent in rural areas and 83 per cent in urban regions.

Target 11.2. By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

Indicator 11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities. Data and methodology for this indicator are not available.

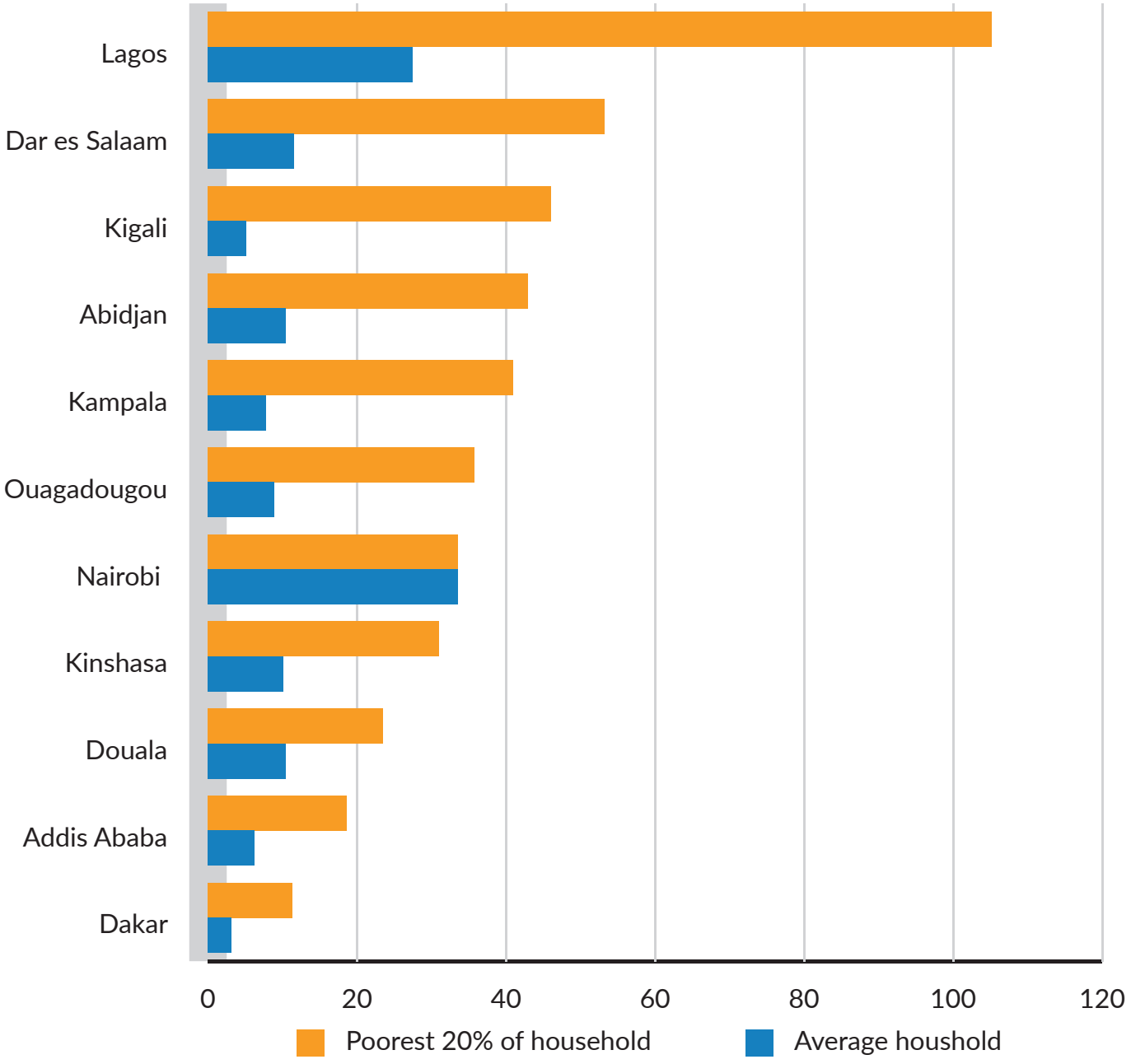
Corresponding Agenda 2063 indicator

i 1.1.4.8 At least detail technical and financial feasibility report for rapid transit system for all cities above two million people is completed.

The ultimate goal of public transportation is to enhance accessibility to goods, services and opportunities for all, making cities more compact and walkable. Well organized public transportation provides numerous benefits to communities and individuals by lowering the unit costs of transport and easing access to different locations. Public transportation also has the potential to increase the individual and community levels of physical activity because of the need to walk at the beginning and end of each trip (Sener and others, 2016). Public transportation helps to reduce congestion and delays, improving air quality and increasing productivity, i.e., less time is wasted in traffic congestion (Litman, 2014; Public Transport Victoria, 2014). Thus, better planning and integration of land-use planning with transportation planning is an important factor for sustainable urbanization. The SDG's imperative to make cities more inclusive implies that cities need to move away from car-based travel to public and active modes of transportation, such as walking and cycling with good inter-modal connectivity.

Despite its demonstrated benefits, however, public transportation has received limited attention and funding in Africa (Sener and others, 2016), making it extremely expensive. Public transportation in most of Africa's major cities is dominated by informal mini-buses and motorbikes, and accounts for relatively large proportions of household budgets, especially among the poorest (Lall and others, 2017). Data on the proportion of the population with access to public transportation in African cities are not easily available. Therefore, household expenditure on transportation is often used as a proxy indicator of accessibility and affordability of it in African cities. A review

FIGURE 3.7 HOUSEHOLD BUDGET NEEDED FOR 60 ONE-WAY TRIPS PER MONTH

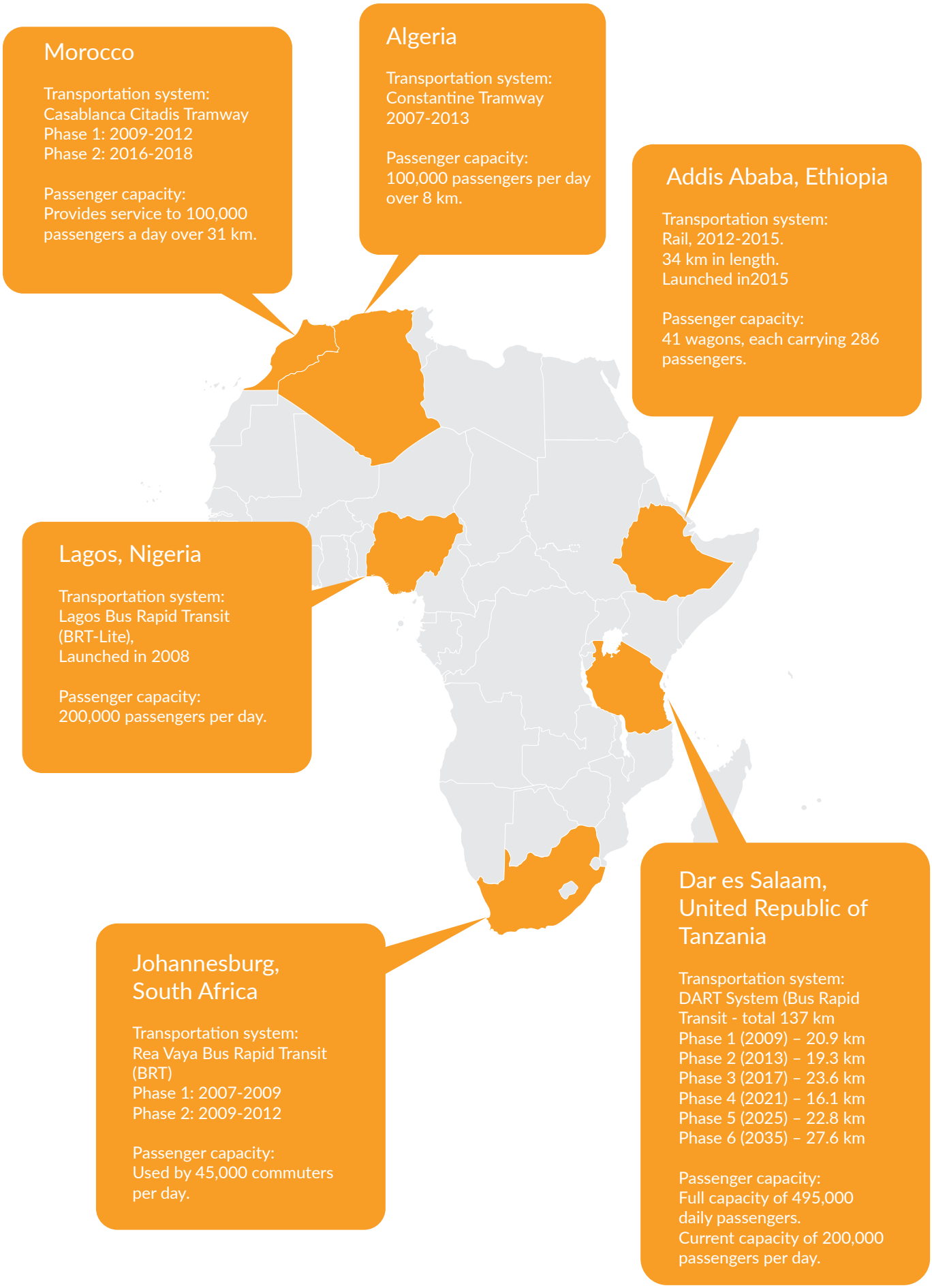


Source: Kumar and Barrett (2008).

of household budgets in African cities established that transportation was a major expense, accounting on average for 8 per cent to 16 per cent of household expenditure (FIGURE 3.7). The poor experience disproportionately higher expenditure on public transportation relative to their incomes in these cities. In Lagos, for example, urban transportation costs exceed the monthly budget of the poorest 20 per cent of households, while in Dar es Salaam the poor spend over half of their household budget on at least 60 one-way trips. In South Africa, the Living Conditions Survey, 2014/5, shows that transportation was the largest expenditure group at 16.3 per cent of total household expenditure. These high-transportation costs are attributed to the expansion of the urban population and informal settlements in the outer fringes of cities, leading to longer commute distances for the poor (World Bank, 2017).

Availability of accessible public transportation constitutes a fundamental element of sustainable cities globally. Interventions to enhance accessibility to public transportation through investments in mass transit systems for efficient services at the required

FIGURE 3.8 MASS TRANSPORTATION SYSTEMS IN SELECTED AFRICAN CITIES



Source: African Economic Outlook, 2016; Africa Development Bank, and World Bank, data, accessed from Global Platform for Sustainable Cities - Integrated Urban Development in Africa, 2018, https://www.thegpsc.org/events/gpsc-african-regional-workshop-integrated-urban-development-africa-challenges-and-lessons.

capacity are ongoing in Addis Ababa (light rail); Lagos and Dar es Saalam (bus rapid transit systems); and Johannesburg and Pretoria (Gautrain) (FIGURE 3.8). In Addis Ababa, the light rail has enhanced mobility at lower costs (Two Ethiopian Birr, less than 10 US cents for a trip of up to eight stations). Lagos's rapid transit systems has a capacity of 200,000 passengers per day and, at full capacity, the Dar es Salaam rapid transit system, which is expected to be completed in 2035, will carry close to 500,000 passengers per day. Similarly, investments in urban trams in each of Algeria and Morocco are providing transportation to over 100.000 passengers per day. Feasibility studies for mass rapid transit have been conducted for Nairobi, Kampala and Dakar to pave the way for financing. In Kenya, six bus rapid transit corridors have been mapped out in Nairobi to reduce traffic congestion, travel time and cost. The corridors are expected to hold up to 950 high-capacity buses and reduce travel time and cost by up to 70 per cent (The East Africa, 2018).

Target 11.3. By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

Indicator 11.3.1 Ratio of land consumption rate to population growth rate.

As a measure of land-use efficiency, this indicator informs and enables decision-makers to track and manage urban growth at multiple scales and enhances their ability to promote land-use efficiency.[4] The horizontal expansion of cities or 'sprawl' in developing countries is a challenge to basic access to services (UN-Habitat, 2016). Less compact cities have negative effects on development, since sprawl tends to reduce land-use efficiency – economically (e.g., proximity of factors of production); environmentally (e.g., lower per capita rates of resource use and GHG emissions); and socially (e.g., avoidance of settlement on vulnerable land and promotion of reduced travel times/distances) (UN-Habitat, 2016; ECA 2017). On the other hand, compact urban design generates numerous advantages arising from higher density. With rapid urban growth amid limited capacities for planning and management, sprawling is a key constraint for many African cities.

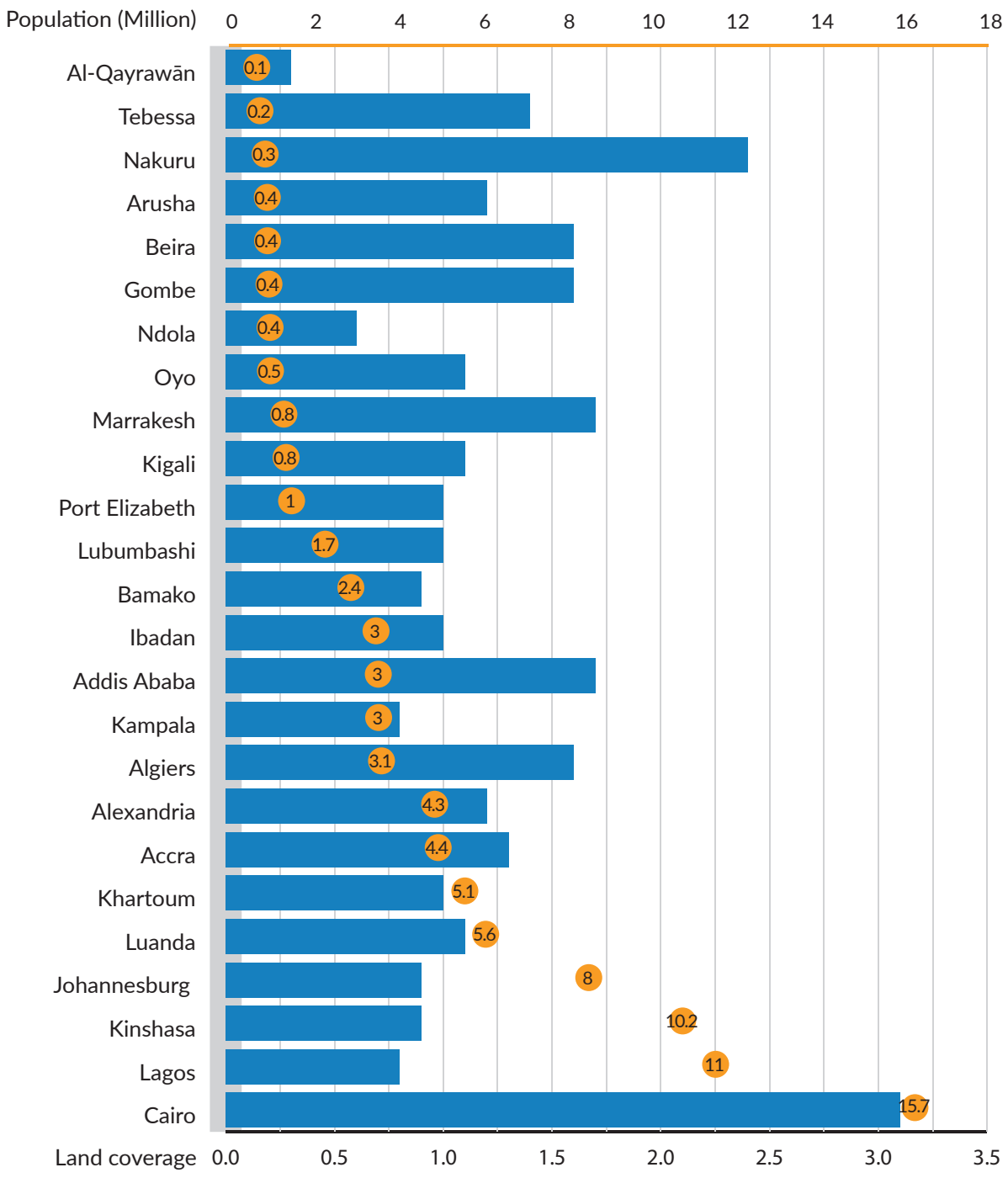
A sample of 25 African cities shows that the majority have grown faster than their urban population, except for two small cities – Al-Qayrawān, Tunisia and Ndola, Zambia – with low land-consumption rates compared with their population growth rates, i.e., 0.3 and 0.6 respectively (FIGURE 3.9). Five cities – Kampala, Bamako, Johannesburg, Kinshasa and Lagos – are at the brink of consuming land at a pace faster than their population growth, with a land-consumption rate measuring between 0.8 and 0.9 times their population growth rate. Kigali and Luanda have a land- consumption rate equal to that of their population growth.

Indicator 11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically.

This indicator measures the progress and willingness of elected officials, urban managers and planners to integrate resident and civil society participation in urban planning and management at various levels. A people-centred approach is key in guiding urban development processes for local ownership and implementation of community projects at citywide or local levels. It forms the understanding of interlinkages and nature of problems and potential solutions facing different urban settings. Public participation means broader consensus building, which greatly enhances political interaction between citizens and government – it enhances the legitimacy of the planning process and the plan itself. Evidence shows that efforts to involve citizens in decision making in Africa have been limited, as participation often takes the form of consultation, which may or may not result in influence (UN-Habitat 2009). However, data limitations have constrained the assessment of progress with this indicator in recent years.

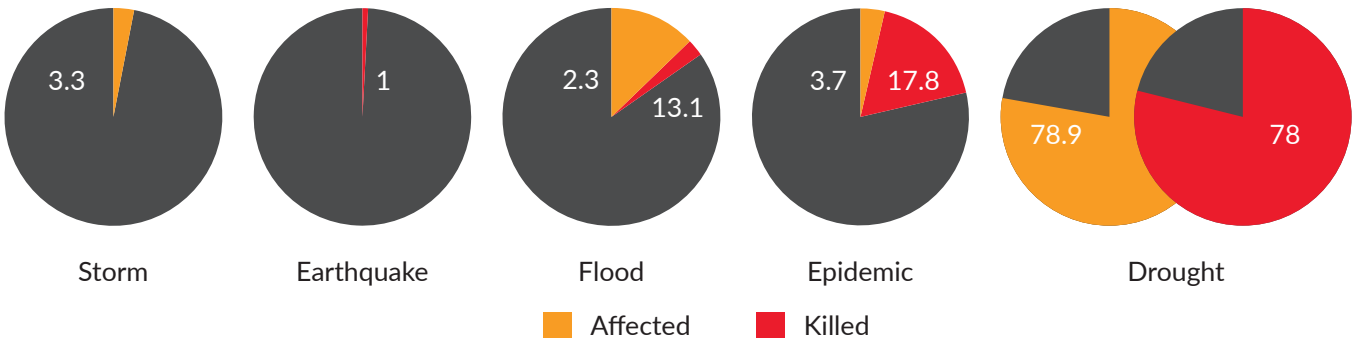
4 Source: http://indicators.report/indicators/i-68/.

FIGURE 3.9 RATIO OF LAND CONSUMPTION TO POPULATION RATE



Source: United Nations Human Settlements Programme Database. Accessed 14 March 2018.

FIGURE 3.10 PER CENT OF PEOPLE KILLED AND AFFECTED BY DISASTER TYPE



Source: United Nations Office for Disaster Risk Reduction (2018).

Target 11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage.

Indicator 11.4.1 Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/ municipal), type of expenditure (operating expenditure/ investment) and type of private funding (donations in kind, private non-profit sector and sponsorship).

Corresponding Agenda 2063 target

i 1.7.1.3 All national parks and protected areas are well managed on the basis of master and national plans.

ii 3.12.2.4 Culture, values and norms of local communities are respected and protected.

The preservation of cultural and natural heritage is an important factor in sustainable urbanization, as cities are home to a considerable wealth of cultural heritage, requiring specific attention and investments for preservation. Aspiration 5 of Agenda 2063 clearly recognizes that Africa's rich cultural heritage can be harnessed for inclusive growth and transformation. In addition, the role of cultural and natural heritage in the socio-economic sustainability of cities is strongly emphasized in the New Urban Agenda. The contribution of culture to sustainable development, i.e., socio-economic and environment, needs to be adequately captured. Efforts to collect this data at a city level are underway in countries to ensure its availability in the coming monitoring rounds for this goal.

Target 11.5 By 2030, significantly reduce the number of deaths and the number of people affected, and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations. This target has two indicators, data and methodology, both of which are available.

Indicator 11.5.1 Number of deaths, missing persons and directly-affected persons attributed to disasters per 100,000 population.

Corresponding Agenda 2063 target

i 1.7.3.3 Reduce deaths and property loss from natural and man-made disasters and climate extreme events by at least 30 per cent.

ii 1.7.3.3 Reduce deaths and property loss from natural and man-made disasters and climate extreme events by at least 30 per cent.

The gaps in urban planning and management, as well as infrastructure deficits, make many African cities more susceptible to loss and damage from natural disasters (UNISDR 2015). Weak land-use planning, informal settlements often located on high-risk areas and limited disaster response capacities in African cities exacerbate disaster vulnerability. In 2016, the share of people killed by natural disasters (earthquakes and floods) in Africa was 3.3 per cent (FIGURE 3.10), with floods being the number one cause of disaster deaths in all African sub-regions (CRED 2016). Hydrological disaster deaths accounted for 89 per cent of all deaths in 2016 (1,285 people) (CRED 2016). Of the share of population affected by natural disasters, Lesotho (44.4 per cent); Malawi (37.1 per cent); Swaziland (36.6 per cent); Somalia (32.8 per cent); and South Sudan (29.6 per cent) top the list. Africa's cities are also at risk of flooding. Forecasts for 2050 predict extreme events (floods and droughts) and 20-50 cm sea level rise, particularly in West Africa (Accra, Ghana; Benin; Togo; Abidjan; Cote d'Ivoire; and the Niger delta). Given the growing concentration of Africa's population in cities amid significant infrastructure and planning deficits, vulnerability will continue to increase in hazard-prone countries. This further underscores the need for effective land-use planning and infrastructure to strengthen resilience, while enhancing disaster response capabilities.

Indicator 11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services attributed to disasters.[5]

The concentration of wealth and assets in cities makes them susceptible to significant economic losses from disasters. The impact of economic losses in terms of GDP in African countries has been significant. Based on the 2016 data, Africa experienced economic losses, averaging 3.9 per cent of GDP due to disasters. With the exception of Seychelles, all African countries experienced economic losses (FIGURE 3.II). Ten countries[6] suffered losses greater than 5 per cent of GDP.

In 2016, the direct economic loss in relation to the proportion of national GDP was highest in United Republic of Tanzania (0.97 per cent), Ethiopia (0.65 per cent) and Namibia (0.29 per cent) (CRED, 2016). The cost of floods in Mozambique (2000) was an estimated $550 million, lowering the country's GDP by 1.5 per cent (World Bank, 2005). Overall, small cities face disproportionately higher risks, as the same size disaster can cause greater damage to a small city than to a large one. Small cities also are limited in terms of financial capacity (UN-Habitat, 2007). Africa's mega cities contribute large proportions to national GDP, hence their vulnerability to natural disasters can lead to significant socio-economic losses, reversing sustainable development gains.

Target 11.6. By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

Indicator 11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated by cities.

Corresponding Agenda 2063 targets

i 1.1.4.9 At least 50 per cent of urban waste is recycled.

ii 1.7.3.5 All Cities meet the World Health Organization's (WHO) Ambient Air Quality Standards (AAQS) by 2025.

The safe removal and management of solid waste is an indicator of well-managed urban environmental services. The pressures associated with a growing urban population leads to an increasing amount of solid waste generated in cities. However, solid waste collection and management data are not currently available for African cities in a comparable manner. Some available data for Benin, Egypt, Kenya and Senegal show that the level of solid waste collection is differentiated across countries and within cities, with informal settlements being serviced less. Benin and Kenya registered up to 30 per cent less solid waste collection in informal settlements than other settlements. In Egypt and Senegal where at least 86 per cent of solid waste is collected on a regular basis, the non-slum areas have higher collection rates of 90 per cent in Egypt and 95 per cent in Senegal.

Similarly, data on recycled urban waste needs to be collected, as it is not readily available, especially since African countries committed to recycle at least 50 per cent of urban waste in over the next five years. In enforcing climate change mitigation and adaptation strategies, the European Union's recent ban on plastics is likely to exert pressure on Africa to intensify recycling efforts and use of bio-degradable materials. Two excellent signs that African countries are taking on the challenge of waste management in urban areas include; Rwanda's banned on the use of polyethylene bags in Africa and Ethiopia's recently-built Waste to Energy Plant at Reppie, the largest plant in Africa, which recycles 1,400 tons of waste to generate 30 per cent of energy consumed by households. The collection of solid waste in many African countries is largely performed by private services. In Bamako, Mali, for example, more than 120 microenterprises collect some 300,000 tons annually. In Lusaka, Zambia, 30 per cent of the municipal waste is collected by informal service providers (UN-Habitat, 2010).

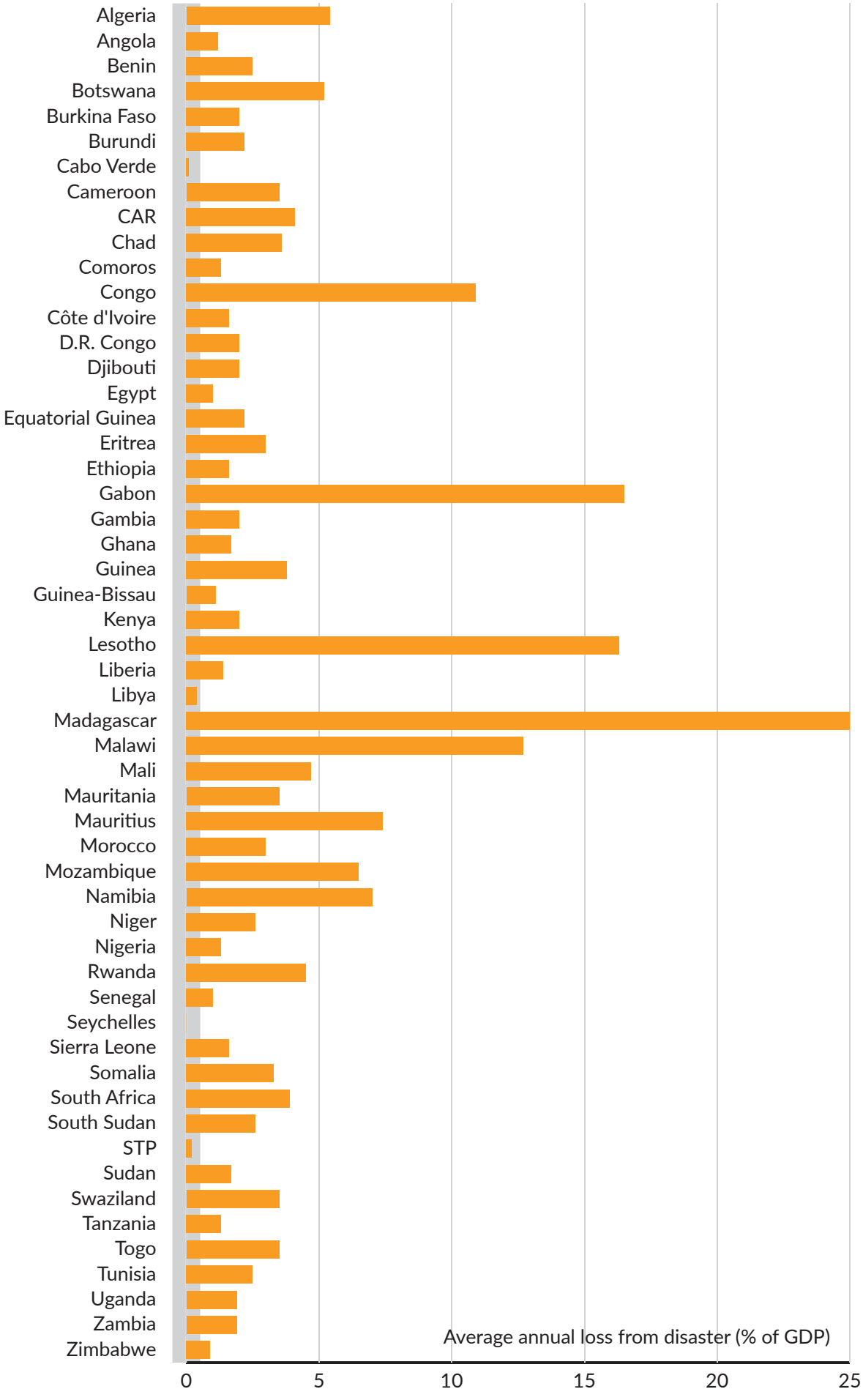
Indicator 11.6.2 Annual mean levels of fine particulate matter (e.g., PM2.5 and PM10) in cities (population weighted).

Africa's rapid urban growth is accompanied by rising demand for energy and waste management services, with adverse implications for the environmental sustainability. Based on a sample of 40 cities covered over a six-year period, 2008-2015, the WHO illustrates the constraints faced by African cities regarding air quality. Of the 52 African countries with data for 2012, it is noted that only Liberia meets the target of PM2.5, which is 10µg/m^3 or below; and

5 Data comparability is difficult because national disaster loss databases are not consistent. All countries are expected to build or adjust their national disaster loss databases to meet the international guidelines by 2020.

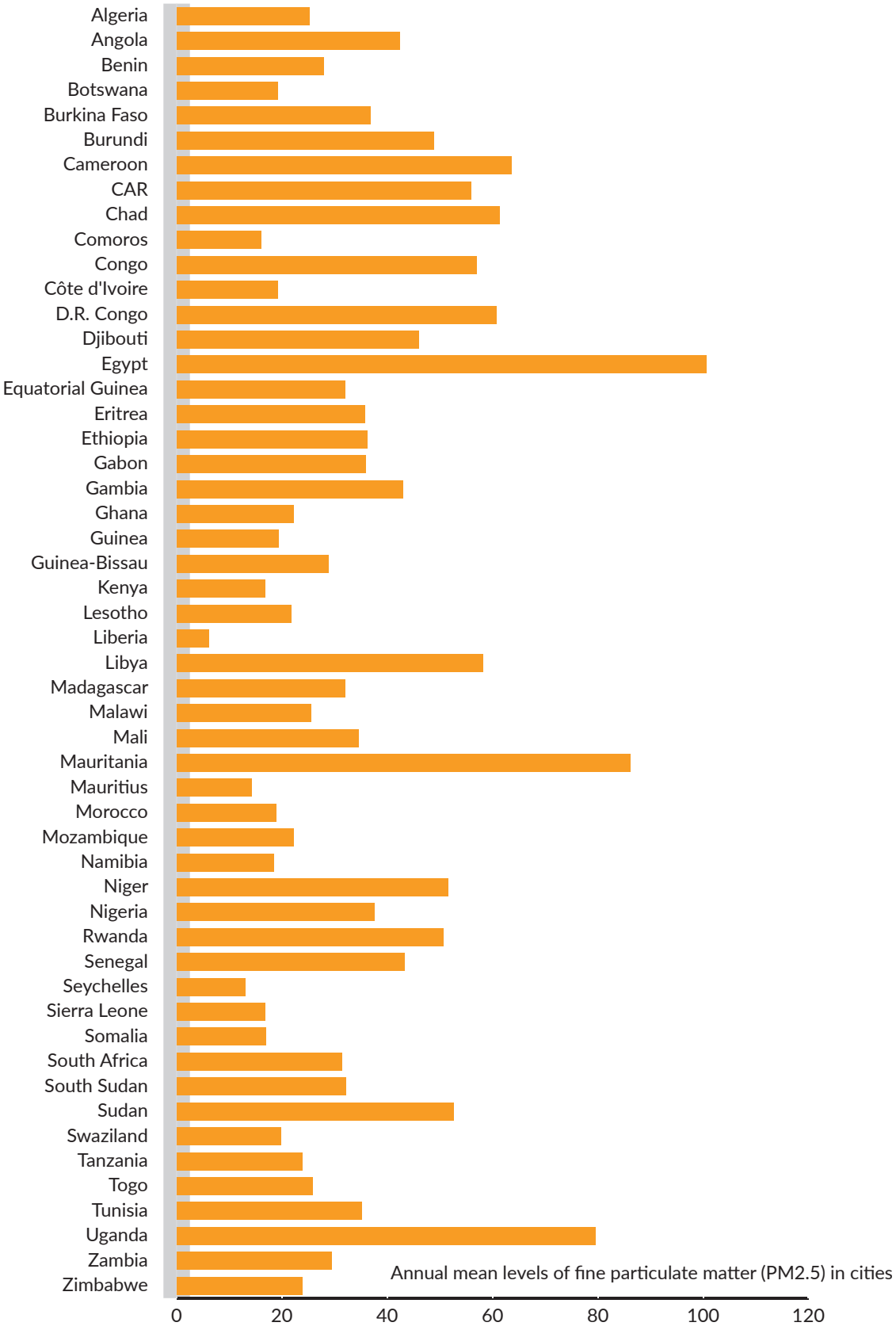
6 Algeria, Botswana, the Republic of Congo, Gabon, Lesotho, Madagascar, Malawi, Mauritius, Mozambique and Namibia.

FIGURE 3.II AVERAGE ANNUAL LOSS FROM DISASTER, PER CENT OF GDP



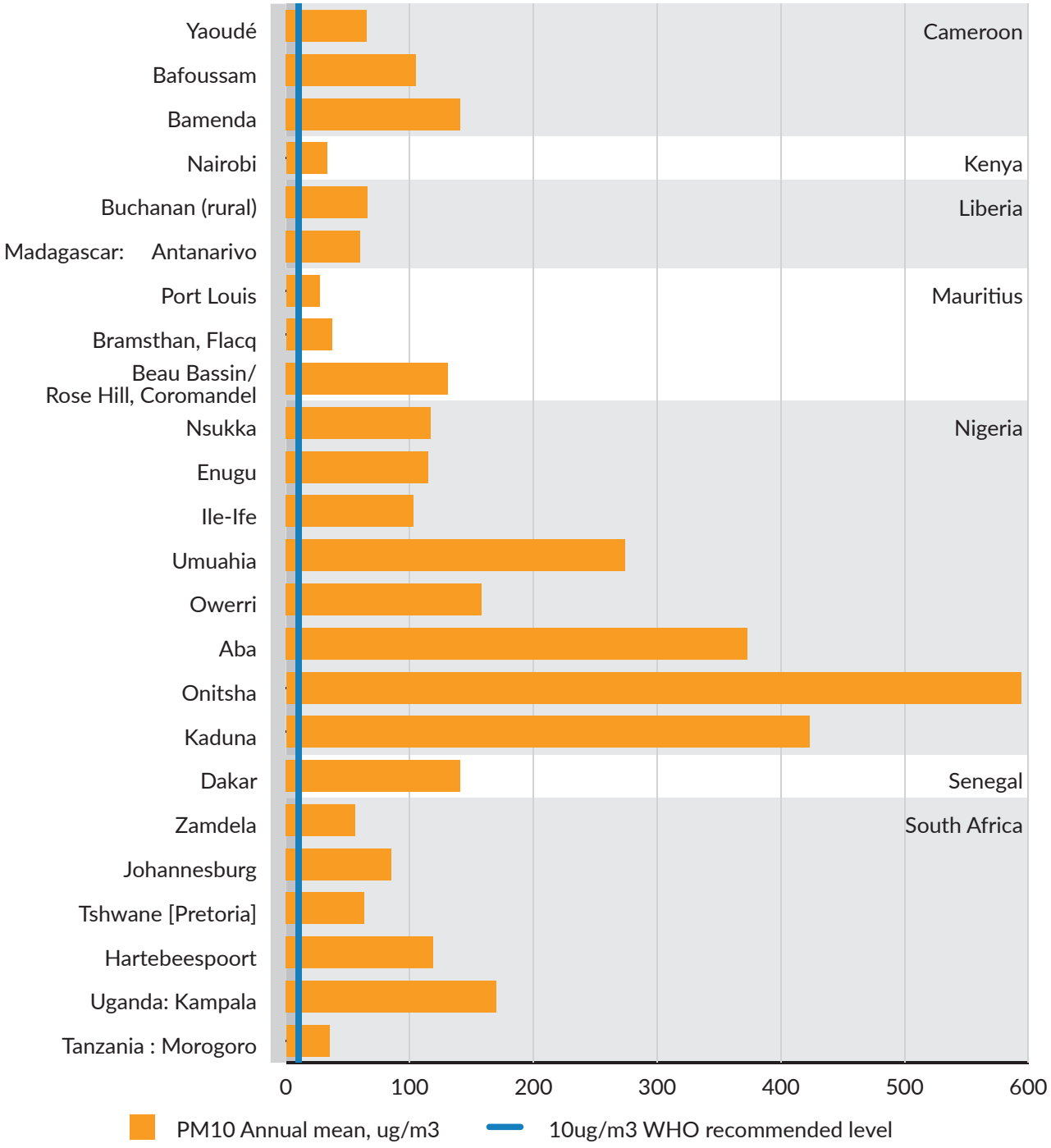
Data source: United Nations Statistics Division (2018).

FIGURE 3.12 ANNUAL MEAN LEVELS OF FINE PARTICULATE MATTER (PM2.5) IN CITIES



Data source: United Nations Statistics Division (2018).

FIGURE 3.13 INDOOR AIR POLLUTION IN AFRICAN CITIES (ANNUAL MEAN PM2.5 AND 10MG/M^3)



40 countries have PM2.5 scores of more than 20 µg/m^3 (FIGURE 3.12).[7] Kampala, Uganda's capital, and Bamenda in Cameron measured more than ten times the recommended WHO level for air quality, while cities in Mauritius, Nigeria and South Africa recorded six times more than the recommended levels (FIGURE 3.13).

7 The PM2.5 measure is of interest because it can be directly linked to estimates of health risks (WHO, 2005). Air pollution consists of many pollutants, among other particulate matter. These particles can penetrate deeply into the respiratory tract and thus pose big health risks by increasing mortality from respiratory infections and diseases, lung cancer and selected cardiovascular diseases (WHO, 2016).

In Africa's rural and urban slum areas, PM2.5 indoors is associated with activities such as cooking, cleaning and infiltration from outdoor sources. High levels of PM2.5 lead to lung and respiratory diseases, cancer and health situations in which the elderly and children are the most vulnerable. This situation continues to exert the pressures on the healthcare system, underscoring the need to address energy deficits as a priority for Africa's socio-economic development (UNECA, 2015).

A look at the percentage of households using solid fuel for cooking provides useful indications on air pollution in cities. Data[8] available for selected African cities shows that the widespread use of solid fuels for cooking accounted for more than 50 per cent in most cases and over 90 per cent in the case of Rwanda. Progress has been observed in some countries: the use of solid fuel for cooking dropped by 9 per cent in Ethiopia, 2011-2016, from 80 per cent to 71 per cent and by 14 per cent in Ghana, 2008-2014, from 70 per cent to 56 per cent.

Target 11.7. By 2030, provide universal access to safe, inclusive and accessible green and public spaces, in particular for women and children, older persons and persons with disabilities. This target has two indicators.

Indicator 11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities.

Indicator 11.7.2 Proportion of persons who are victims of physical or sexual harassment, by sex, age, disability status and place of occurrence in the previous 12 months.

The availability of accessible public spaces in cities is fundamental to ensuring inclusive and sustainable urbanization. Rapid and unplanned urban growth puts at risk the preservation and designation of urban land for public use in many cities, including in Africa. Streets constitute a key component of public space in cities. An efficient street pattern, provides for infrastructure development, enhances environmental sustainability, supports higher productivity, enriches quality of life and promotes equity and social inclusion (UN-Habitat, 2016). Therefore, the proportion of urban land allocated to cities provides insights about the extent of accessibility of public space.

UN Habitat reports that Eastern, Central, West and Southern Africa have the lowest proportion of public space dedicated to streets, accounting for only 16 per cent of the urban built-up area. Many cities in Africa have streets that are disconnected by dead-end roads due to the sub-division of large parcels of land within the city core (FIGURE 3.14).[9] On average, the proportion of land allocated to streets is two times greater within the city core compared with the suburban area, and rapid peripheral urban growth has compounded the proliferation of irregular narrow streets (UN-Habitat, 2016).

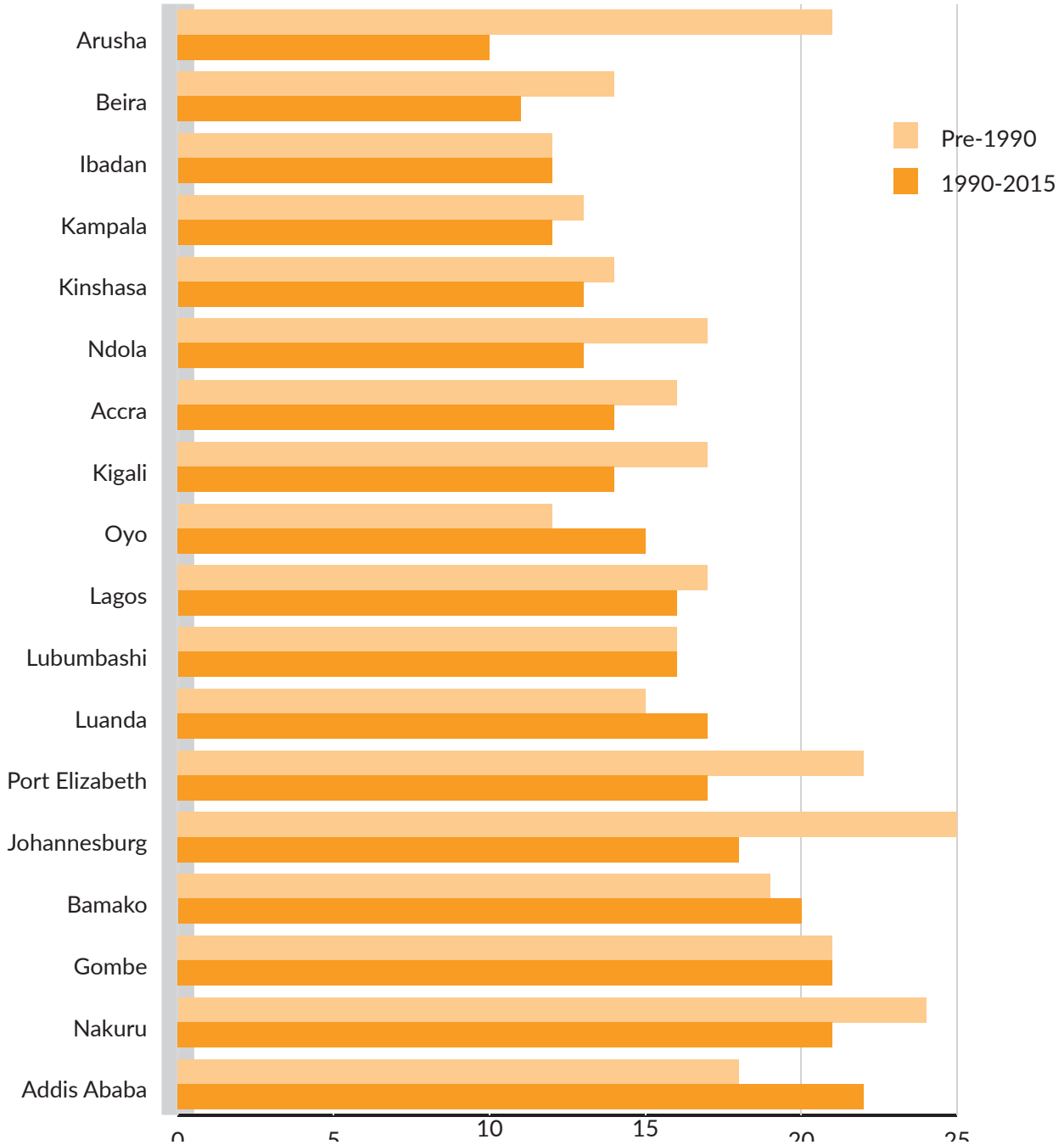
Safety is vital for inclusive and productive cities where inhabitants, regardless of sex, age or disability, are protected from violence and threats to their well-being. Physical and sexual harassment are significant dimensions of safety in cities, but there is no readily available data from African cities on this indicator. However, some selected cities with this data have recorded a significant challenge. For instance, Lagos, Cape Town, Johannesburg, Durban and Nairobi registered high incidences of crime. Over 70 per cent of the city residents in Lagos reported that they were fearful of being victims of crime; 39 per cent of girls in Cairo reported that they did not feel safe using public transport; and 80 per cent of girls in Kampala felt very unsafe in public spaces.

Data disaggregation is important for distinguishing perception from reported cases to evaluate the crime levels and friendliness of cities and urban centers for residential purposes, work and social interaction. National-level data on the proportion of women who are victims of physical and sexual violence highlight the extent of the challenge. In a select subset of countries, two to three out of ten women experienced physical violence in a 12-month period, prior to the time of reporting the incidence: 22.3 per cent in Tanzania; 22.5 per cent in Gabon; 24.7 per cent in Mali; 27.2 per cent in the Democratic Republic of Congo; and 27.4 per cent in Cameroon.

8 Based on MEASURE DHS: Demographic and Health Surveys.

9 African cities included in the study were: Alexandria, Cairo, Addis Ababa, Accra, Nairobi, Abuja, Lagos, Kigali, Dakar, Cape Town, Johannesburg, Dar es Salaam, Dodoma and Harare.

FIGURE 3.14 SHARE OF BUILT-UP AREA OCCUPIED BY ROADS



Source: United Nations Human Settlements Programme Database. Accessed 14 March 2018.

Target 11.a. Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.

Indicator 11.a.1 Proportion of population living in cities that implements urban and regional development plans, integrating population projections and resource needs by size of city.

Effective urban and regional development planning requires sub-national data on urban and regional development plans, which are not comprehensively available. Many African countries are formulating and/or implementing national urban policies. Currently,13 countries are at the formulation stage, and 21 are in the process of implementation (FIGURE 3.15).

Target 11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels. This target has two indicators.

Indicator 11.b.1 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.

Corresponding Agenda 2063 target

i 1.7.3.3 Reduce deaths and property loss from natural and man-made disasters and climate extreme events by at least 30%.

The Sendai Framework Data Readiness Review 2017 offered the opportunity for considerable work that will need to be undertaken by countries to monitor this indicator. However, only Central African Republic, Egypt, Ethiopia and Liberia have adopted and are implementing national disaster risk-reduction strategies in line with the Sendai framework.[10]

A United Nations Office for Disaster Risk Reduction (UNISDR) report on Africa described reasons given for the slow adoption of strategies by African countries: (i) unrealistic expectations of how quickly and comprehensively disaster risk reduction (DRR) could bring results, which leads to disappointment; (ii) the feeling that the process is too costly to be sustainable; (iii) lack of commitment from the real decision-makers in the process; and (iv) lack of financial resources to hold regular meetings of the National Platform. Additionally, frequently recurring major disasters have led to a focus on continued emergency management, as national authorities struggle to deal with people's immediate needs (UNISDR, Africa toolkit).

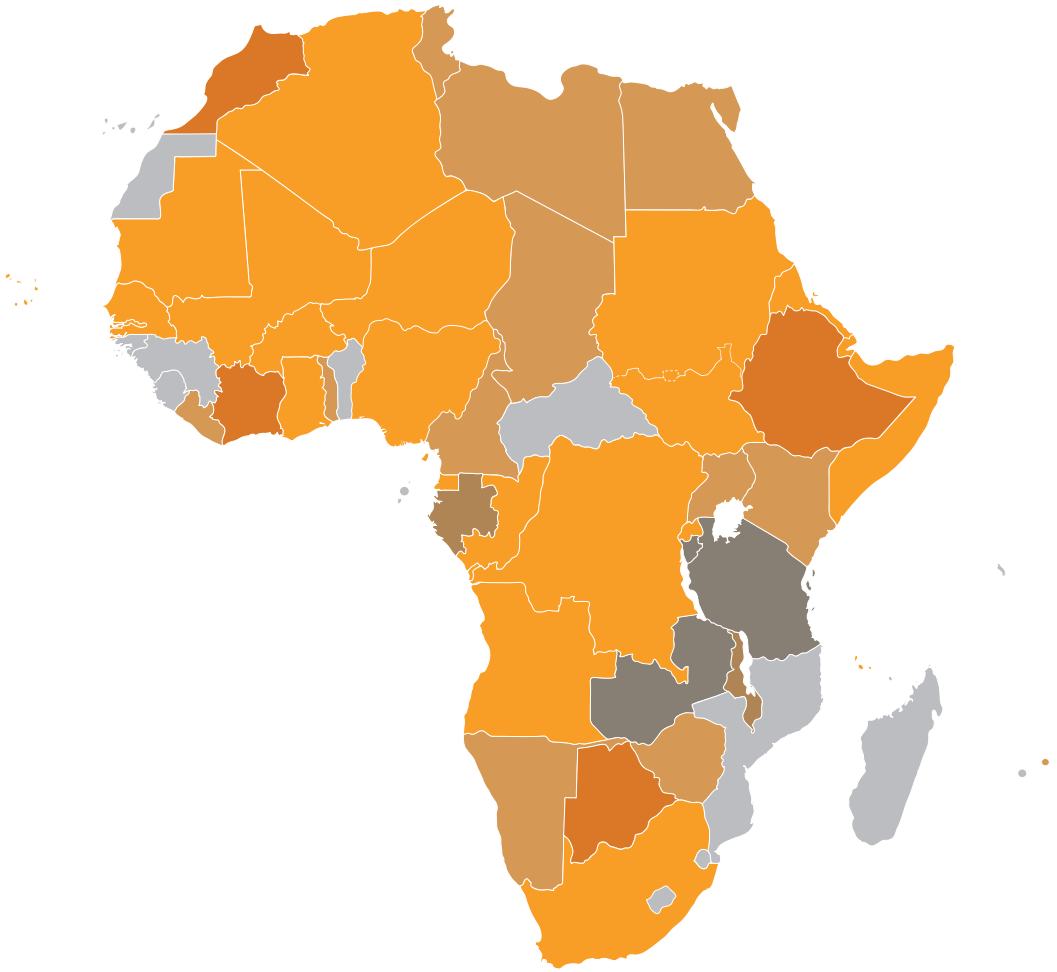
Indicator 11.b.2 Proportion of local governments that adopt and implement local disaster risk- reduction strategies in line with national disaster risk-reduction strategies.

Given the vulnerability of cities to disaster impacts, as well as the opportunities they offer in risk reduction, local governments are required to play a key role in national efforts to minimize disaster risks. While this is well articulated in the Sendai framework, there is no readily-available data on the proportion of local governments adopting and implementing local disaster risk-reduction strategies, curtailing efforts to assess progress of this indicator.

Given the vulnerability of cities to disaster impacts, as well as the opportunities they offer in risk reduction, local governments are required to play a key role in national efforts to minimize disaster risks.

10 This list of countries is not conclusive but reported based on latest website information provided by the United Nations Office for Disaster Risk Reduction.

FIGURE 3.15 STATUS OF NATIONAL URBAN POLICY IN AFRICA



Prefeasibility phase	Diagnostic phass	Formulation Phase	Implementation Phase	Monitoring and Evaluation
Burundi	Gabon	Egypt	Algeria	Morocco
United Republic of Tanzania	Malawi	Libya	Sudan	Botswana
Zambia		Cameroo	Angola	Cote d'Ivoire
		Chad	Burkina Faso	Ethiopia
		Kenya	Cabo Verde	
		Liberia	Comoros Island,	
		Mauritius	Democratic Republic of Congo	
		Namibia	Republic of Congo, Djibouti	
		South Sudan	Equatorial Guinea	
		Togo	Eritrea	
		Tunisia	Ghana	
		Uganda	Gambia	
		Zimbabwe	Mali	
			Mauritania	
			Niger	
			Nigeria	
			Rwanda	
			Senegal	
			Somalia	
			South Africa	

Source: United Nations Human Settlements Programme Database. Accessed 14 March 2018.

Target 11.c. Support least-developed countries (LDCs), including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.

Indicator 11.c.1 Proportion of financial support to the least-developed countries (LDCs) that is allocated to the construction and retrofitting of sustainable, resilient and resource-efficient buildings utilizing local materials.

Corresponding Agenda 2063 target

i 2.10.1.1 At least national readiness for implementation of the trans-African Highway Missing link is achieved.

Sustainable construction, which is still at its burgeoning stages in Africa, contributes to reduction of green-house gas emissions in cities. Given the cost savings and use of local materials associated with sustainable construction, there is a growing interest in alternative construction technology. African countries are yet to enforce sustainable construction and utilization in their urban planning and financing policies for resilient and resource-efficient buildings. Through the Addis Ababa Action Agenda, world leaders stated their commitment to finance development of cities and local authorities in developing countries that construct resilient and environmentally-sound infrastructure and buildings with local materials. Such data are still not readily available through the effective channels of the national statistical systems in countries, making progress difficult to monitor.

3.4 Conclusions

Urbanization offers considerable opportunities to accelerate Africa's inclusive growth and transformation of cities that are well planned and managed. It brings economic and social opportunities from agglomeration, trade, employment, innovation and more, as well as numerous challenges, such as congestion, inequality, pollution and slums, among others. However, Africa's pace of urbanization far outstrips the growth of physical infrastructure and social amenities, posing adverse consequences for living conditions. On average, more than one out of every two urban residents lives in slums under deplorable conditions with high levels of deprivation. Traffic jams, generated by the growing urban middle income class, poor roadways and undisciplined driving are responsible for heavy economic losses and transportation fatalities. The extent to which Africa benefits from the advantages of rapid urbanization and agglomeration will depend on how these trends are managed to augment the continent's strong long-term fundamentals and potential demographic dividend (ECA, 2017)

Goal 11 and its corresponding Africa's Agenda 2063 Goals, as well as the New Urban Agenda, provides an opportunity for Africa to promote inclusive and orderly urbanization for sustainable development. Africa's response to the ongoing urban transition for sustainable development, requires a paradigm shift, in which implementation of urbanization related goals and targets are aligned to other sectoral targets and goals on environment; climate change; industry; energy; water and sanitation; education; and agriculture and forestry, during the planning, implementation and monitoring processes.

3.5 Recommendations

Opportunities arising from urbanization need to be articulated in national development plans if the respective sector policies are to be linked. In turn, this should inform sector policies guiding urban and industrial development (ECA, 2017). Translating the targets and visions for sustainable urbanization into action and results requires effective national and sub-national policies and strategies, as well as robust follow up and review mechanisms. The adoption of national urban policies by a growing number of countries in Africa is encouraging and will set the framework within which Goal 11 can be implemented. In this context, all relevant stakeholders, including local authorities, the private sector and communities, should regularly monitor and evaluate their own performance in the implementation of the New Urban Agenda. National statistical offices (NSOs) should develop, collect and analyse indicators at the local level to monitor a range of local or national priority issues, e.g., social development, economic performance and service delivery. Establishing permanent mechanisms for monitoring Goal 11 indicators will allow for dissemination of information that is comparable and will strengthen transparency in the planning process.

Beyond the accelerated implementation of urban-related commitments, effective monitoring and reporting mechanisms that are informed by robust data and analytical evidence are required at the national and sub-national levels. The paucity of disaggregated urban-level data remains a major constraint for monitoring progress.

At the national level, formulation of action plans that propose options to harmonize sectoral objectives, based on urban indicators and best practices analysis, would be beneficial. This should include a coordinating framework for collection, analysis and application of indicators at the national and local levels. The national coordinating body of city-level data can integrate this information into national data repositories that ensure protocols and standards are met. At the sub-regional level, it is important to develop or strengthen existing datasets by collecting and synthesizing data from reports submitted by national governments. Integration of household surveys, such as DHS, MICS and other surveys (e.g., Living Standards Measurement Surveys and national travel surveys), will fill some of the data gaps. Strengthening national and local capacities, as well as sharing compendiums of best practices for gathering, processing and analyzing data, can help to improve monitoring. At all levels – city, national and regional – hosting open-data sharing platforms will help to increase data accessibility and create opportunities for collaboration.

Opportunities arising from urbanization need to be articulated in national development plans if the respective sector policies are to be linked.

CHAPTER 4

Sustainable Consumption and Production

4.1 Introduction

Goal 12 of the 2030 Agenda for Sustainable Development aims to ensure sustainable consumption and production (SCP) patterns in communities, countries and regions of the world for development while safeguarding the environment that we live in. The key principles underpinning SCP patterns include:

- Improving the quality of life without increasing environmental degradation and without compromising the resource needs of future generations.
- Decoupling economic growth from environmental degradation by: reducing material/energy intensity of current economic activities and reducing emissions and waste from extraction, production, consumption and disposal; and promoting a shift of consumption patterns towards groups of goods and services with lower energy and material intensity without compromising quality of life.
- Applying life-cycle thinking which considers the impacts from all life-cycle stages of the production and consumption process - minimizing losses and waste and promoting re-use in order to do more and better with less.
- Guarding against the re-bound effect, where efficiency gains are cancelled out by resulting increases in consumption (United Nations Environment Programme (UNEP), 2011 cited in UNEP, 2015).

The focus on SCP patterns emerged from several debates and reports dating back to the 1970s when it was recognized that action was imperative because of current patterns of development that put natural capital and the sustainability of development pathways at risk. Indeed, a review of today's consumption and production patterns is critical for meeting current human needs while sustaining the life-supporting ecosystems (Visser, 2010) and protecting the ability of ecosystems to maintain/renew themselves perpetually (Martin and Schouten, 2014). To ensure that current consumption and production requirements do not compromise the ability of future generations to meet their needs (Brundtland, 1987), it is important to adopt strategies that meet current demands while protecting the resources required for future development (IISD, WBCSD and Deloitte & Touche, 1992).

Aside from behavioral and lifestyle changes, a focus on leveraging new technologies and approaches in both industry and for consumption of goods that conserve resources or use them more effectively is needed. Understanding of the SCP patterns plays a pivotal role in the 2030 Agenda for Sustainable Development, as the patterns connect the social economic and environmental dimensions of sustainable development with a view to ensuring that the right balances and synergies are realized without jeopardizing the achievement of any of the other goals. The centrality of SDG 12 and Goal 7 of Agenda 2063 cannot be overemphasized as their achievement is related to the realization of the entire agenda with pronounced connections to other social and environmental goals. For example, reducing food waste and post-harvest losses would contribute to the achievement of both Goals 2 and 12; while the sound management of chemicals and the reduction of pollution is critical for good health and well-being (Goal 3), as well as the preservation of the environment (Goals 13, 14 and 15). On the other hand, ensuring that industries make better use of energy and utilize clean technologies is also an imperative for Goals 7, 9 and 12. Goal 11, which is related to sustainable cities, captures many of the concrete priorities needed to realize Goal 12 targets. Targets such as sustainable urbanization in a rapidly urbanizing world are key to ensuring overall SCP patterns. Tackling many of the challenges outlined under Goal 12 and other green economy targets can also be the source of significant job creation – an objective of Goal 8 (decent work and economic growth) and Goal 1 (poverty reduction). Understanding SCP patterns and their linkages to other goals and targets underpin the imperatives for sustainable development.

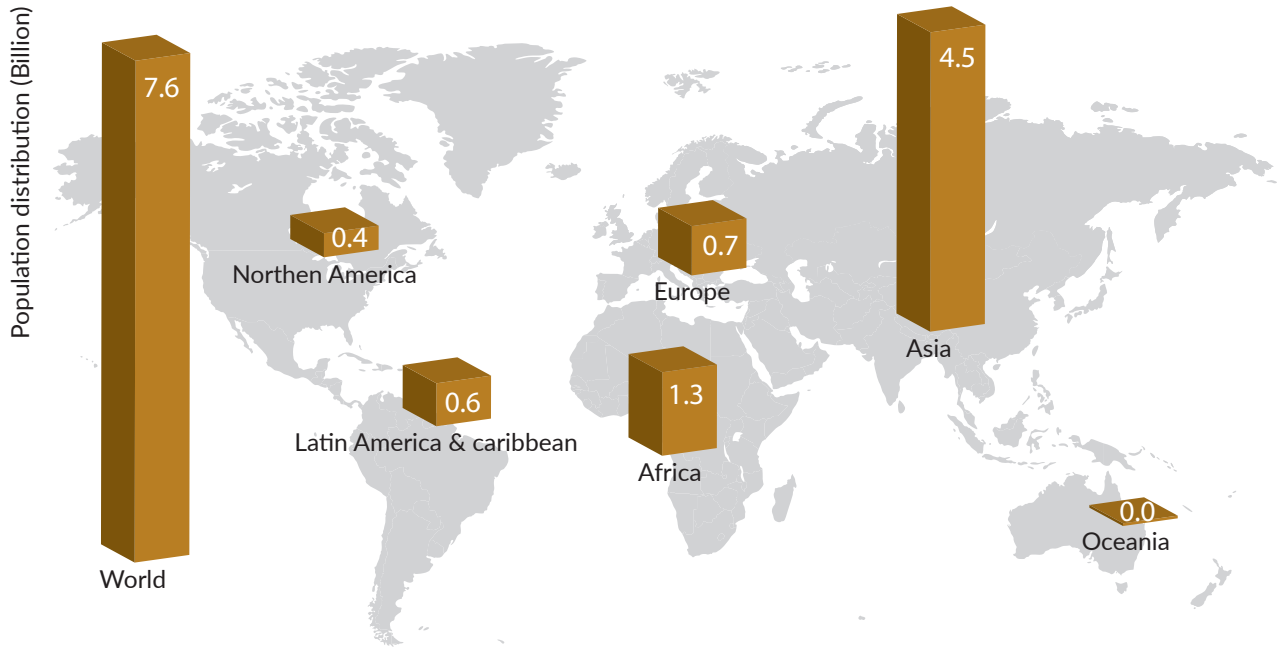
The key drivers of increased global resource use include: rapid population growth, rapid urbanization, a growing middle class and resource-intensive production patterns. In 2017, the global population was estimated at 7.6 billion people (FIGURE 4.1) and is projected to increase to 9.8 billion by 2050. Asia's relatively large population, 4.5 billion of the world total of 7.6 billion, coupled with rising urbanization and industrialization, is a recent driver of resource use. Africa's total population in 2017 was estimated at 1.2 billion and projected to increase to almost 4.5 billion by 2100 (FIGURE 4.2). The projected rapid growth rates are due to the large youth bulge, which means that even as population growth rates in other regions taper off, Africa will be the only region experiencing substantial population growth, with its share of the global population expected to increase from 16 per cent in 2017, to 20 per cent in 2030 and 46 per cent in 2100.

By 2016, 54.5 per cent of the world's population lived in urban settlements with a projected increase of 5.5 per cent by 2030. Even through Asia is relatively less urbanized than other developed regions, it has some of the largest and most densely-populated cities in the world. Of the world's 31 megacities, 24 are located in less-developed regions and five are in Africa, excluding North Africa. Out of the ten fastest growing cities in the world, two are in Africa, excluding North Africa. This intensifies the imperative to proactively plan and ensure sustainable urbanization and sustainable consumption and production patterns.

In addition, there were about 3.2 billion people in the middle class worldwide by the end of 2016. With an average growth rate of 4 per cent per year, the carbon foot-print per person is certain to rise. As the middle class expands, people will have a higher propensity to spend on new products and services, with construction being a key driver of materials use.

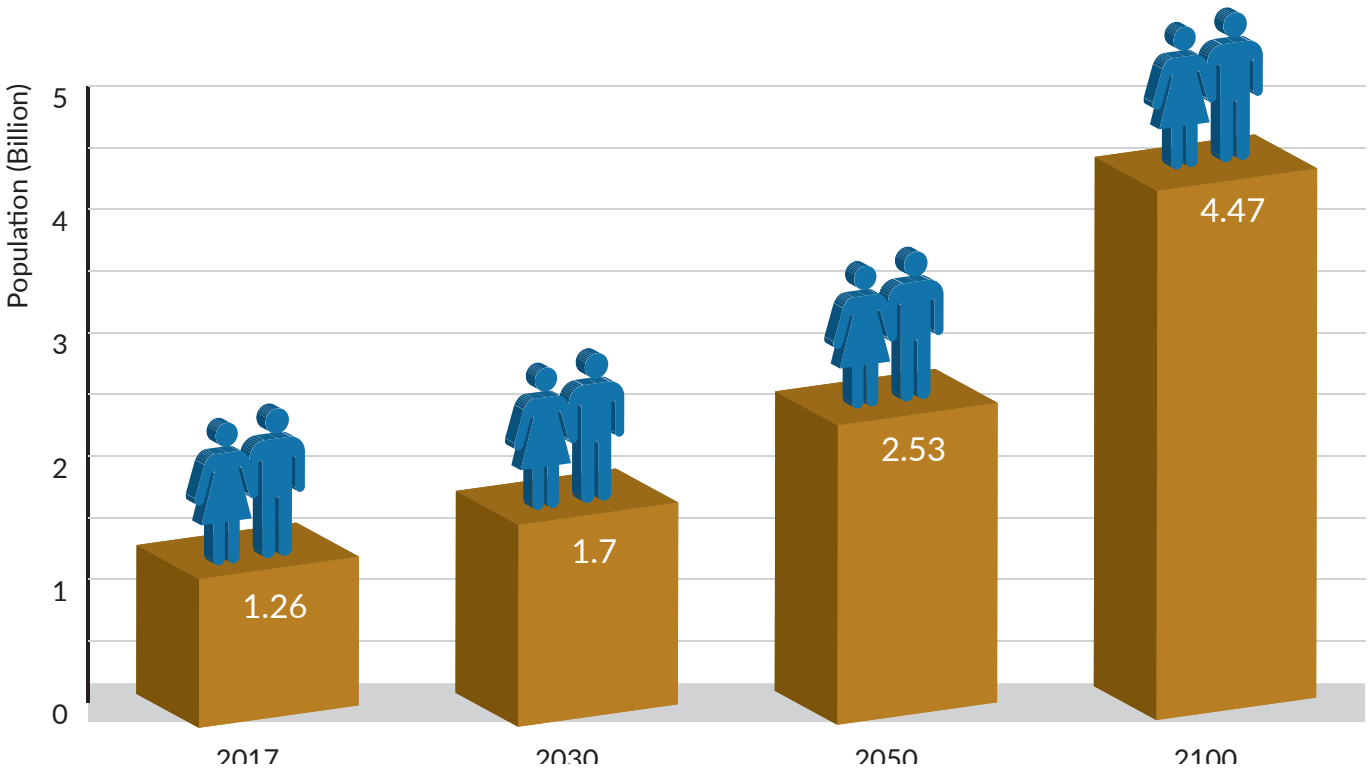
Not surprisingly, there has been a growing intensity in the use of materials – biomass, fossil fuels, metals and non-metallic minerals – to fuel the global economy and facilitate improvements in the consumption of rising numbers of people with increased purchasing power. The world increased the use of natural resources by at least 34 billion tons total domestic material consumption (DMC) between 2000 and 2017. The Asian region, which is home to 4.5 billion people, accounts for most of the recent increase in DMC (material footprint), registering an increase of at least 27 billion tons over the same period. Although the levels in DMC are still low for developing regions, the pace is rising, with Africa nearly doubling its

FIGURE 4.1 GLOBAL AND REGIONAL POPULATION DISTRIBUTION, 2017



Source: United Nations Department of Economic and Social Affairs, World Population Prospects (2017).

FIGURE 4.2 AFRICA'S POPULATION, 2017 AND PROJECTIONS TO 2100



Source: United Nations Department of Economic and Social Affairs, World Population Prospects (2017).

resource use between 2000 and 2017. Developed regions on other hand, have seen modest reductions during the same period.

In addition to conserving resources, reducing waste and losses in the production and consumption processes has huge development implications. The World Food Programme estimates that roughly one third of the food produced in the world for human consumption every year (1.3 billion tons) gets lost or wasted. Both industrialized and developing countries dissipate roughly the same quantities of food (670 and 630 million tons, respectively). Every year, consumers and retailers in rich countries waste almost as much food (222 million tons) as the entire net food production of Africa excluding North Africa (230 million tons). In developing countries, the losses occur closer to the farm. Food losses in Africa, excluding North Africa, were estimated to exceed 30 per cent of total crop production, representing more than US$4 billion in value every year (WFP, 2014). The implications on the environment for such wastage are huge. Solid waste management is a growing challenge for both developing and developed countries, particularly in urban areas. UNDESA (2012) projections show that by 2050, the world's waste production could reach up to 27 billion tons. A circular economy approach needs to be applied, where the objective is 'to keep resources in use for as long as possible, extract the maximum value from them while in use, then recover and regenerate products and materials at the end of each service life,' with the goal to preserve the environment while making full use of it for economic and human development.

Food losses in Africa, excluding North Africa, were estimated to exceed 30 per cent of total crop production, representing more than US$4 billion in value every year.

4.2 Alignment with Agenda 2063

Some of the priorities and issues underpinning Goal 12 are reflected in Africa's Agenda 2063, which predates the SDGs. In general, the alignment with the SDGs is stronger at the **goal** or **priority area level** as opposed to the specific targets and indicators. For Goal 12, the alignment is more complex, and comparable priorities appear not only under the specific targets to be monitored for Agenda 2063 but also under the broader set of indicative strategies under the relevant goals (TABLE 4.1 for summary).

TABLE 4.1 GOAL 12 ALIGNMENT WITH RELEVANT AGENDA 2063

	ALIGNMENT WITH AGENDA 2063	
SDG 12 TARGETS	AGENDA 2063 GOALS	TARGETS
12.1 Implement the 10 Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.		
12.2 By 2030, achieve the sustainable management and efficient use of natural resources.	**12** Capable institutions and transformed leadership in place at all levels.	**3.12.2.2** Local communities have a fair share of the exploitation of natural resources and are using them for the benefit of all.
12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	**5** Modern Agriculture for increased productivity and production.	**1.5.1.4** Reduce post-harvest losses by 50%.
12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	**1** A high standard of living, quality of life and well-being for all citizens.	**1.1.4.9** At least 50% of urban waste is recycled.
	7 Environmentally sustainable and climate resilient economies and communities.	**1.7.3.5** All Cities meet the World Health Organization's Ambient Air Quality Standards by 2025. Societies produce and consume goods and services in a sustainable manner.
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	**1** A high standard of living, quality of life and well-being for all citizens.	**1.1.4.9** At least 50% of urban waste is recycled.
12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices. and to integrate sustainability information into their reporting cycle.		

TABLE 4.1 (CONT)

SDG 12 TARGETS	ALIGNMENT WITH AGENDA 2063	
	AGENDA 2063 GOALS	TARGETS
12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.		
12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.		
12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.		
12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products.	**4** Transformed economies and job creation.	**1.4.3.3** Contribution of the creative arts to gross domestic product in real terms is increased by at least 100%.
	12 Capable institutions and transformed leadership in place at all levels.	**3.12.2.2** Local communities have a fair share of the exploitation of natural resources and are using them for the benefit of all.
	16 African cultural renaissance is pre-eminent.	**5.16.2.1** At least 20% of the citizenry participate in culture and appreciate the creative arts.
12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.		

Sources: United Nations Department of Economic and Social Affairs (2018), Economic Commission for Africa and others (2017). Source: African Union (2017) Agenda 2063–Sustainable Development Goals mapping exercise. https://au.int/en/ea/statistics/a2063sdgs.

4.3 Progress tracking

4.3.1 Overview

The targets for Goal 12 encompass a focus on the scale and efficiency of resource use, the decoupling of economic activity from resource use and adverse impacts including through reducing waste and managing chemicals over their lifecycles, the promotion of sustainable practices by business and lifestyles by consumers, financing and investments in transformation for SCP and related policy support.

It should be noted that there are still gaps in definitions and methodologies for a majority of the indicators (10 out of 13) of Goal 12. There are also significant data gaps, especially for Africa excluding North Africa. Thus, where data permits, trends are analyzed for North Africa and the rest of the continent and compared to other regions of the world.

Progress on Goal 12 is mixed. Looking at the trends for resource use: global material extraction increased significantly, the major drivers of which were the extraction of industrial and construction minerals (increased by more than 240 per cent), pointing to the importance of this resource category for industrial development, housing, energy and transport infrastructure. Furthermore, the global extraction of metal ores increased by 183 per cent, fossil fuels by 82 per cent and biomass by 61 per cent over a period of 33 years.[1]

The material footprint relative to GDP, however, declined in most regions, potentially pointing to both greater efficiencies in resource use and a slower increase in resource use (e.g., in Africa, excluding North Africa). This decline points to a relative decoupling in some regions, although there was not much change at the global level.

In terms of per capita consumption, despite the declining trends between 2000 and 2017, developed regions required at least 25 to 40 tons of materials per capita per annum, which is very high and unsustainable. Further, it is not just an issue of how intensively resources are utilized in production and consumption processes, but also the extent to which resources are wasted must also be considered.

4.3.2 Analysis of progress on selected targets

Target 12.1 Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.

During the 14th session of the African Ministerial Conference on Environment (AMCEN) in 2012, there was agreement to develop and implement a number of Regional Flagship Programmes to ensure the effective implementation of the outcomes of the United Nations Conference on Sustainable Development (Rio+20). The most important of these for Africa is the Partnership for SCP in Africa created to speed up the implementation of the 10-YFP Roadmap on SCP with key regional partners, such as the African RoundTable on SCP (ARSCP), the African Union Commission (AUC), the New Partnership for Africa's Development (NEPAD), AfDB, the RECs and UN agencies working at the regional and national levels. During the 15th Session of AMCEN in 2015, the African Ministers of Environment agreed, among others, to align their efforts under the Africa Green Economy Partnership (AGEP), and associated delivery platforms, such as the Partnership for Action on Green Economy (PAGE), African Mining Vision (AMV) and the global 10-YFP. Subsequent sessions of AMCEN built on these initial commitments to feed into the 2030 Agenda for Sustainable Development and the African Union's Agenda 2063 to "put in place strategies for sustainably harnessing Africa's natural capital including instituting appropriate policies and practices to reverse ecosystems degradation and promote sustainable consumption and production patterns" (AMCEN, 2016).

Indicator 12.1.1 Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies.

Data availability is a major issue for this indicator. In 2012, at Rio+20, Heads of State adopted the 10-YFP on SCP patterns, a global framework for action to accelerate the shift toward SCP in both developed and developing countries. Regional cooperation

1 Vienna University of Economics and Business.

mechanisms underscoring priorities to be realized have been developed, including for Africa. The African Regional Roadmap for the 10-YFP on SCP patterns (2014) notes that pilot projects for mainstreaming SCP in national and sub-national development policies and plans were conducted in Tanzania, Mauritius and the city of Maputo in Mozambique. Seven other countries that have initiated or developed their own national SCP plans include Burkina Faso, Côte d'Ivoire, Ghana, Mali, Senegal, Uganda and Zambia.

Target 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.

A critical variable here is managing the extraction and use of materials where the term 'material footprint' refers to the amount of raw materials extracted globally to meet the domestic final consumption demand of a country. It is a measure of the volume of primary materials required across the entire supply chain, both domestic and foreign.

Between 2000 and 2017, the global material footprint increased significantly. Material extraction is estimated to have risen from 51.6 billion metric tons in 2000 to 85.9 billion metric tons by 2017 (FIGURE 4.3). Two regions accounted for over two thirds of this footprint in 2017 – East and South Asia (40.7 billion metric tons) and Europe and North America (26.9 billion metric tons). The contribution of North America was falling over time. Africa, excluding North Africa, contributed a minuscule 2.8 billion tons.

For Africa, excluding North Africa, the material footprint per capita remains very small, averaging about 2.5 tons/capita during 2000-2017.

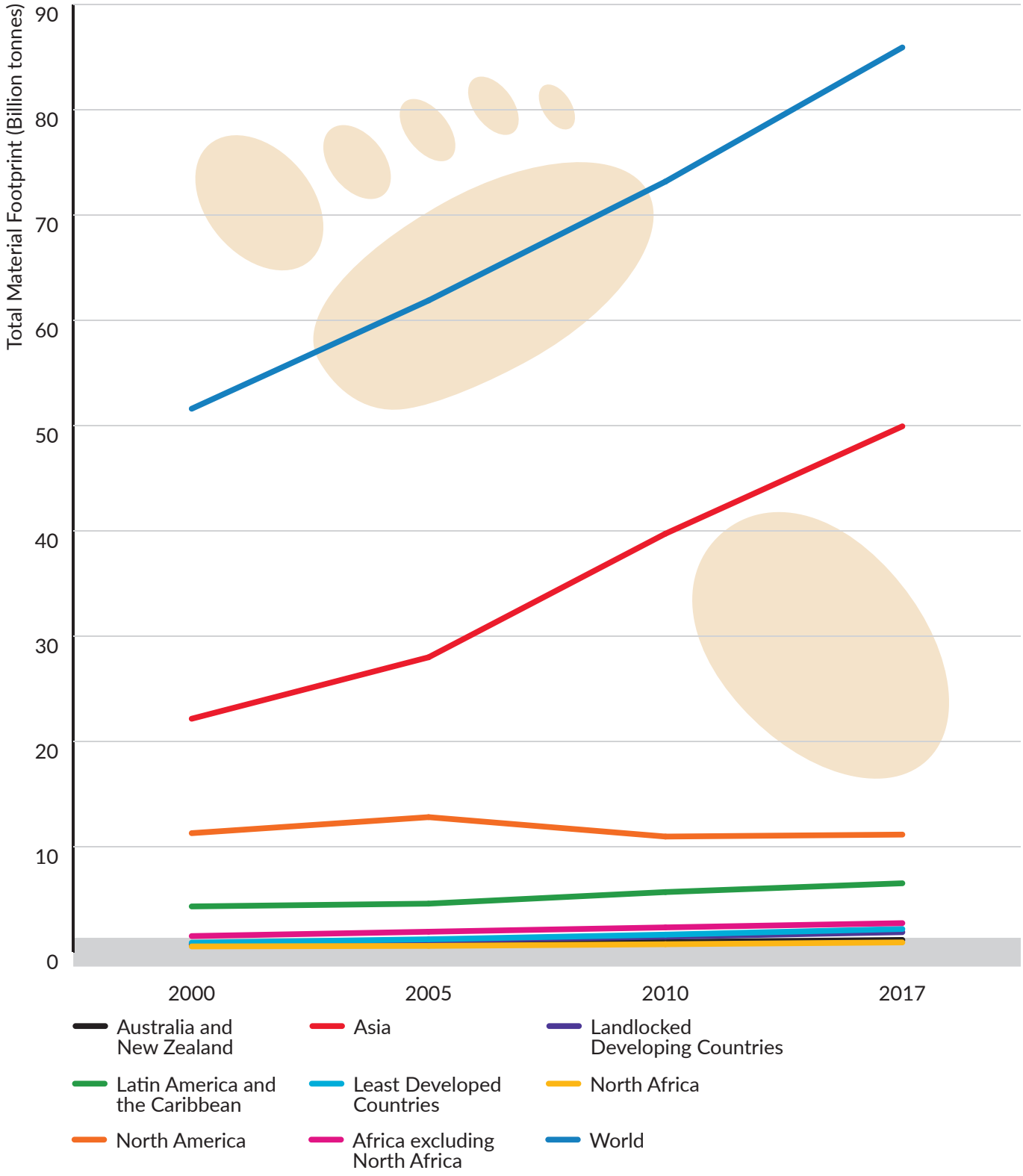
In per capita terms, the global material footprint increased from 8.4 metric tons per capita in 2000 to 11.4 metric tons per capita in 2017. Economic development fosters modern lifestyles, which require large amounts of resources to meet consumption and production needs. There were encouraging trends in most regions, with reductions on resource intensity and total resource use. An increasing total population, rapid urbanization and technological advancements, which make products available to a larger target group, will continue exerting a lot of pressure on balancing the three dimensions of sustainable development. This is true for various developed regions that required more resources per person per year between 2000 and 2017, as seen in Australia, New Zealand, North America and Oceania (FIGURE 4.4). Developed regions alone, required at least 25 to 40 tons of materials per capita per annum, which is very high and unsustainable. Latin America and the Caribbean, Asia and North Africa have increasing trends in per capita material footprint per year, signaling the impact of growth and the modernization of economies.

For Africa, excluding North Africa, the material footprint per capita remains very small, averaging about 2.5 tons/capita during 2000-2017 (FIGURE 4.4), although this could change. Contributing factors to the low material footprint likely include the slow pace of poverty reduction and the significant population growth rate. While real GDP growth averaged about 5 per cent between 2001 and 2014 – given the region's extraordinarily high population growth (2.6 per cent annually more recently) – GDP per capita rose by just 2.1 per cent per year compared with 5.1 per cent for South Asia and 7.8 per cent for East Asia and the Pacific. On the other hand, the per capita footprint for East Asia more than doubled (9.1 to 19.8 tons/capita), likely reflecting the industrial and urban transformation taking place therein.

On the surface, data for 2000-2015, show significant declines and a decoupling for some regions, yet a slight increase for the world, when changes in the footprint are viewed with regard to changes in GDP over the past 15 years (FIGURE 4.5).

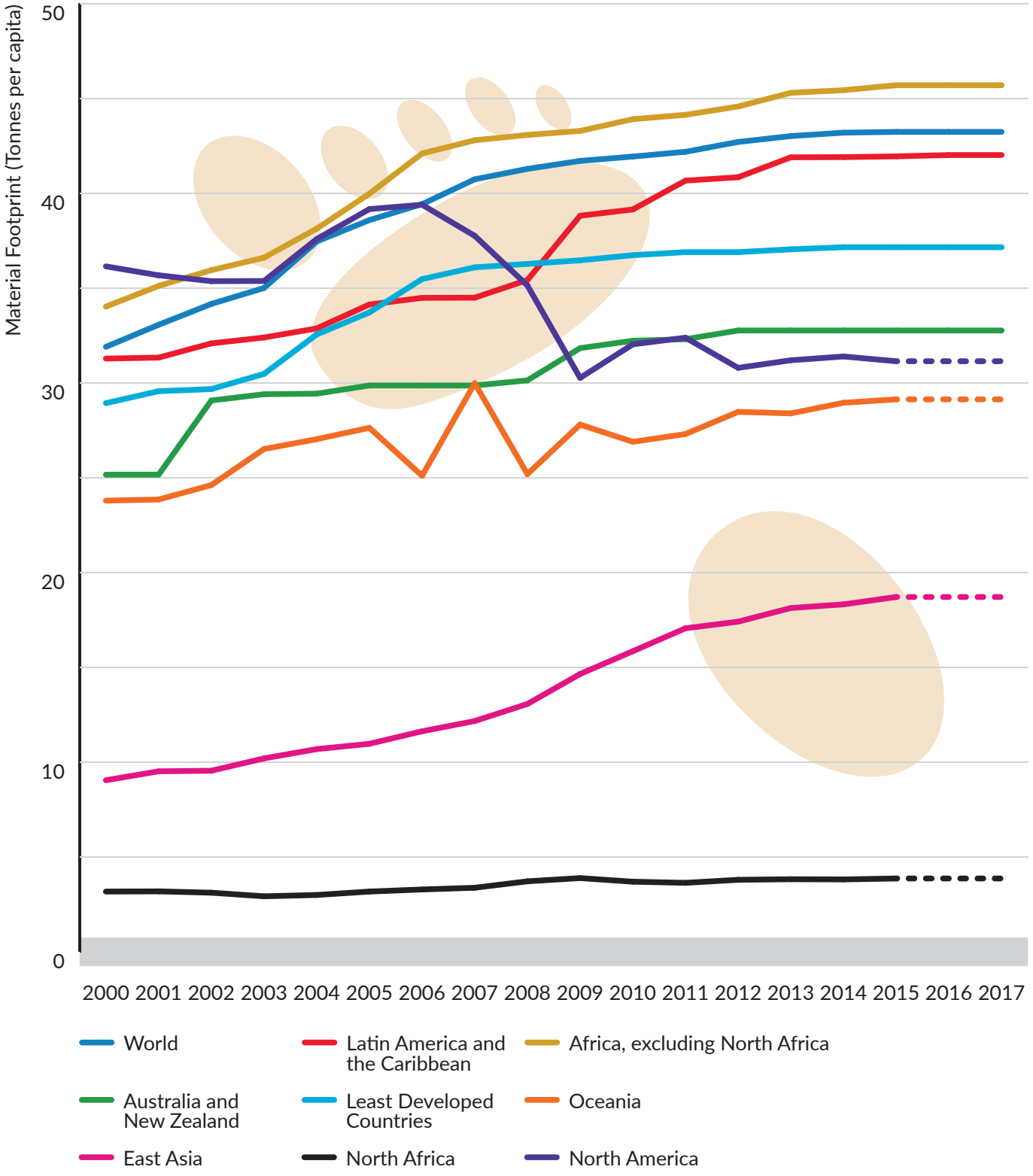
As UNEP Live points out, DMC and material footprint need to be looked at together as they cover production and consumption dimensions of the economy. The DMC provides a measure of the actual amount of material in an economy, whereas the material footprint provides an estimate of the (virtual) amount required across the whole supply chain to service final

FIGURE 4.3 TOTAL MATERIAL FOOTPRINT



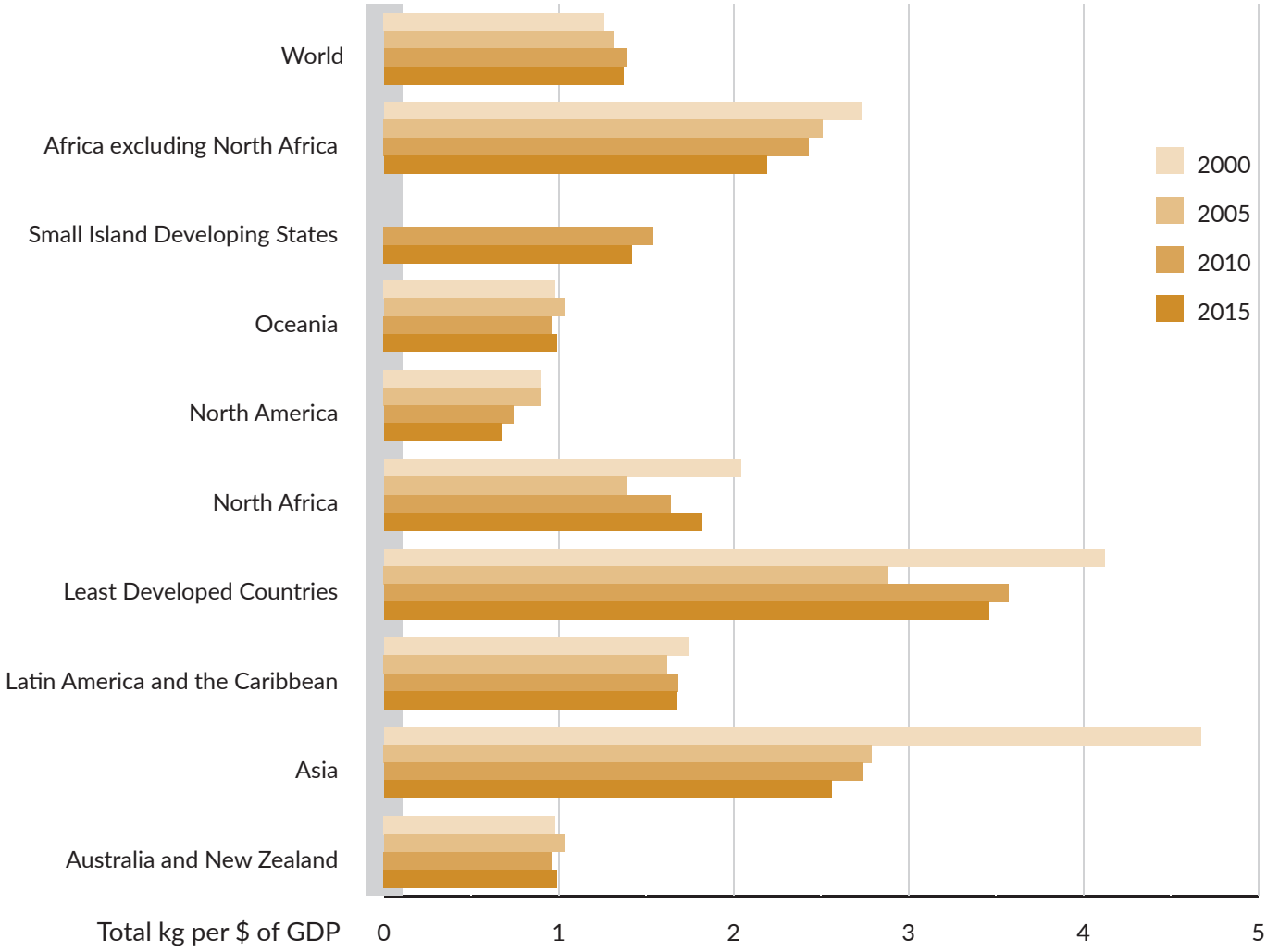
Source: Environment Live database, United Nations Environment Programme.

FIGURE 4.4 MATERIAL FOOTPRINT (TONS PER CAPITA)



Source: Environment Live database, United Nations Environment Programme.

FIGURE 4.5 MATERIAL FOOTPRINT (TOTAL KG PER USD OF GDP)

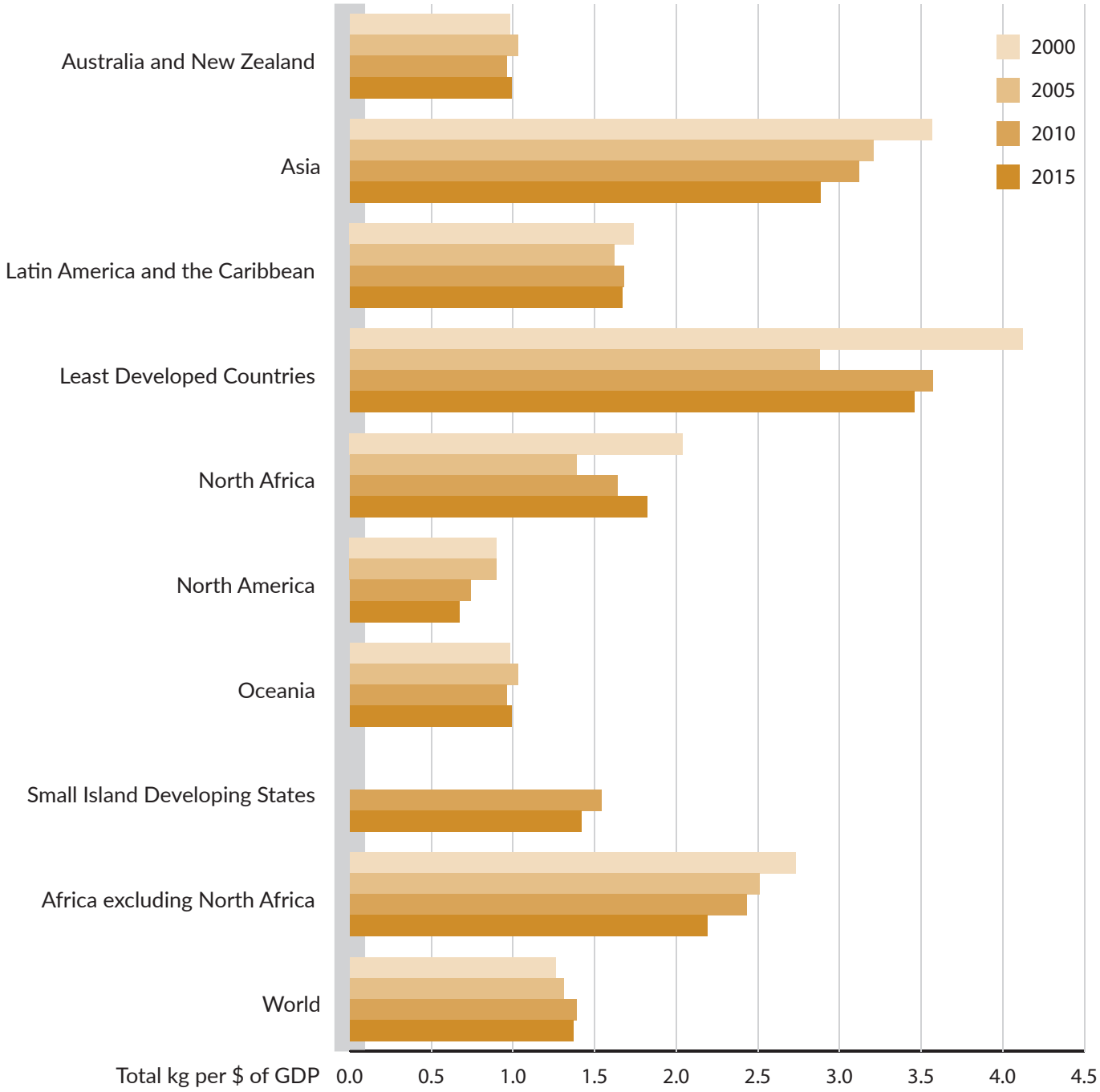


Source: Environment Live database, United Nations Environment Programme.

demand. In this context, a country is likely to have very high DMC if it has a large primary production sector for export, overestimating consumption for exporters, as traded goods require much more material to produce than what is physically incorporated in them, particularly for metals and biomass. Whereas, a low DMC can point to its outsourcing of material-intensive industrial process to other countries, effectively underestimating consumption for importers. The material footprint is thought to correct for both phenomena (FIGURE 4.6 and FIGURE 4.7). [2]

2 UNEP Live Section on DMC under SDG 12 indicator 12.2.2. As traded goods require much more material to produce than what is physically incorporated in them, the DMC measure will therefore overestimate consumption for exporters (particularly for metals and biomass) and underestimate it for importers of metals and biomass.

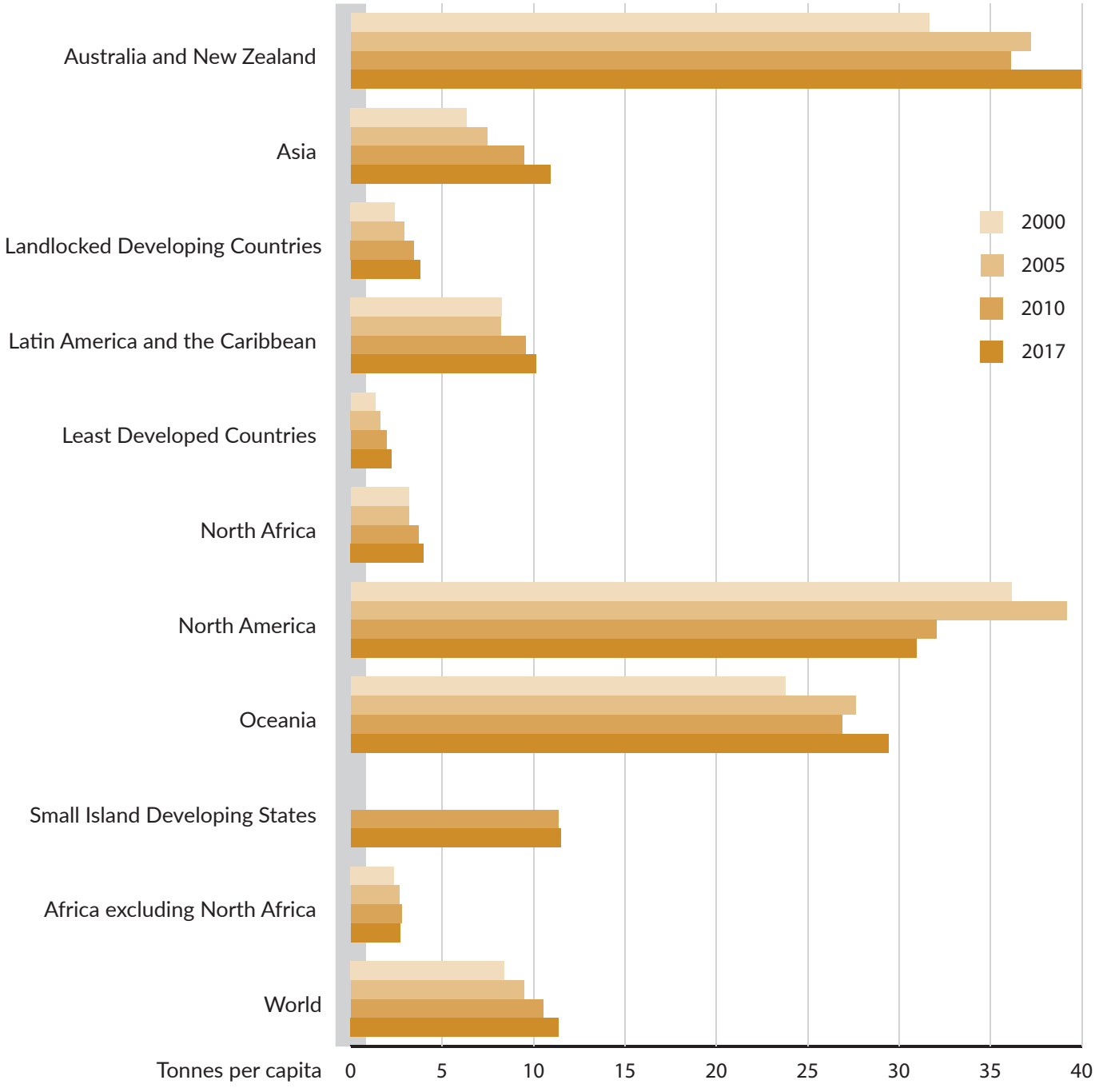
FIGURE 4.6 FIGURE 4.6: DOMESTIC MATERIAL CONSUMPTION PER UNIT OF GDP



Source: Environment Live database, United Nations Environment Programme.

While, most of the regions of the world experienced **decreases in their total DMC per unit of GDP** (measure of the amount of materials directly consumed in an economy by businesses for economic production and by households relative to total output) since 1990, the pace slowed after the year 2000 (FIGURE 4.6). The drivers are: increased efficiencies in production; implementation of environmental standards; incentives that promote efficiency in resource use and recycling; outsourcing; as well as the shift that has been taking place to more service-based economies (including in Africa), which are less resource-intensive than industrial ones. The largest increases in resource efficiency since 2010 were in Asia, though Africa, excluding North Africa, North America, and Small Island and Development States (SIDS) also show improvements in resource use per unit of GDP (FIGURE 4.7). On the other hand, the DMC measure remained constant for Latin America and the Caribbean, while there were noTable increases in

FIGURE 4.7 DOMESTIC MATERIAL CONSUMPTION PER CAPITA

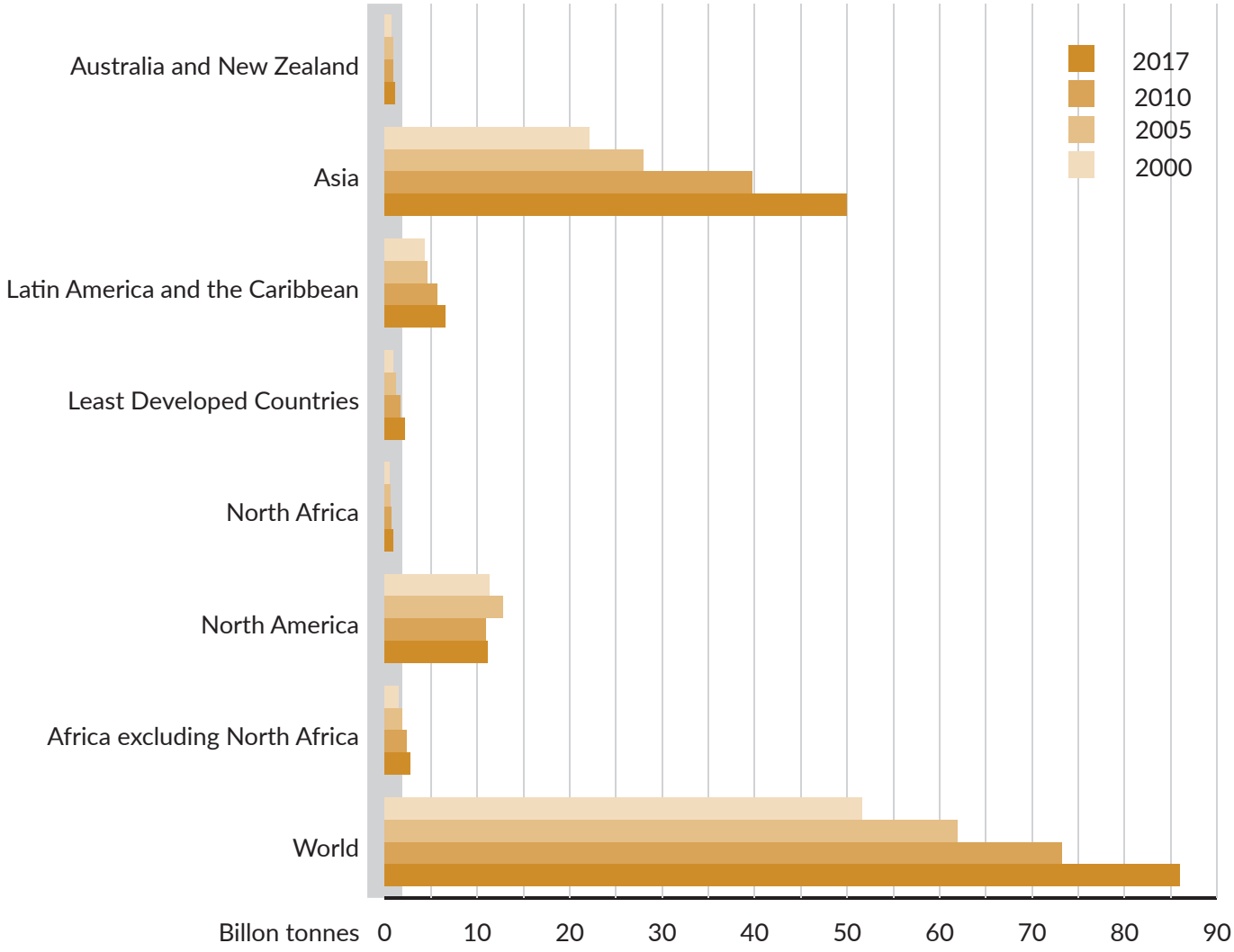


Source: Environment Live database, United Nations Environment Programme.

North Africa by at least 18 per cent between 2010 and 2015, and a 3 per cent increase in the Oceania region, which includes Australia and New Zealand.

Asia's large population, rapid industrialization and urbanization, the economic rise of China and India, along with the related massive infrastructure developments and exports, underpin the significant levels of DMC for this sub-region. In contrast, likely substitution of domestic material extraction in many parts of the developed world by imports from North-East Asia are some of the major drivers underlying the lower levels for North America.

FIGURE 4.8 TOTAL DOMESTIC MATERIAL CONSUMPTION



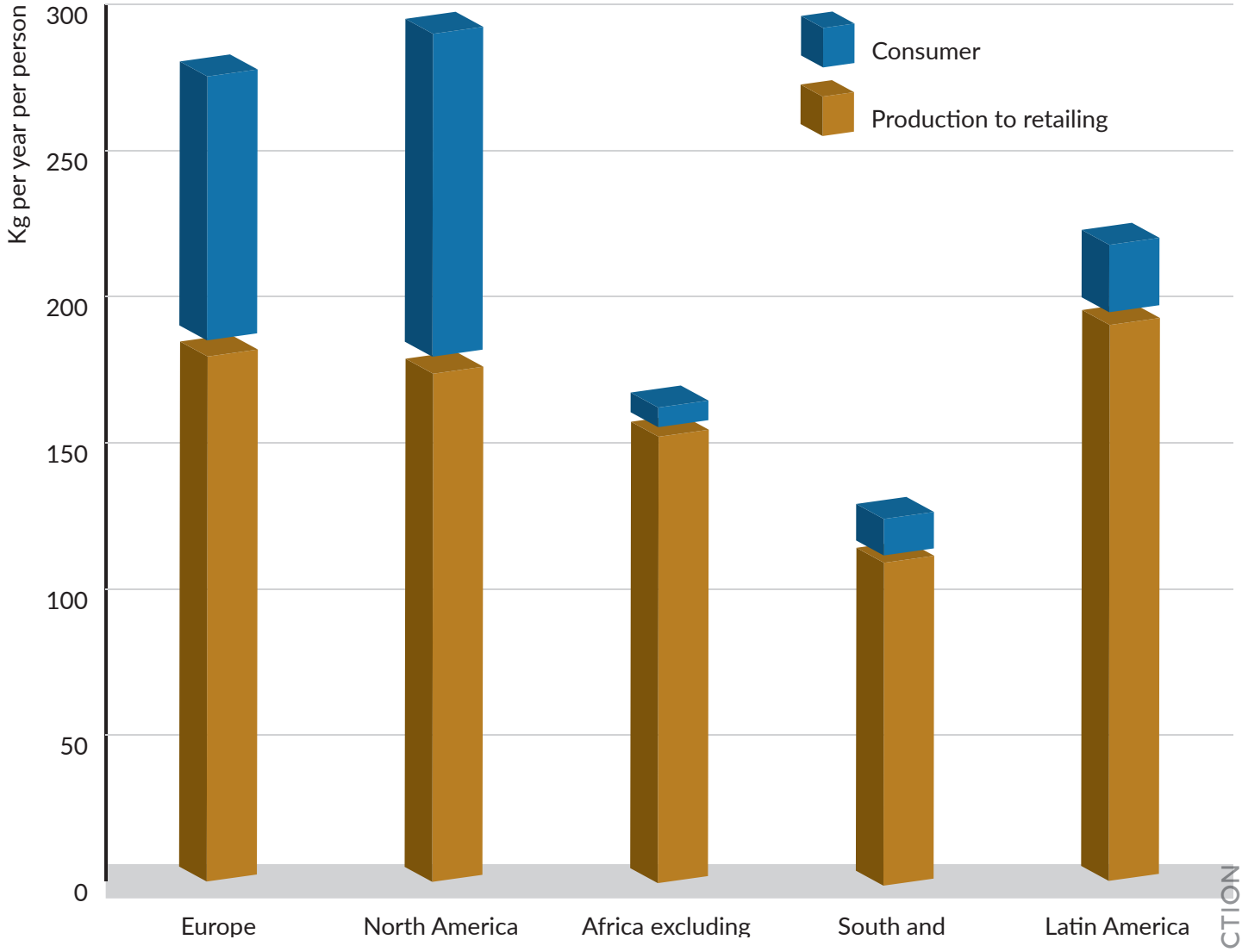
Source: Environment Live database, United Nations Environment Programme.

Between 2000 and 2017, total material consumption in Asia increased by 27 billion tons, representing a 125 per cent increase overall, and continued to account for over half of the global total (FIGURE 4.8) Although the levels in DMC for growth are still low for developing regions, especially Africa, excluding North Africa, the pace of increase is significant. For example, between 2000 and 2017, North Africa and the rest of Africa, respectively, recorded increases of 69 per cent and 80 per cent in DMC. For the LDCs, the combined increase was 145 per cent. Developed regions on other hand, saw modest reductions of about one million tons per year, a 0.07 per cent reduction per year since 2000. Given the rising rates of urbanization and population growth in Africa, these numbers are worrying.

Target 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

Coverage of this target is incomplete and the indicator of food waste is still to be developed. In addition, measurement is complex and there is a lack of international guidelines on how to collect post-harvest losses and waste data. A two-pronged model is being adopted: (i) developing **model-based** estimates as an interim solution for global monitoring and for filling data gaps (refining the model through case studies, empirical data and review by national and international experts); and (ii) developing **cost-effective methods for collecting post-harvest losses data**, providing capacity development to countries to improve food loss measurement (Gennari, 2016). An analysis by the Food and Agricultural Organization of the United Nations (FAO) underscores troubling

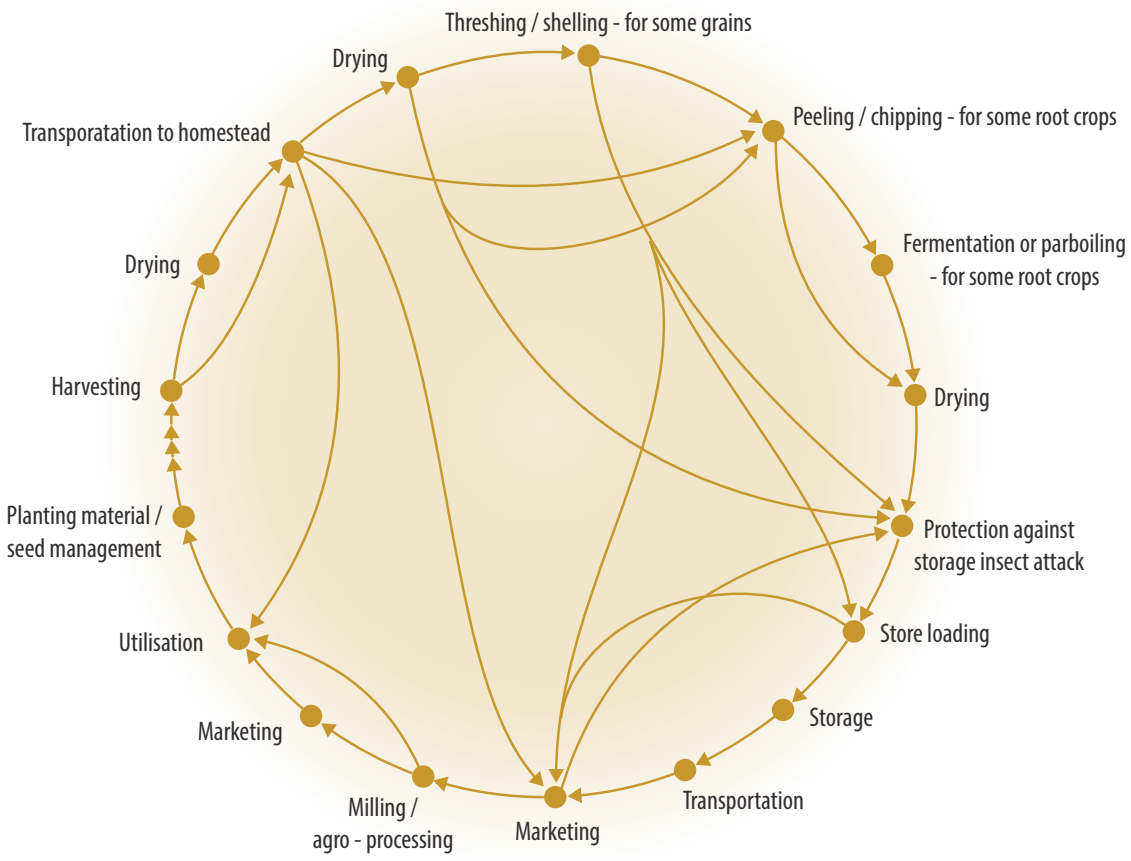
FIGURE 4.9 PER CAPITA FOOD LOSSES AND WASTE AT CONSUMPTION AND PRE-CONSUMPTION STAGES 2010



Source: Food and Agriculture Organization of the United Nations (2011).

patterns of food losses and waste. In developing countries, 40 per cent of losses occur at post-harvest and processing levels, while in industrialized countries more than 40 per cent of losses happen at retail and consumer levels. The latest data show per capita food losses in Africa, excluding North Africa, amount to about 230 kg per person, much of which occurs in the process of production to retailing (FIGURE 4.9). Food losses are highest in North America and Oceania, reaching close to 300 kg per person.

FIGURE 4.10 FOOD PROCESSING CYCLE



Source: Sathers (2017).

Stathers (2017) points out there are numerous steps in the post-harvest processing chain, with opportunities to reduce losses (FIGURE 4.10 see page 78).[3] Depending on the value-chain (e.g., grains, vegetables), specific measures would need to be identified. The focus would need to be on addressing the financial, managerial and technical limitations in harvesting techniques, as well as ensuring adequate storage and cooling facilities in often challenging climatic conditions. The Technical Platform on the Measurement and Reduction of Food Loss and Waste points to the various initiatives underway to improve data collection and estimation.[4] For example, International Food Policy Research Institute (IFPRI) has developed a methodology to improve the measurement of food losses across the value chain, as well as to factor in deterioration in quality that result in economic losses.

Target: 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

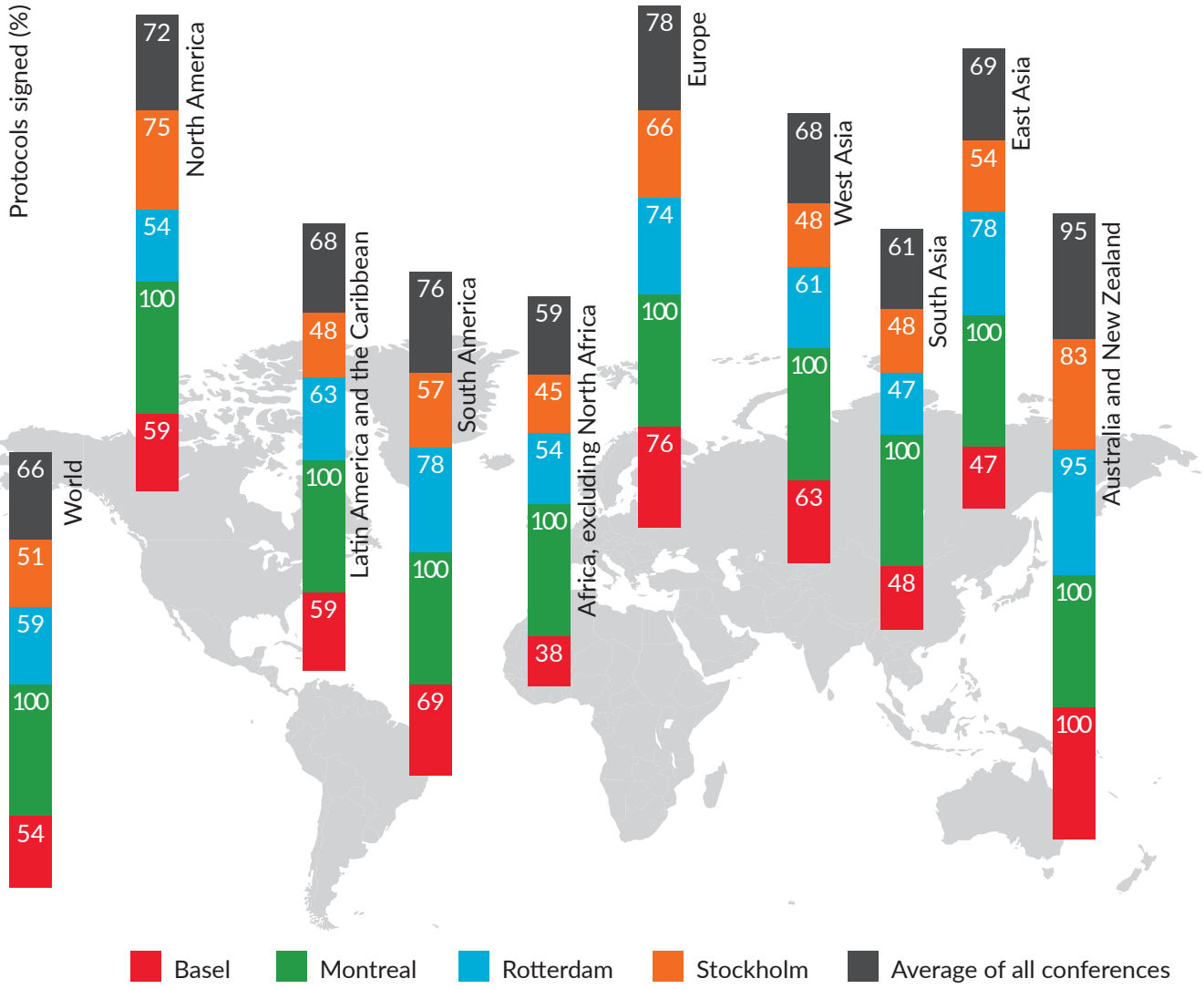
Indicator 12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement.

As of 2015, most countries in the world had signed on to the Montreal Protocol, although the percentages were lower for other multilateral environment agreements (MEAs). Africa, excluding North Africa, came in well below the global average. This is similar to South Asia (FIGURE 4.11) in terms of the overall numbers. Comparatively, Australia and New Zealand have signed the most number of environmental agreements.

3 Stathers, T (2017). Quantifying postharvest losses in Sub-Saharan Africa with a focus on cereals and pulses Presentation at the Bellagio Workshop on Postharvest Management, 12-14 September 2017.

4 Technical Platform on the Measurement and Reduction of Food Loss and Waste and the recent Africa-wide Postharvest food loss reduction Congress and Exhibition.

FIGURE 4.11 SIGNED ENVIRONMENTAL AGREEMENTS BY REGION (PER CENT)



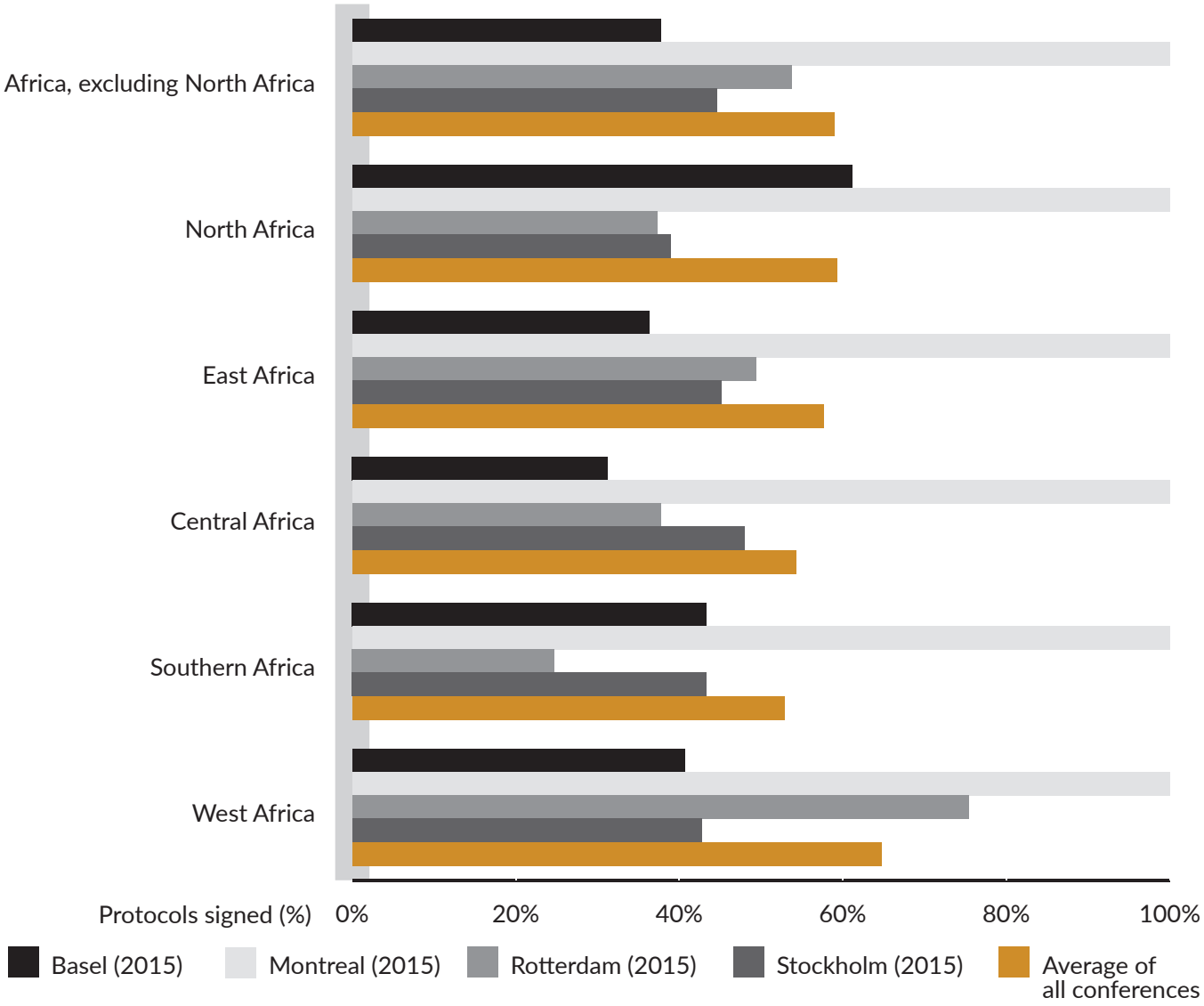
Source: United Nations Statistics Division (2017).

Within Africa itself, West, North and East Africa are the sub-regions that have signed on to most agreements, while Southern and Central Africa fall below the average for Africa, excluding North Africa, in terms of the sum of agreements (FIGURE 4.12 see page 80).

As difficult as it is to balance the different dimensions of sustainable development and prioritize the care of the environment, MEAs are additionally challenging for developing countries. There are estimated to be 500 international treaties and agreements on the environment (155 biodiversity-related; 179 chemicals-related; 46 land-related; and 196 water-related) and a proliferation of subsidiary bodies for the different conventions and administrative arrangements. There is a growing call for mechanisms to ensure synergies across different clusters (e.g., chemical and biodiversity conventions) and to facilitate coordination between focal points for interrelated conventions at national and regional levels. Additionally, important are leveraging synergies in responsibilities of conventions across various sectoral policies, with the promotion of joint implementation and coordination of funding sources and programmes, as well as multi-stakeholder outreach and engagement to ensure buy-in.[5] Capacity building is required given the increasingly complex scientific and technical issues involved. Meanwhile, critical actions may not be taken with fallout for human and environmental health.

5 E.g., Chasek (2014) "Rationalizing the Global Environmental Governance System: Synergies between Multilateral Environmental Agreements."

FIGURE 4.12 SIGNED ENVIRONMENTAL AGREEMENTS BY AFRICA SUB-REGION (PER CENT)



Source: United Nations Statistics Division (2017).

Target 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

Indicator 12.5.1 National recycling rate, tons of material recycled.

Waste management is a growing challenge for many African municipalities, and it is often the largest item on the budget. While there are an increasing number of recycling projects, few countries have adopted system-based approaches or invested in the promotion of the circular economy (waste reduction, reuse and recycling). Further, the methodology (this is a Tier III indicator) and data are issues.

Target 12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

Indicator 12.6.1 Number of companies publishing sustainability reports.

Behavioral change and accountability are keys to ensuring progress for Goal 12. Although Target 12.6 focuses on sustainability reporting, its methodology is still work in progress, with a Tier III indicator whose methodology is yet to be agreed upon. This is largely due to the challenges of defining **companies, sustainability reports** and the integration of quality considerations for what constitutes a **sustainability report**. The Global Reporting Initiative (GRI) has developed a harmonized indicator set and methodology for

companies to report on sustainability and their contribution to the SDGs. The GRI also has a sustainability disclosure database, a global tracker that provides information on countries with national sustainability reporting policies.[6] In terms of regional trends, it notes that Asia has experienced a steady increase in the number of reporters over the last six years, but Latin America, the Caribbean, and Africa, excluding North Africa, have lagged. In African, excluding North Africa, the companies were concentrated in Cote d'Ivoire, Nigeria and South Africa. Southern Africa has the highest disclosure rates with companies from South Africa, Botswana and Mauritius, constituting 70 per cent of all the companies listed in the Barometer.[7]

Target 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

Indicator 12.7.1 Number of countries implementing sustainable public procurement policies and action plans.

This is currently a Tier III indicator and there are challenges with methodology and data for reporting. While this is still in its infancy in many countries in Africa,[8] there are lessons to be learned from the implementation of the 10-YFP on sustainable public procurement and related initiatives at country and institutional levels. More specifically, as public procurement accounts for up to 30 per cent of GDP in many developing countries, leveraging this for incentivizing the purchase of more sustainable goods and services can help drive markets, including for local producers.[9]

The remaining targets all have Tier III indicators: Target 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature; Target 12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production; Target 12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products; and Target 12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.

While there are an increasing number of recycling projects, few countries have adopted system-based approaches or invested in the promotion of the circular economy (waste reduction, reuse and recycling).

6 http://database.globalreporting.org/SDG-12-6/Global-Tracker

7 The *Financial Times* with the UN Global Compact (2013).

8 Western Cape in South Africa offers some lessons. See IISD case study and support. Among others, Ghana has also made a commitment to develop a fully-fledged SPP policy.

9 E.g., the 2017 Global Review of Sustainable Public Procurement from UNEP, which explores the progress made in the past three years at a global scale and highlights some of the regional trends (limited in the case of Africa). The research investigated what 41 national governments are doing to promote, implement and measure the outcomes of SPP to benchmark results and assess progress over time. The survey also gathered inputs from stakeholders on their views on the drivers, risks, barriers and outcomes for sustainable procurement broadly and as it is practiced within their organizations.

4.4 Conclusions

SCP patterns offer opportunities for Africa to move toward more sustainable development pathways with enhanced results for existing sectors and the well-being of its people. For example, greening industrial value chains would provide Africa with the opportunity to achieve forward-looking structural transformation (i.e., deliver a more competitive and resource-efficient industrial sector that is also more climate resilient), diversification and job creation while mitigating adverse impacts on the continent's natural resource base.

While material intensity in Africa, excluding North Africa, is still relatively very low, this is not grounds for complacency. Africa has been experiencing the fastest population growth rate relative to other regions. More than half of the anticipated growth in global population between now and 2050 is expected to occur in Africa, which is the only region still experiencing substantial population growth.

Promoting sustainable urbanization (addressed under SDG 11) is a critical entry point for the SCP Agenda in Africa. Rapid urbanization is adding to the sustainability growth challenge for developing regions as a whole, including much of Africa. Planned urban growth around dense human settlements, use of green technologies for building and energy efficiency, and designing and implementing public transport systems (covered in Target 11.2) will facilitate inclusion and offer job opportunities. Further, relatively few African cities have integrated solid waste management plans or recycling plans, an issue that requires urgent attention. Without good waste management systems in place (covered in Target 11.6), recycling targets might not be met.

Even as food insecurity and malnutrition are high, food losses are also very high (post-harvest) in Africa. Reducing such post-harvest food losses and waste needs to be a priority for African countries for a number of reasons. Despite the prevalence of food insecurity and malnutrition in Africa, food losses, especially at post-harvest, are high. Climate change is expected to hit many countries hard, and potential impacts include greater frequency of extreme weather events, longer dry spells and reduced rainfall. These pose significant threats to agriculture in many parts of Africa, excluding North Africa. At the same time, rapid population growth is increasing the demand for food. Of the 2.2 billion people projected to be added to the global population between 2017 and 2050, 1.3 billion are expected to be in Africa (World Population Prospects: revised edition 2017). The productivity of a number of crops will have to rise dramatically to respond to demand. It is argued that even saving just one quarter of the food currently lost or wasted globally could feed 870 million hungry people and can result in significant savings in the use of water, materials and land in the context of production. For Africa, reduction in post-harvest food losses could mitigate the required increases in productivity among other solutions and contribute to enhancing food security. The Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods (2014) included a commitment 'to halve the current levels of post-harvest losses by the year 2025' (prior to SDG target year 2030). Improvements in farm-based technologies, infrastructure and warehousing facilities, along with the adoption of warehouse receipt systems, inclusive rural financial markets and measures to address high rates of food contamination are required to achieve the Malabo Declaration.

SCP patterns offer opportunities for Africa to move toward more sustainable development pathways with enhanced results for existing sectors and the well-being of its people. However, SCP patterns rank low on Africa's policy agenda, in part because of the relatively low level of material use and low levels of

Climate change is expected to hit many countries hard, and potential impacts include greater frequency of extreme weather events, longer dry spells and reduced rainfall. These pose significant threats to agriculture in many parts of Africa, excluding North Africa.

income. It is, therefore, important to mainstream SCP patterns in the Agenda 2063 indicators as methodologies are being clarified.[10] At the national level, SCP pattern-related plans need to be pragmatic and prioritized. There is often a lack of focus on identifying priority interventions; coupled with the limited enforcement capacity, this results in limited impact.

Awareness about the potential and scope of SCP is limited. In development policy arenas, environmental considerations are often perceived as 'add-ons' to doing business, and there is considerable underpricing of environmental goods and services and underestimation of social losses and impacts on natural capital.

Multi-stakeholder forums, such as the regional roundtables on SCP patterns and SWITCH Africa Green (SAG) initiative, offer opportunities for learning on concrete sector-specific initiatives, including eco-tourism, which is an area of focus under Target 12.6 Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products. The initiative is currently supporting six countries in Africa: Burkina Faso, Ghana, Kenya, Mauritius, South Africa and Uganda. There is room for scaling up to cover more countries.

The African Regional Roadmap for the 10-YFP on SCP patterns identifies six key approaches to promote SCP patterns, which remain relevant: (i) an enabling policy and regulatory framework; (ii) a participatory approach between civil society, business and policy makers to build effective policies leading to new actors; (iii) a conducive financing framework, including domestic resource mobilization; (iv) capacity building of all stakeholders; (v) R&D to encourage innovation and build a strong science base for policy making relative to SCP patterns; and (vi) knowledge management to ensure its efficient transfer and utilization.

10 SDG Goal 12 does not appear in Annex 3: Agenda 2063 and the Sustainable Development Goals: Commonality Profile of the African Union's First Ten-Year Implementation Plan 2014–2023, nor in the Core indicators Profile Handbook for Member States, March 2017.

CHAPTER 5

Life on Land

5.1 Introduction

Goal 15 of the 2030 Agenda for Sustainable Development: **Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss,** and Goal 7 of Agenda 2063 were formulated in furtherance of the objectives of a number of Multilateral Environmental Agreements (MEAs), which date back to the landmark United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992. Although the Forest Principles[1] adopted during the UNCED are not legally binding, they reflect the first global consensus on forests and call for sound management, conservation and sustainable development of forests. The Convention on Biological Diversity (CBD)[2] adopted at the same conference, however, is a legally binding multilateral agreement aimed at achieving a triad of objectives: conservation of biological diversity; sustainable use of its components; and fair and equitable sharing of benefits. Another legally binding MEA of relevance to this goal is the 1994 United Nations Convention to Combat Desertification (UNCCD). UNCCD was adopted with the objectives of combating desertification and land degradation in countries experiencing serious drought and/or desertification, particularly in Africa, where achieving this goal includes improvement of land productivity, rehabilitation, conservation and sustainable management of land and water resources.[3] UNCCD represents the first global attempt at linking environment and development to sustainable land management. The United Nations Framework Convention on Climate Change (UNFCCC)[4] has the broad objective of reducing greenhouse gas emissions in order to prevent human activity induced climate change.[5] Further, although there is no one global agreement on mountains, the Rio Declaration,[6] CBD, UNFCCC, as well as UNCCD, all contain wording and commitments with strong bearing on mountain people and resources, noting in particular, the importance and vulnerability of mountain ecosystems.

Terrestrial habitats and ecosystems such as forests, wetlands, drylands and mountains with their diverse flora and fauna are important for economic, scientific, educational, socio-cultural, recreational and aesthetic values and form part of our common heritage. Plants provide 80 per cent of the human diet, and agricultural production, in addition to providing the necessary nutrition and food security, is also an important means of livelihood, especially for rural agrarian communities in Africa. Forest ecosystems, which cover 30 per cent of the earth's surface, provide vital habitats for millions of flora and fauna and serve as an important source of clean air and water, which are critical for our sustenance. Forests are carbon sinks and thus play a critical role in combating climate change. Despite their benefits, many of Africa's ecosystems are under threat of serious degradation due primarily to anthropogenic causes. All African countries are prone to desertification, with the Sahelian countries on the southern fringes of the Sahara Desert being particularly vulnerable. Rapid population growth, rapid urbanization, unsustainable land-use systems and climate variation, coupled with a dearth of clear policy and legislative frameworks, weak institutional capacities and limited funding are all-important contributing factors to the rapid degradation of the continent's ecosystems and loss of important habitats. Unsustainable production and consumption patterns are also important contributors to ecological stress,

1 http://www.un.org/documents/ga/conf151/aconf15126-3annex3.htm.

2 https://www.cbd.int/doc/legal/cbd-en.pdf.

3 http://www.unccd.int/en/about-the-convention/Pages/Text-overview.aspx.

4 https://unfccc.int/resource/docs/convkp/conveng.pdf.

5 It is instructive to note that the Paris Agreement (https://unfcc.int), builds on this particular Convention and commits all nations to undertake ambitious efforts to combat climate change and adapt to its effects by, specifically, keeping the global temperature rise this century well below 2^0 Celsius above pre-industrial levels through Nationally Determined Contributions (NDCs) and regular reporting on the same.

6 http://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf.

Habitat and ecosystem degradation in effect jeopardizes the provision of basic services, such as health and education, as well as water, agricultural production and productivity, economic growth and job creation, and ultimately, the quality of human life.

especially on agricultural lands, energy and water resources. Habitat and ecosystem degradation in effect jeopardizes the provision of basic services, such as health and education, as well as water, agricultural production and productivity, economic growth and job creation, and ultimately, the quality of human life. Conservation and sustainable use of ecosystems hold the key to mankind's continued existence on earth. But ecosystem conservation is not a zero-sum policy option. There exist inherent trade-offs and synergies between conservation, sustainable management and economic benefits derivable from the continent's abundant environmental resources, including terrestrial and freshwater resources. Conservation and sustainable management of ecosystems should yield economic, socio-cultural, scientific, recreational and other benefits to national and local governments, as well as local communities, including indigenous peoples.

Goal 15 commits the global community to take urgent actions to protect, restore and promote sustainable use of terrestrial and freshwater ecosystems; sustainably manage forests; combat desertification; and halt and reverse land degradation and loss of biodiversity. Unlike other SDG targets which are to be achieved by the year 2030; the targets under this goal, with the exception of Target 15.3 (combating desertification) and Target 15.4 (conserving mountain ecosystems), are to be met within a much shorter time frame, that is, by 2020, underlining the urgency with which action is needed. Goal 7 of Agenda 2063 on environmentally sustainable and climate resilient economies and communities identifies the following areas for priority action by African governments: biodiversity conservation and sustainable natural resource management; achieving water security; and climate resilience and natural disasters preparedness. Building on the *Africa Sustainable Development Report 2017*, this chapter assesses Africa's progress on Goal 15 relative to other regions, by describing key baselines and trends (where data is available).

5.2 Alignment with Agenda 2063

Goal 15 has 12 targets and 14 indicators and is aligned to Goal 7 of Agenda 2063 on environmentally-sustainable climate-resilient economies and communities. Specifically, three targets and three indicators of Goal 15 are distinctly aligned to two corresponding targets and three indicators of Goal 7 of Agenda 2063 as shown in TABLE 5.I.

TABLE 5.1 GOAL 15 ALIGNMENT WITH AGENDA 2063

AGENDA 2030 TARGETS	ALIGNMENT WITH AGENDA 2063	
	AGENDA 2063 GOAL	TARGETS
15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.	**7** Environmentally sustainable climate resilient economies and communities.	**1.7.1.2** At least 17% of terrestrial and inland water and 10% of coastal and marine areas are preserved.
15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.		**1.7.3.2** Reduce to 2013 levels emissions arising from agriculture bio-diversity loss, land use, and deforestation.
15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.		
15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.	**7**	**1.7.1.2** At least 17% of terrestrial and inland water and 10% of coastal and marine areas are preserved.
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.		
15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed.		
15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.		
15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.		
15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.		
15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.		

TABLE 5.1 (CONT)

AGENDA 2030 TARGETS	ALIGNMENT WITH AGENDA 2063	
	AGENDA 2063 GOAL	TARGETS
15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.		
15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities.		

Sources: United Nations Department of Economic and Social Affairs (2018) and Economic Commission for Africa and others (2017). Source: African Union (2017) Agenda 2063–Sustainable Development Goals mapping exercise. https://au.int/en/ea/statistics/a2063sdgs.

5.3 Progress tracking

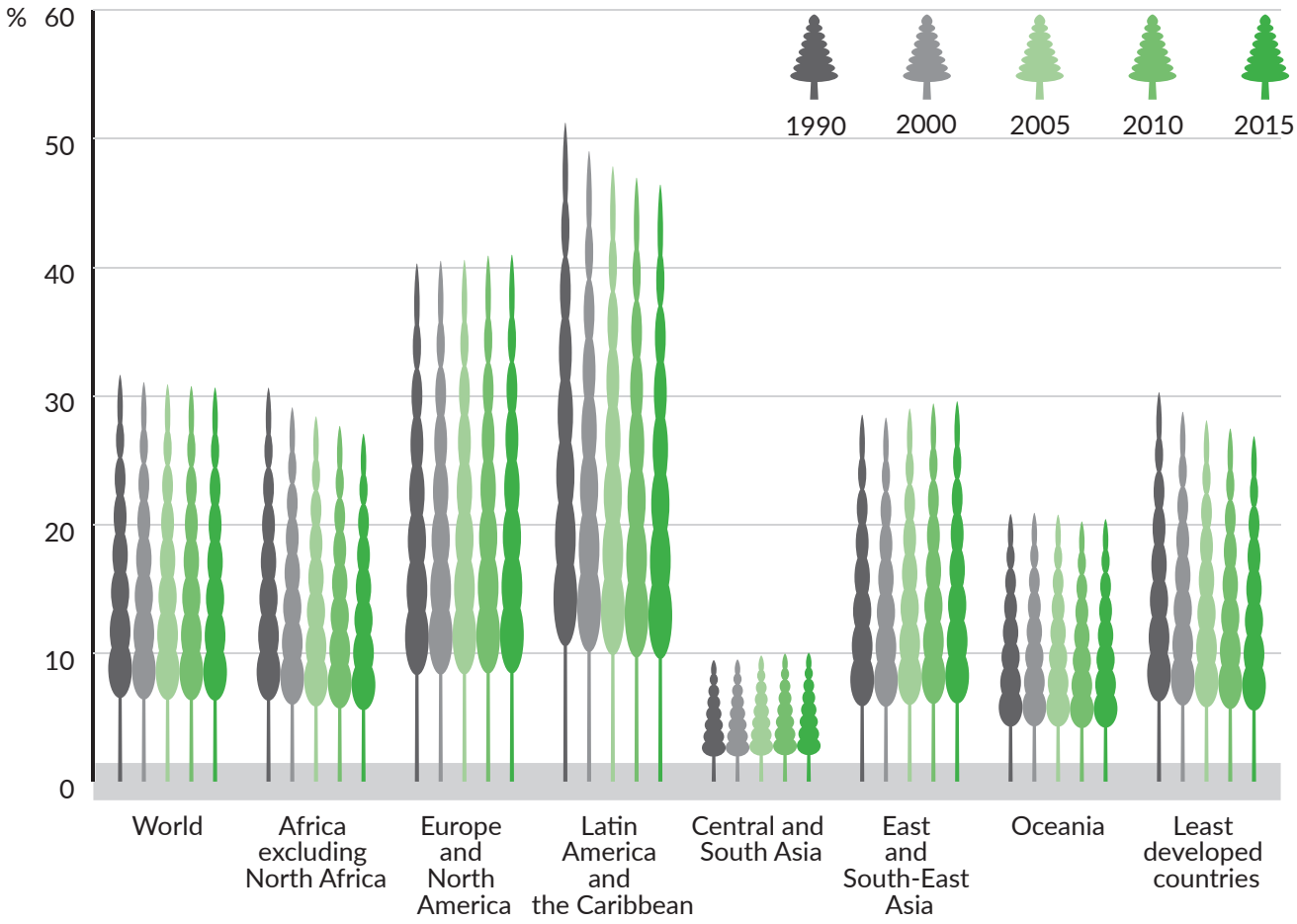
5.3.1 Overview

Africa's ecosystems are under growing threat of degradation. Africa, excluding North Africa, together with South East Asia are the two regions with a decline of at least two percentage points in relative forest cover (forest as a proportion of total land area) over the 2000-2015 period. This is four times the global average of 0.5 percentage points. Africa is also one of the five regions of the world to have registered a net decline in area under forest cover of at least 0.4 per cent between 2010 and 2015.[7] The relative rapid decline in total forest cover in Africa can be attributed, in part, to lumbering, encroachment of forest lands for farming, and settlements and a dearth of long-term forest management plans for most of the region's forest lands. Although the proportion of forest area with such long-term management plans doubled between 2005 and 2010, the current (2010) figure of 15.3 per cent (23 per cent for Northern Africa) is below the global average of 52.6 per cent and the figure for Europe which stands at 95 per cent.

The region has however, taken commendable steps to protect its biological resources, being second only to Europe and North America in terms of important sites for biodiversity (both terrestrial and freshwater) currently under protection with 47 per cent of important sites for terrestrial biodiversity and 45 per cent of sites important for freshwater biodiversity currently under protection compared to the figures for Europe and North America which stand at 60 per cent and 54 per cent, respectively. Moreover, the region's proportion of forest area within protected areas compares favourably with the global average which bodes well for the conservation of forests. With respect to the Mountain Green Cover Index (MGCI), which measures changes in green vegetation (forest, shrubs, pasture and crop land) in mountain areas, Africa outperforms many of the world's regions, except Oceania (96 per cent) and Southeast Asia (98 per cent), with 90 per cent of the region's mountains covered by vegetation against a global average of 76 per cent. One area of concern for the region however, remains the high risk of extinction of major animal species in the future. Like other regions of the world, Africa faces the risk of extinction of major animal species as exemplified by the downward trend in the Red List Index over the 2000–2007 period. Another important area of concern is the continued threat of desertification and its impact on land use and the livelihoods of local populations.

7 The other regional blocks are landlocked least developed and developing countries.

FIGURE 5.1 FOREST AREA AS A PROPORTION OF TOTAL LAND AREA



Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.1.2 based on BirdLife International, International Union for Conservation of Nature and UN Environment World Conservation Monitoring Centre (2017); www.keybiodiversityareas.org and www.protectedplanet.net.

5.3.2 Analysis of progress by Target

Target 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

Indicator 15.1.1 Forest area as a proportion of total land area.

Globally, forest area as a proportion of total land area has been on a declining trend over the past two and a half decades. The fastest decline is registered in Africa, excluding North Africa, and LDCs, affirming the well-documented positive correlation between poverty levels and rate of deforestation as the poor try to eke a living out of forest lands and fragile ecosystems. Forests also serve as the main source of woody biomass, an important source of cooking fuel for a majority of the African population, especially those in rural, and peri-urban areas. Within Africa, there exist wide sub-regional variations in the rate of deforestation with the fastest rate of deforestation having been registered in the eastern Africa region. At the national level, while most African countries recorded a decline in the proportion of total land covered by forests, there were a few exceptions. Six countries[8] recorded an increase in proportion of total land area covered by forests.

8 Cote d'Ivoire, Gabon, Gambia, Ghana, Seychelles and Sierra Leone.

FIGURE 5.2 FOREST AREA AS A PROPORTION OF TOTAL LAND AREA BY AFRICA SUB-REGIONS

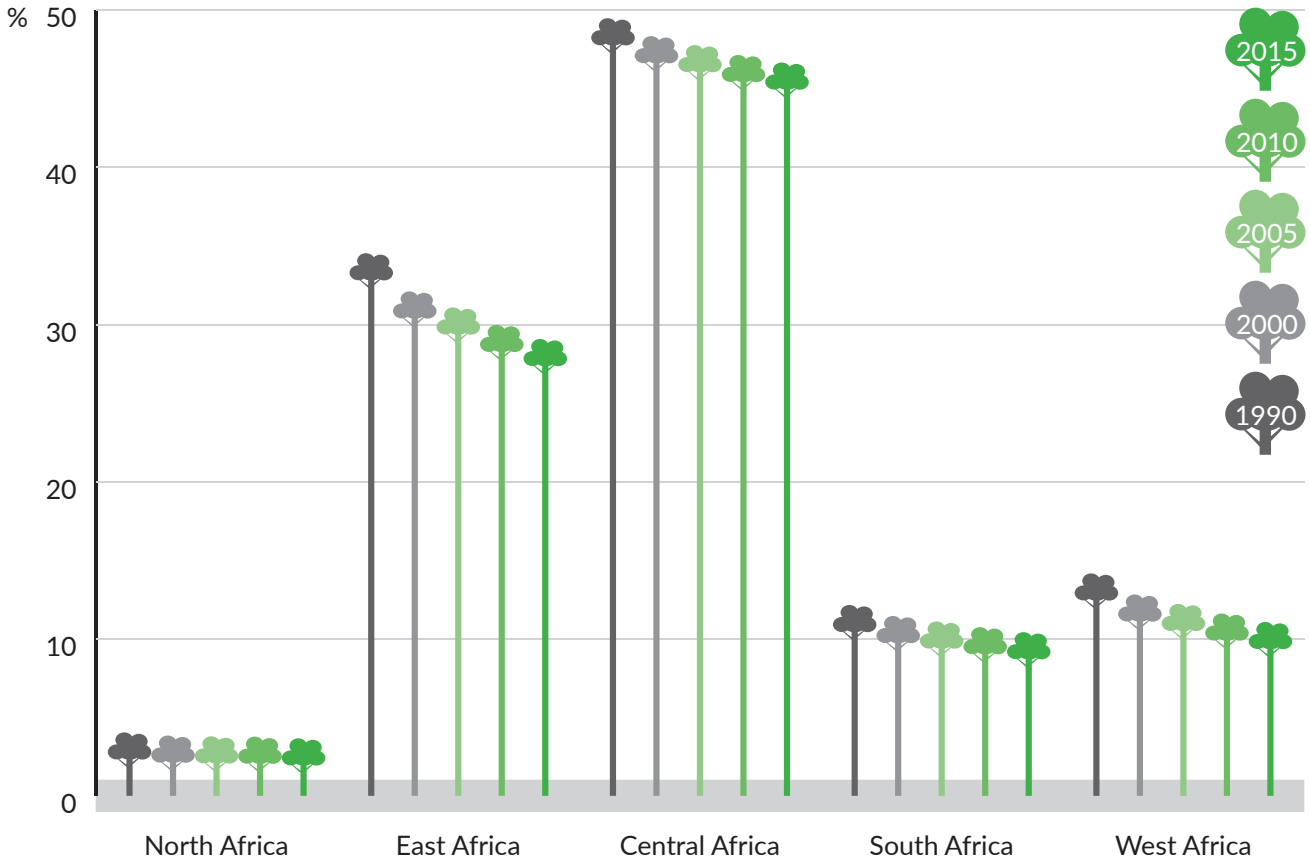
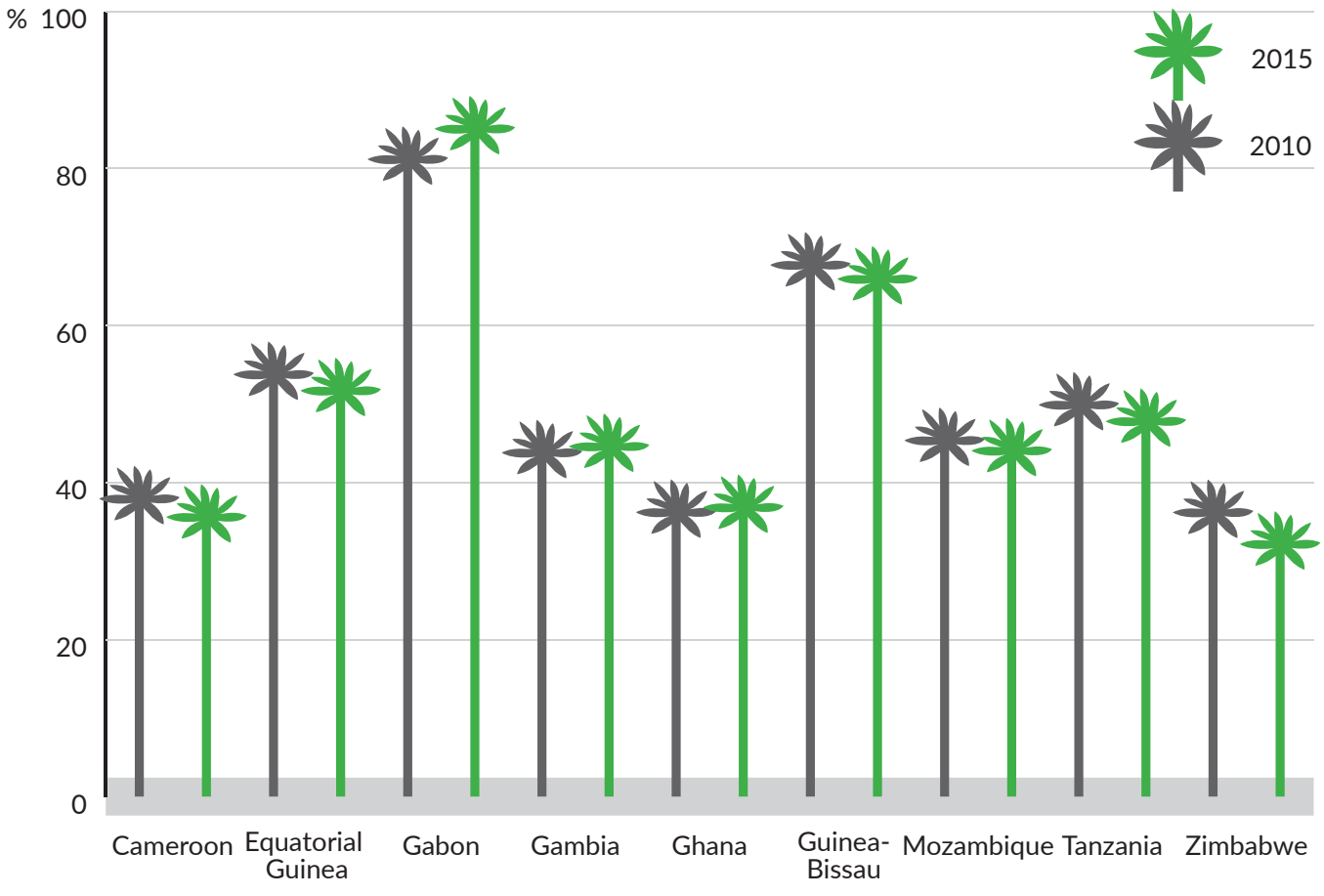


FIGURE 5.3 FOREST AREA AS A PROPORTION OF TOTAL LAND AREA FOR SELECTED AFRICAN COUNTRIES



Source figures 5.2 & 5.3: https://unstats.un.org/sdgs/indicators/database/?indicator=15.1.2 based on BirdLife International, International, International Union for Conservation of Nature and UN Environment World Conservation Monitoring Centre (2017); www.keybiodiversityareas.org and www.protectedplanet.net.

Indicator 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type.

The CBD calls for the conservation of biodiversity under both *ex-situ* and *in-situ* conditions,[9] conservation within protected areas.[10] For endangered and endemic species, conservation, either under *ex-situ* or *in situ*, is of critical importance. Efforts to conserve biodiversity (both terrestrial and freshwater) through policy, legislative and administrative actions have intensified since 2000. A significant proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas are rising in all regions of the world, including Africa. However, there are wide inter-state variations in the rate of change over time and current values of the proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas.[11]

A significant proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas are rising in all regions of the world, including Africa.

Target 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.

Indicator 15.2.1 Progress towards sustainable forest management.

Africa is under serious threat of deforestation, with the area under forest declining at a rate above the global average.[12] At the sub-regional level, West Africa recorded the greatest decline in area under forest between 2010 and 2015.[13]

The rapid rate of deforestation in the region, measured using the net change in forest area or forest area as a proportion of total land area can be partially attributed to increased exploitation of forest resources for commercial purposes, including lumbering; encroachment of forest land by local communities for agricultural activities, and a dearth of long term management plans for most of the region's forests, coupled with a lack of resources and weak institutional capacity to implement such long-term plans where they exist. However, regional and national efforts to design such plans and place forest management within protected areas are beginning to yield positive results. During the 2005-2010 period, almost every African country registered an increase in the proportion of forest area with long-term management plans.

Target 15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

Indicator 15.3.1 Proportion of land that is degraded over total land area.

Desertification refers to land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities (UN, 1994).[14] Although there are no reliable (global and/or regional) datasets to support an analysis of trends or a determination of baselines of proportion of land that is degraded, the UNCCD recognizes that desertification and drought affect sustainable development through their interrelationships with important social problems, such as

9 Ex-situ conservation involves the management of components of biological diversity outside their natural habitats and in-situ considers conservation of ecosystems and natural habitats, maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

10 A geographically defined area, designated or regulated and managed to achieve specific conservation objectives.

11 For terrestrial ecosystems the top four countries are Equatorial Guinea, Ghana, Togo and Zimbabwe. For freshwater ecosystems, the top five countries are Central Africa Republic, the Republic of Congo, Cote d' Ivoire, Guinea and Gabon.

12 Only comparable to landlocked developing countries.

13 It is important to distinguish between forest area as a proportion of total land area and net change in forest area.

14 http://www.unccd.int/en/about-the-convention/Pages/Text-overview.aspx.

FIGURE 5.4 PROPORTION OF IMPORTANT SITES FOR TERRESTRIAL BIODIVERSITY COVERED BY PROTECTED AREAS

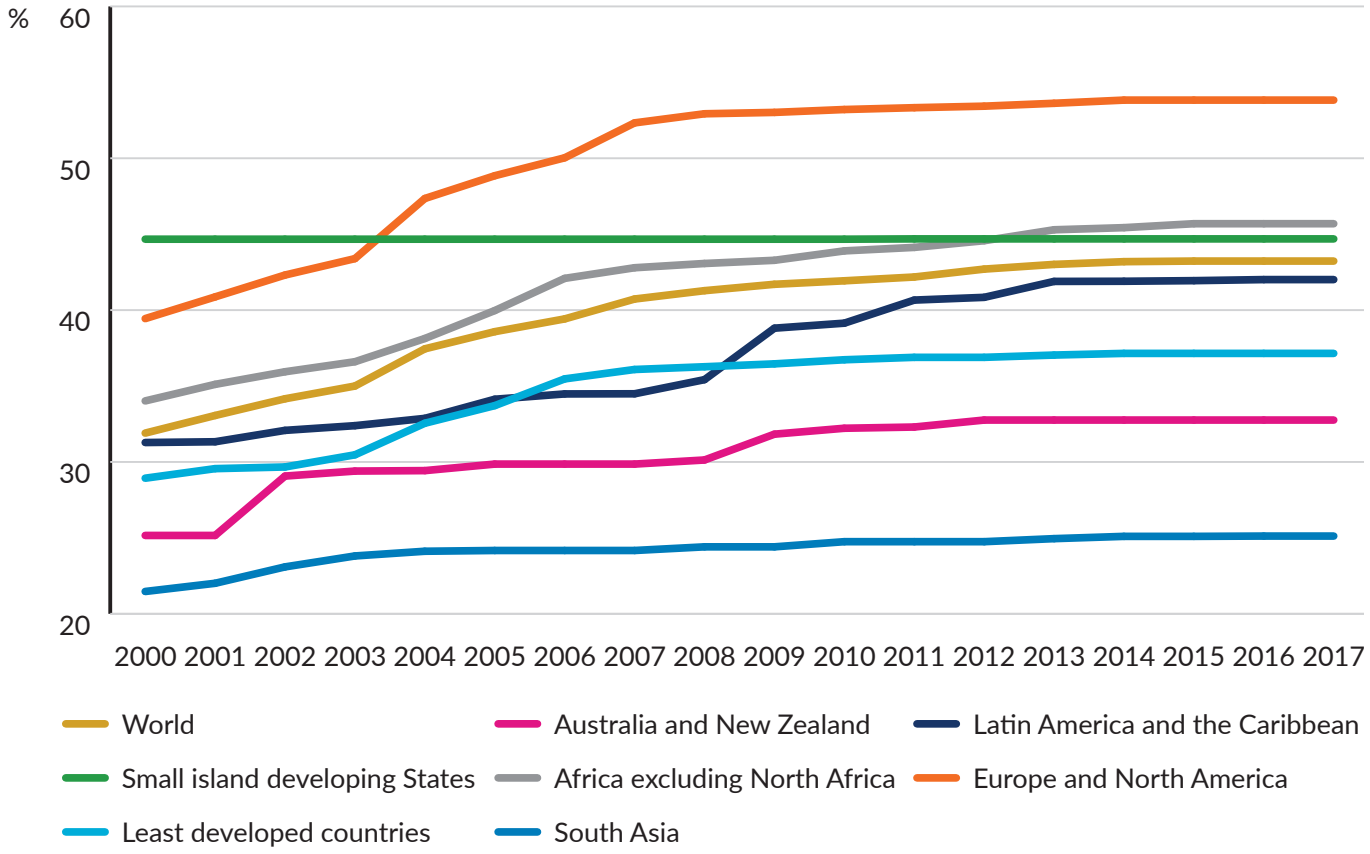
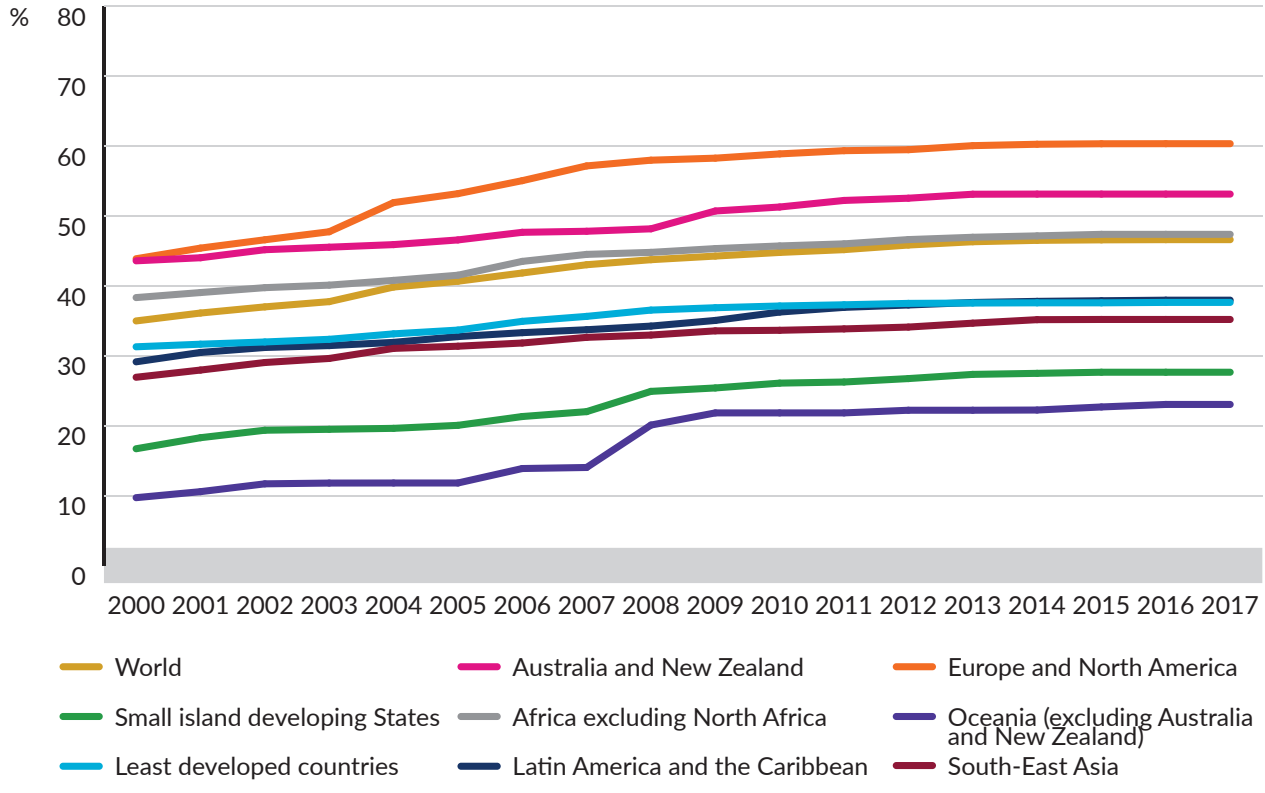
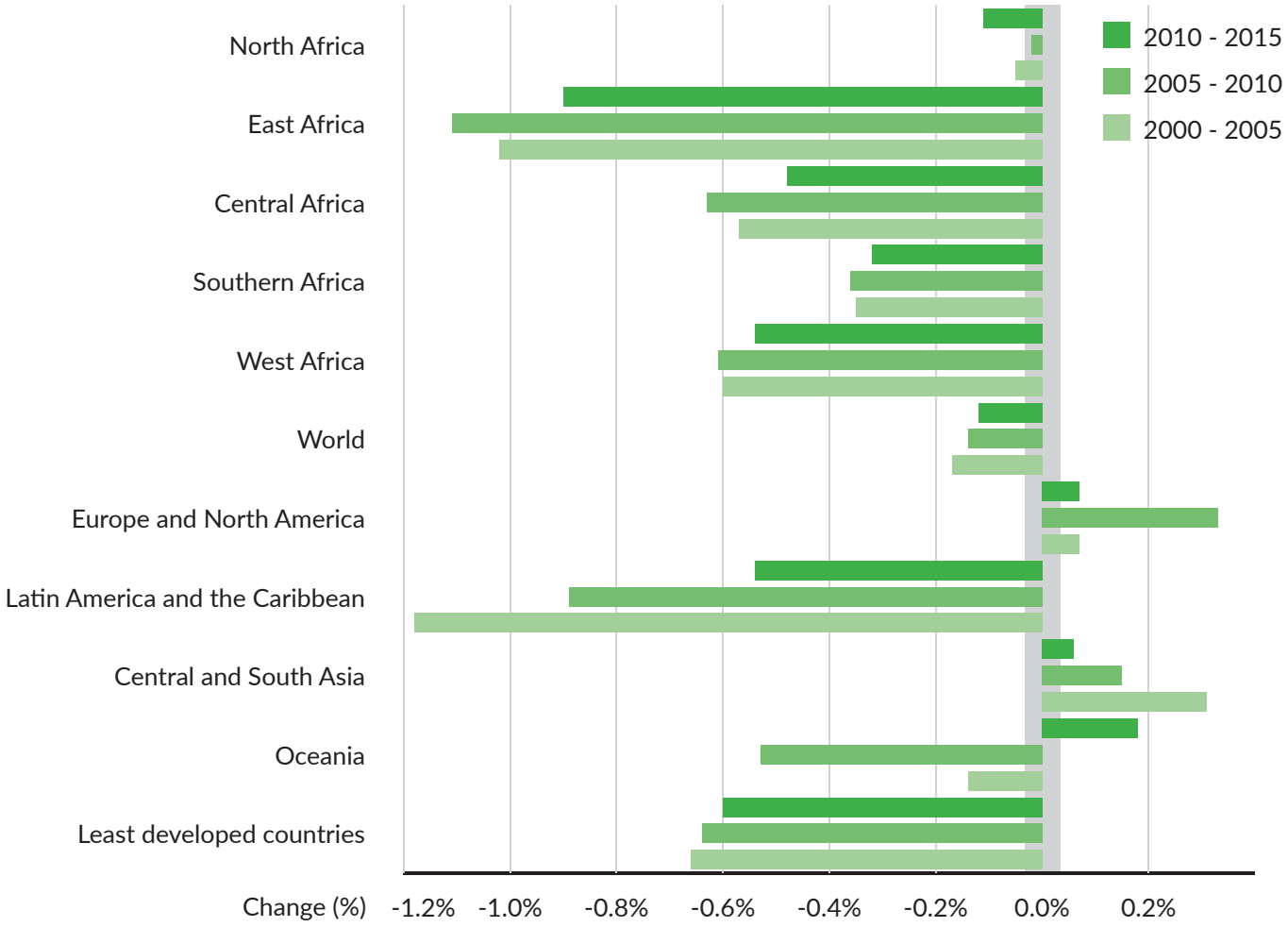


FIGURE 5.5 PROPORTION OF IMPORTANT SITES FOR FRESHWATER BIODIVERSITY COVERED BY PROTECTED AREAS



Source figures 5.4 & 5.5: https://unstats.un.org/sdgs/indicators/database/?indicator=15.1.2 based on BirdLife International, International, International Union for Conservation of Nature and UN Environment World Conservation Monitoring Centre (2017); www.keybiodiversityareas.org and www.protectedplanet.net.

FIGURE 5.6 FOREST AREA NET PER CENT CHANGE RATE, 2005-2010 AND 2010-2015



Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.1.2 based on the Food and Agriculture Organization of the United Nations (FAO) Global Forest Resources Assessment; FAO estimates.

poverty, poor health and nutrition, lack of food security, combined with those arising from migration, displacement of persons and demographic dynamics. It is also recognized that these phenomena mostly affect the LDCs, particularly those in Africa. Although, there is limited targeted funding available under the Global Environment Facility (GEF) Trust Fund, the Convention, nonetheless, calls for international cooperation and the need to honour the developed country commitments outlined in Chapter 33 of Agenda 21[15] for the realization of its objectives. Agenda 21 identifies domestic resources from mainly public, and private sectors, as well ODA (especially for LDCs) as the main sources of financing for SCP patterns. It also calls on the global community to maximize the availability of new and additional resources and use of all available funding mechanisms in support of environmental conservation and development.

15 https://www.dataplan.info/img_upload/7bdb1584e3b8a53d337518d988763f8d/agenda21-earth-summit-the-united-nations-programme-of-action-from-rio_1.pdf.

FIGURE 5.7 PROPORTION OF FOREST AREA WITH A LONG-TERM MANAGEMENT PLAN

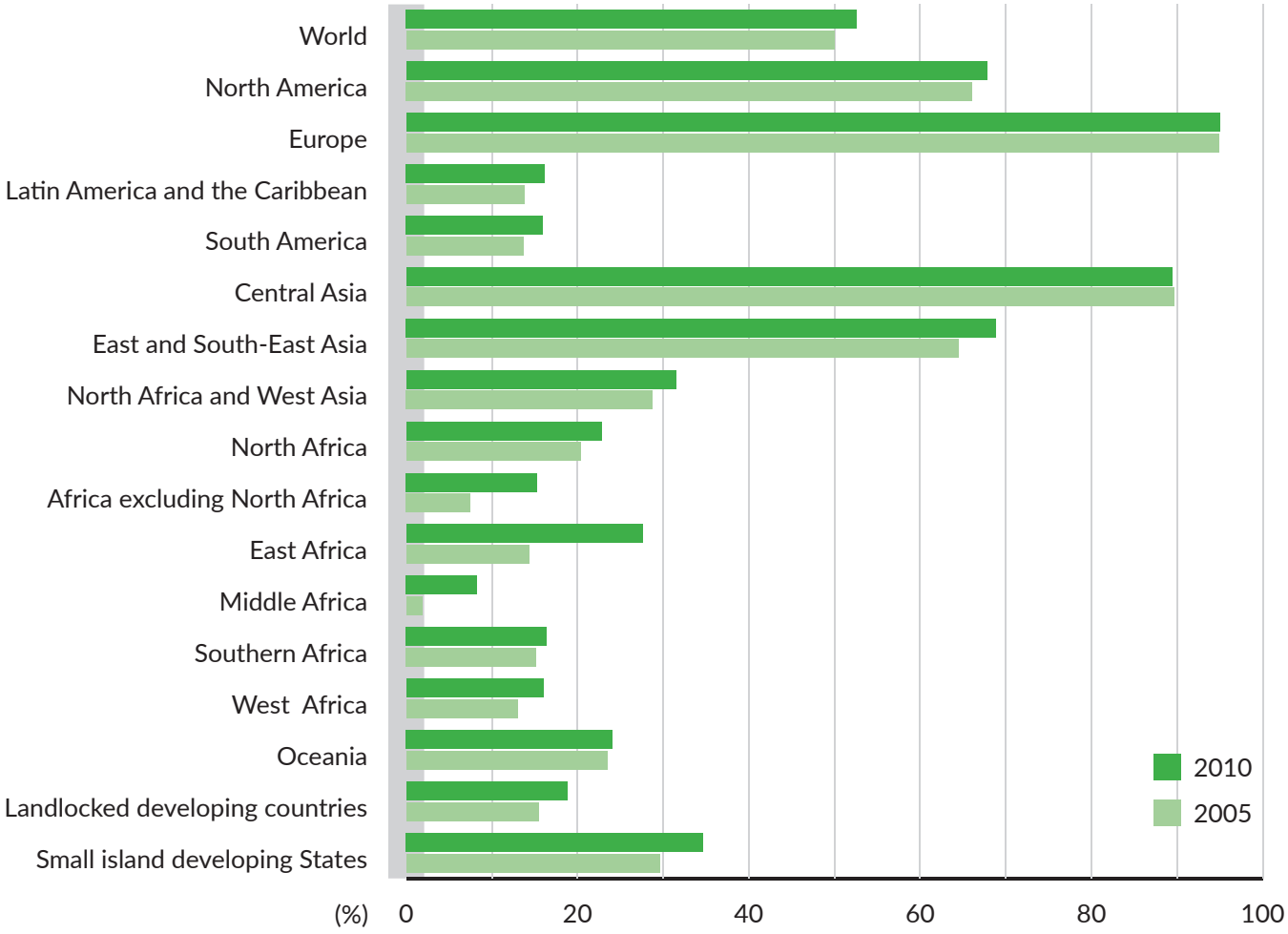
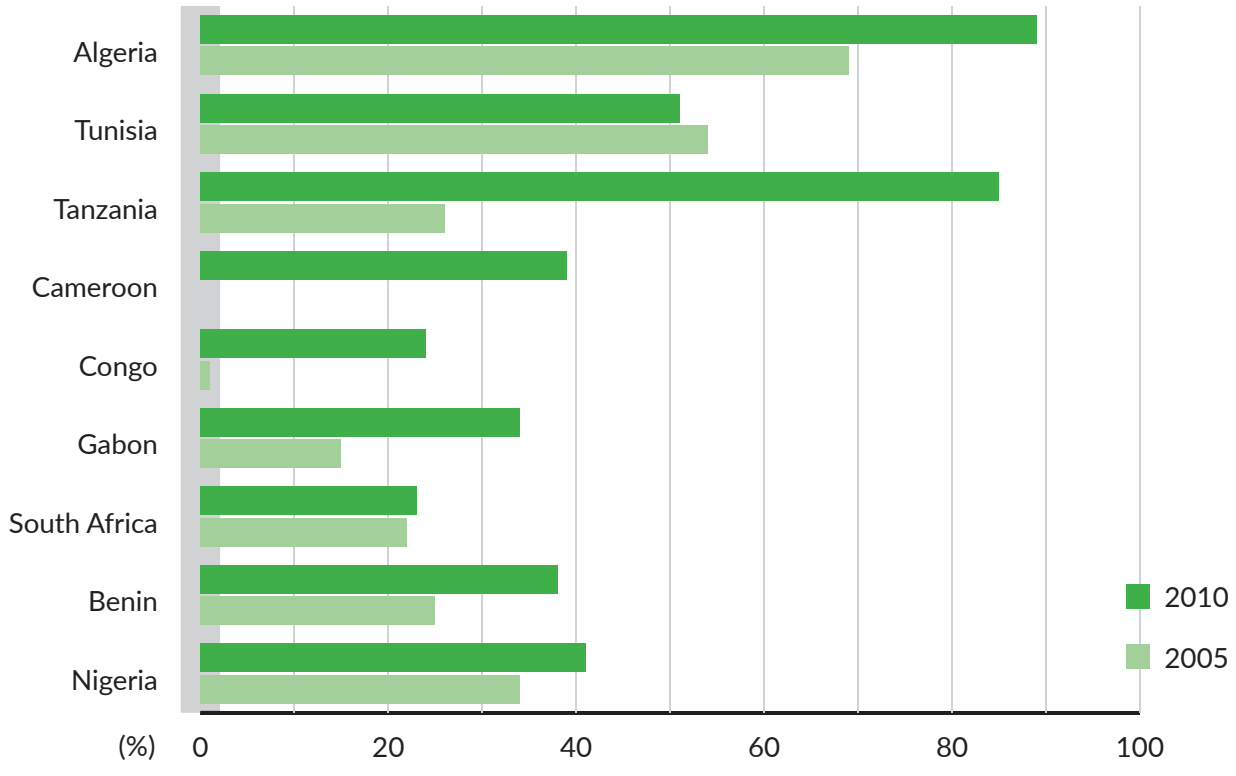
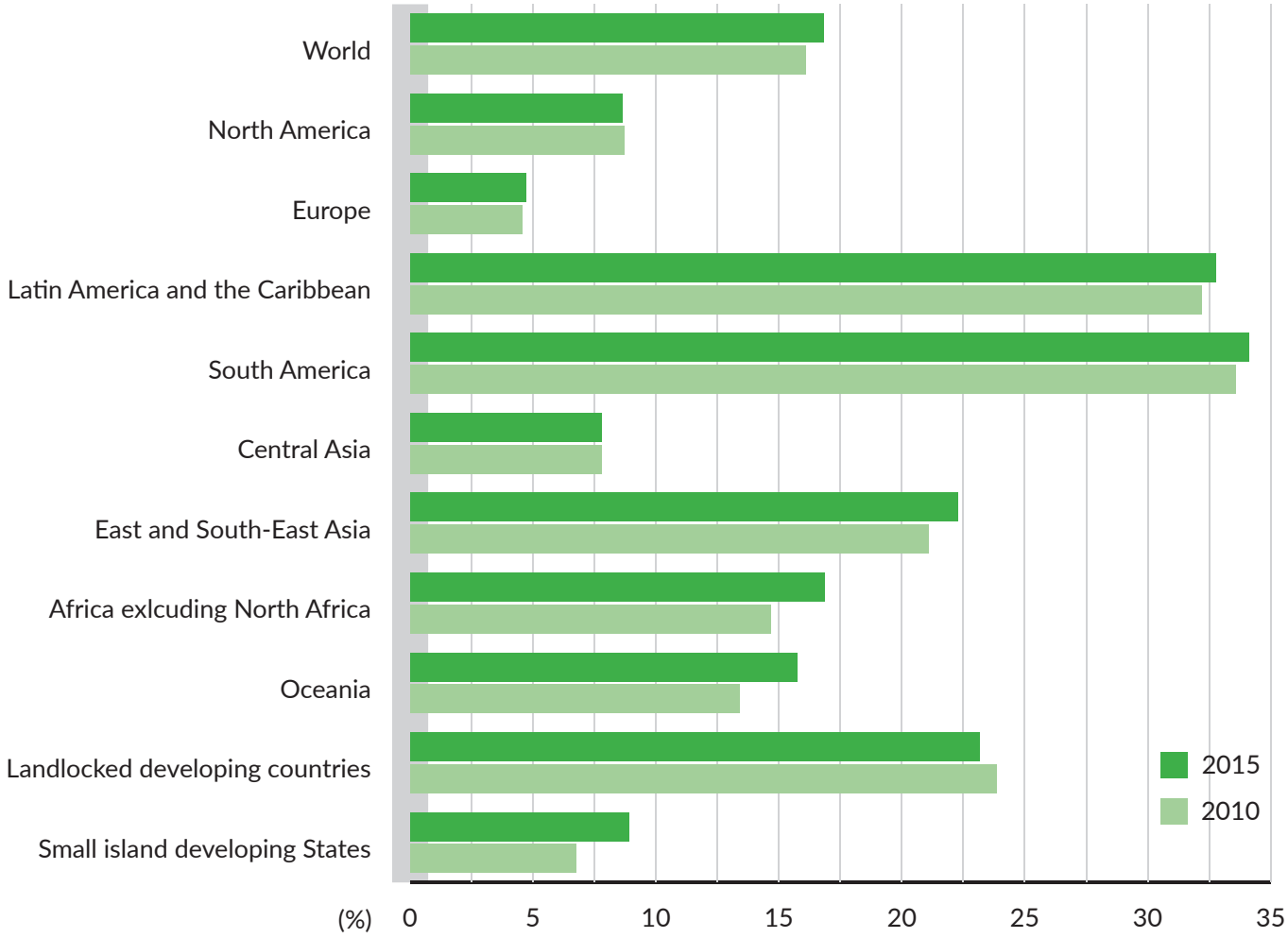


FIGURE 5.8 PROPORTION OF FOREST AREA WITH A LONG-TERM MANAGEMENT PLAN, SELECTED COUNTRIES



Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.1.2 based on FAO Global Forest Resources Assessment; FAO estimates.

FIGURE 5.9 PROPORTION OF FOREST AREA WITHIN LEGALLY-ESTABLISHED PROTECTED AREAS



Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.1.2 based on the Food and Agriculture Organization of the United Nations (FAO) Global Forest Resources Assessment; FAO estimates.

FIGURE 5.10 PROPORTION OF FOREST AREA WITHIN LEGALLY-ESTABLISHED PROTECTED AREAS

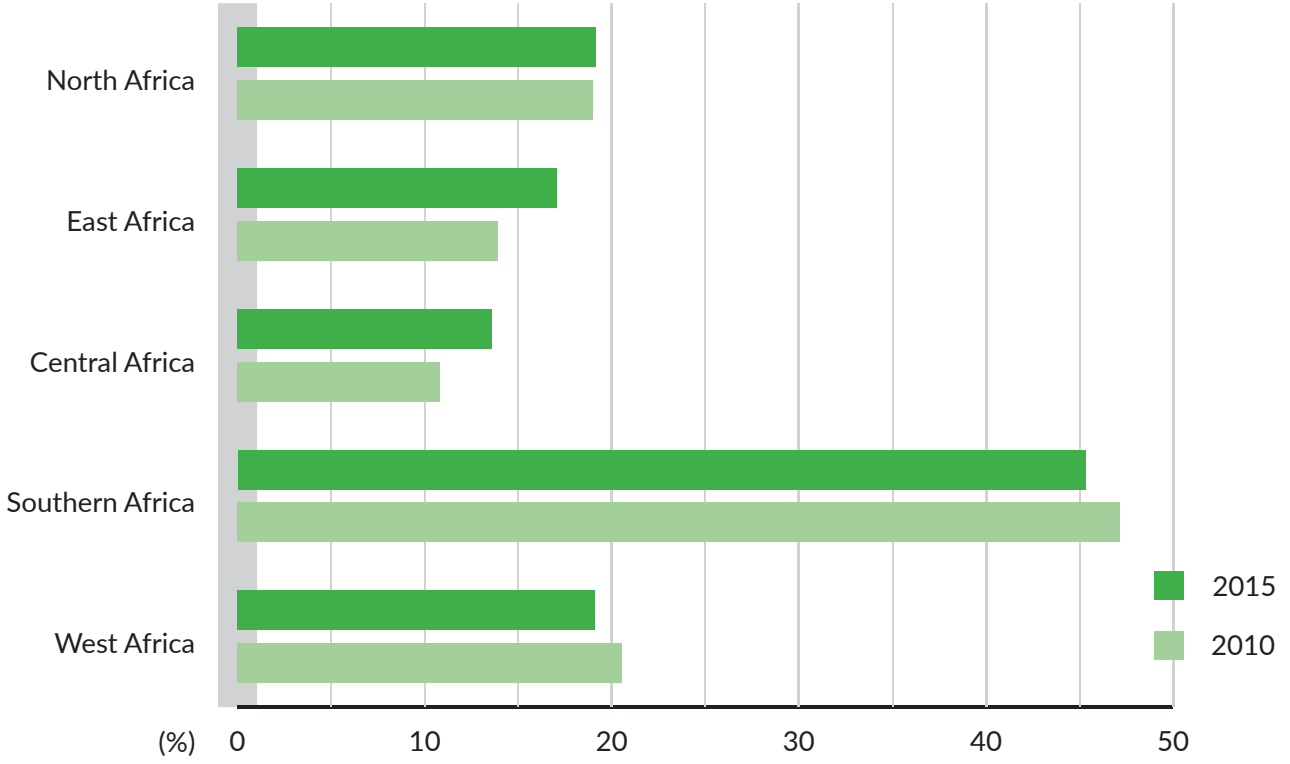
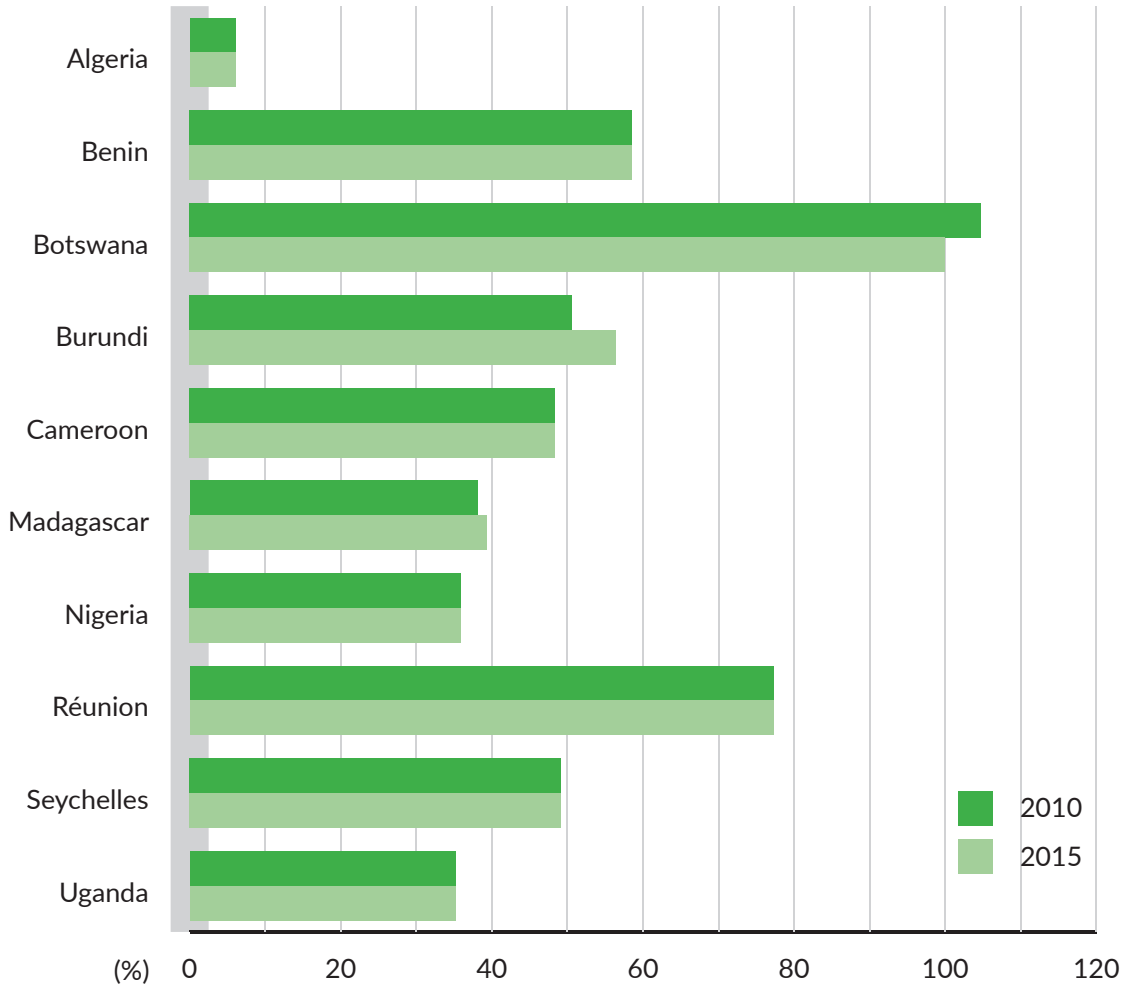


FIGURE 5.II PROPORTION OF FOREST AREA WITHIN LEGALLY-ESTABLISHED PROTECTED AREAS BY SELECTED COUNTRIES



Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.1.2 based on the Food and Agriculture Organization of the United Nations (FAO) Global Forest Resources Assessment; FAO estimates.

Target 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.

Indicator 15.4.1 Coverage by protected areas of important sites for mountain biodiversity.

Mountain environments cover an estimated 27 per cent of the world's land area, directly supporting an estimated 22 per cent of the world's population.[16] However, Agenda 21 noted that mountain ecosystems are rapidly changing, are under threat of habitat degradation, and that the proper management of mountain resources deserves special action. Mountain ecosystems are important reservoirs of biological diversity, especially endemic plants and animals, and represent important sites for *in situ* conservation. Since 2000, the percentage of areas identified as key biodiversity areas (KBA) for mountain biodiversity that is covered by protected areas has been on the rise in all regions of the world, including Africa, although at varying rates as shown on page 98.

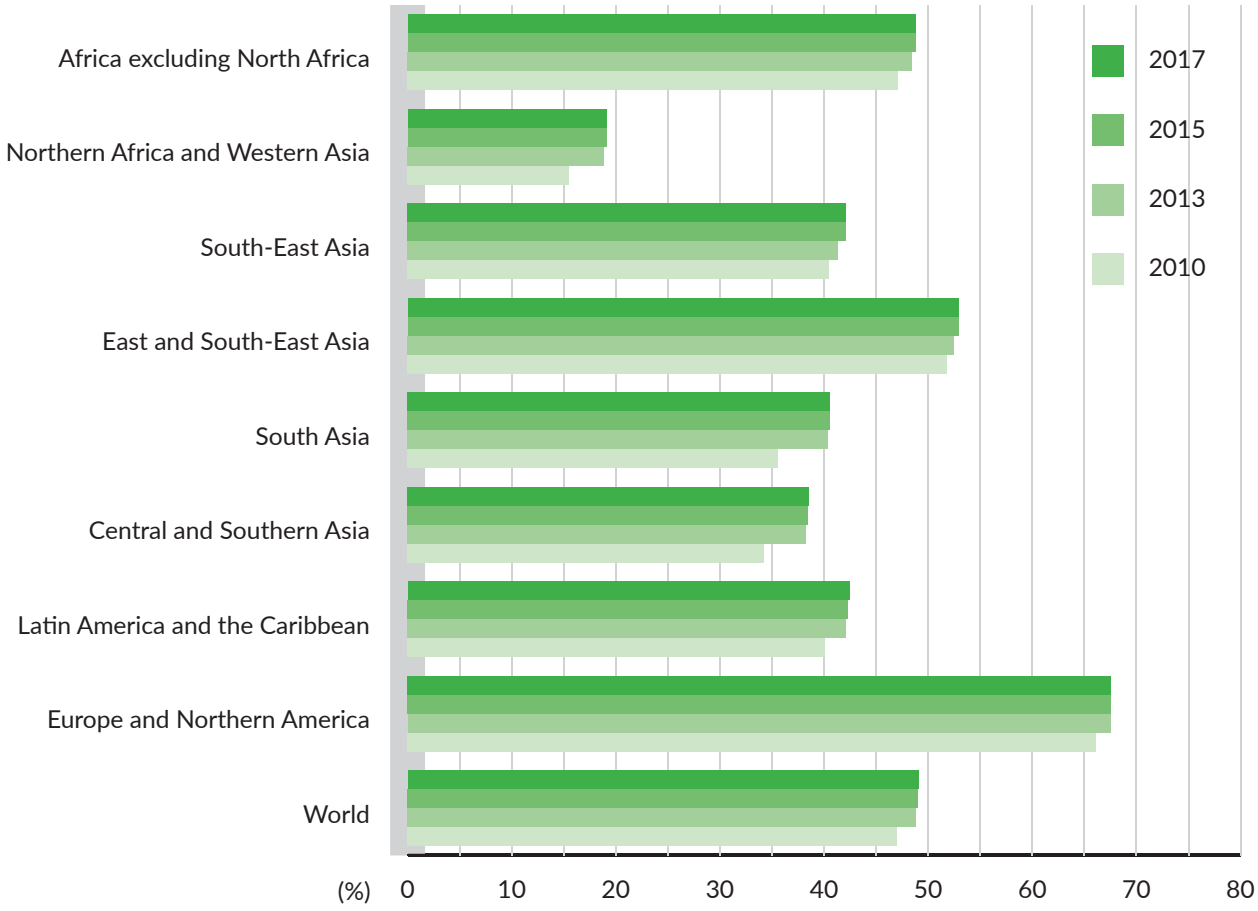
Indicator 15.4.2 Mountain Green Cover Index.

Ranging between 0 and 100, MGCI measures changes in the area of green vegetation (forest, shrubs, pasture and crop land) in mountain areas. This index is an indicator of the extent to which mountains are efficiently managed, taking into consideration the inherent trade-offs and delicate balance between conservation and sustainable use of resources. No time series data are available for this indicator but the 2017 figures provide useful baselines against which future trends may be analysed.[17] Africa, excluding North Africa, has an MGCI of 90 per cent, well above

16 https://www.cbd.int/mountain/what.shtml.

17 A reduction in the MGCI would generally imply increased exploitation of green vegetation within and general degradation of mountain areas while an increase would imply better conservation and sustainable use of resources in mountain areas.

FIGURE 5.12 COVERAGE BY PROTECTED AREAS OF IMPORTANT SITES FOR MOUNTAIN BIODIVERSITY



Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.4.1 based on BirdLife, International Union for Conservation of Nature and UN Environment World Conservation Monitoring Centre (2017); www.protectedplanet.net.

the global average of 76 per cent and only second to Oceania and South-East Asia at 96 per cent and 98 per cent, respectively.

Target 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

Indicator 15.5.1 Red List Index.

Ranging from 0 to 1, the Red List Index (RLI) is a composite index depicting changes in the state of biodiversity within a region.[18] It is a temporal measure of the risk of extinction of major species of animals, coral reefs and cycads in the absence of any conservation efforts. A downward trend in the RLI means that the expected rate of future extinction of species is worsening. The converse holds true, with a RLI of 1 indicating that habitat degradation and biodiversity loss have been halted. As in all regions of the world, RLI for Africa has been on a downward trend in the recent past (over the 2000-2017 period). From a high of 0.8 in 2000, the current (2017) figure stands at 0.74, a trend similar to the global pattern.

18 It is an index of aggregate survival probability for all birds, mammals, amphibians, coral and cycads in a given region, weighted by the fraction of each species' distribution occurring within the region.

FIGURE 5.13 MOUNTAIN GREEN COVER INDEX, 2017

Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.4.2 based on Food and Agriculture Organization of the United Nations data.

Target 15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed.

Indicator 15.6.1 Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits.

Fair and equitable sharing of benefits arising from the utilization of genetic resources is perhaps the most contentious of the three objectives of the CBD.[19] Many African countries are Contracting Parties to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity[20]; and the International Treaty on Plant Genetic Resources for Food and Agriculture (PGRFA)[21]. International transfer of genetic resources should lead to fair reward and equity in sharing of benefits arising therefrom. Many African countries are increasingly using Standard Material Transfer Agreements (SMTAs)[22] in the transfer of genetic resources for purposes of food and agriculture with the total reported number of such agreements rising exponentially since 2012.

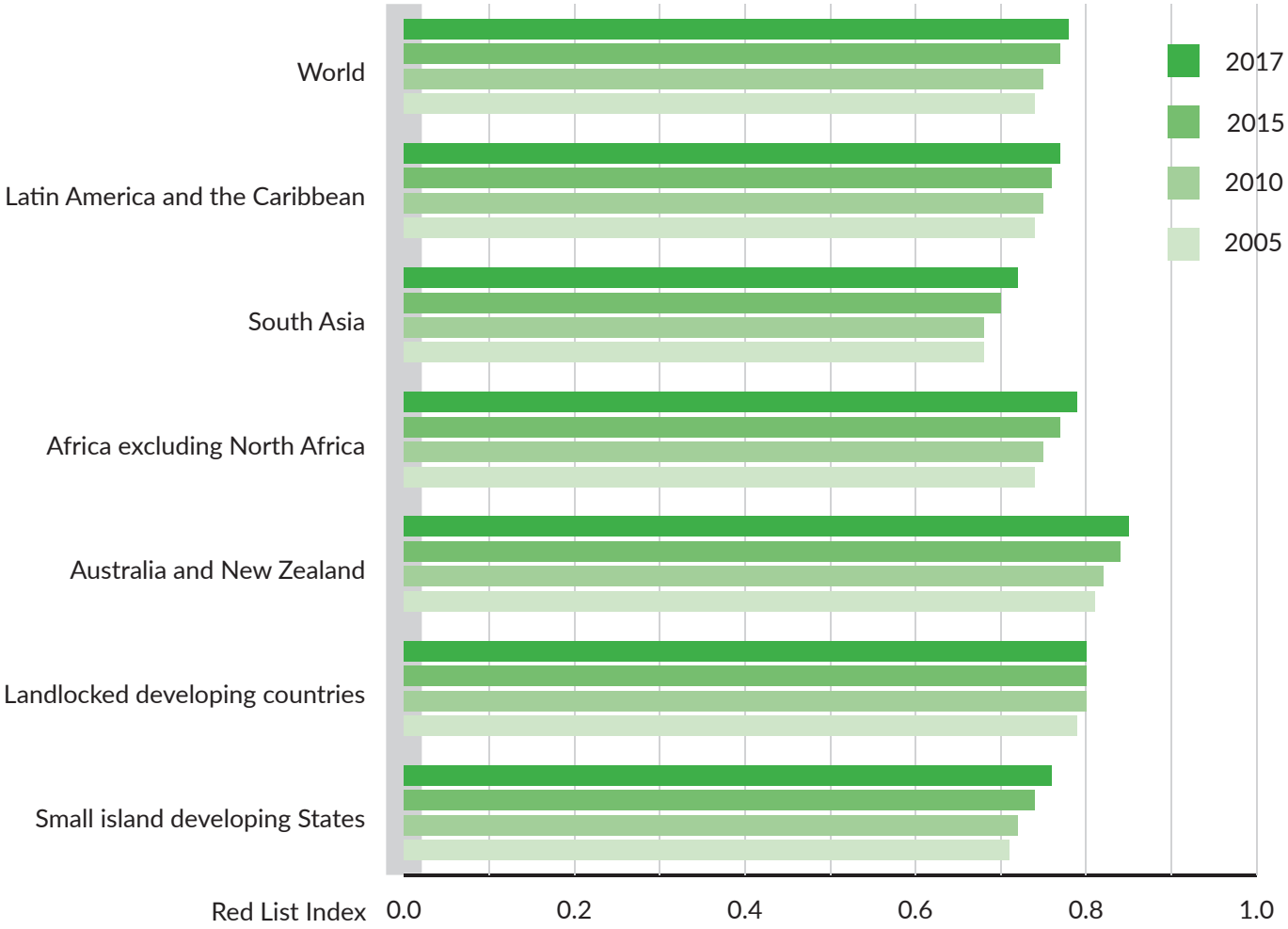
19 The other objectives being the conservation of biological diversity and the sustainable use of its components.

20 Exceptions are Algeria, Cabo Verde, Central African Republic, Chad, Equatorial Guinea, Eritrea, Ghana, Libya, Morocco, Nigeria, Somalia, South Sudan, Tanzania and Zimbabwe. Adopted in 2010, the Nagoya Protocol Convention advances the understanding and implementation of the third objective of the CBD by providing a strong basis for greater legal certainty and transparency for both providers and users of genetic resources. https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pd

21 Only exceptions are Botswana, Cabo Verde, Comoros, Equatorial Guinea, Gambia, Mozambique, Nigeria, Somalia and South Sudan.

22 Refers to a standardized contract drawn up with the primary objective of promoting the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of benefits out of their use in harmony with the CBD. http://www.fao.org/tempref/docrep/fao/011/i0520e/i0520e00.pdf

FIGURE 5.14 RED LIST INDEX



Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.5.1 based on BirdLife International and International Union for Conservation of Nature (2017).

Target 15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.

Indicator 15.7.1 Proportion of traded wildlife that was poached or illicitly trafficked.

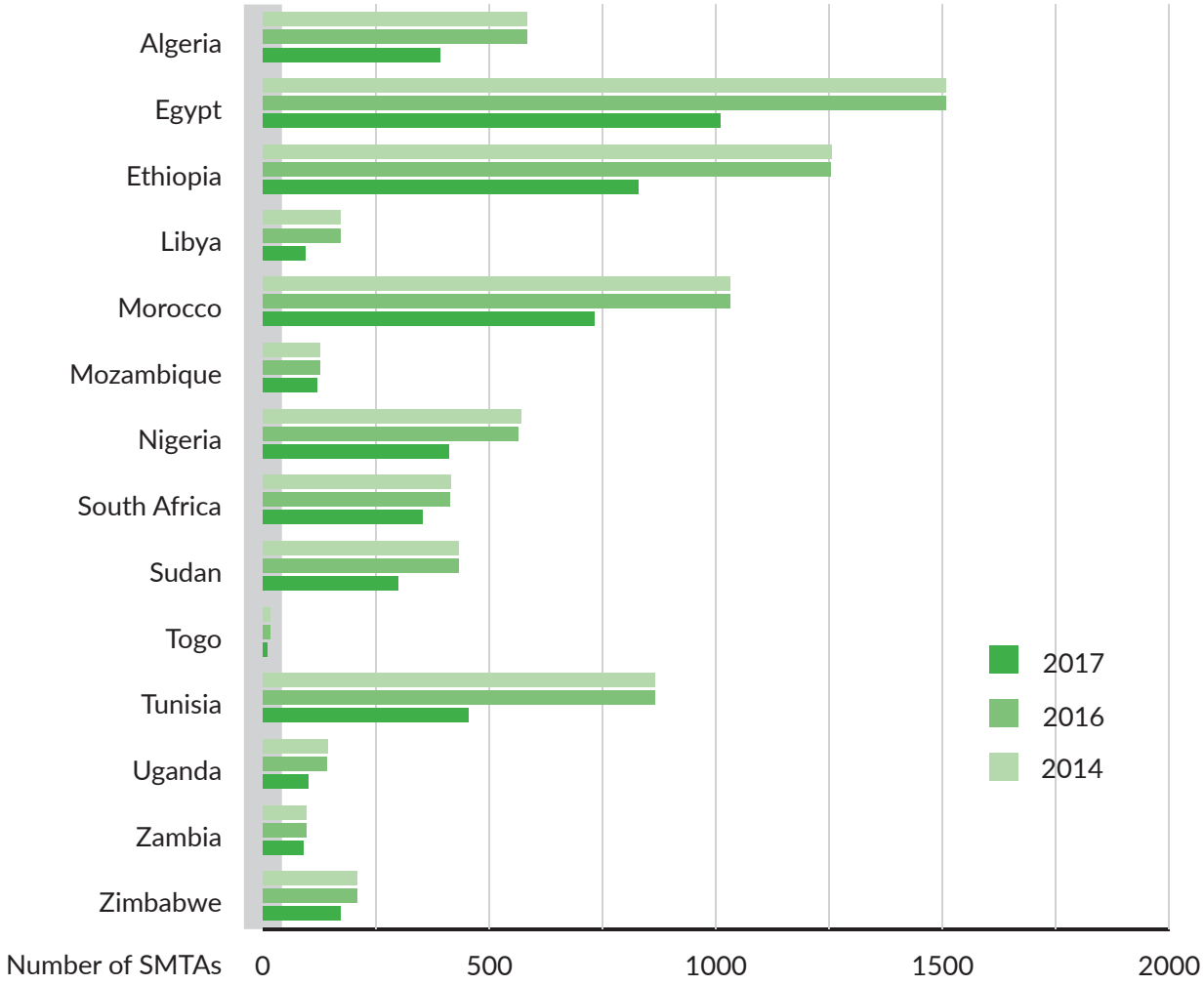
The Convention on International Trade in Endangered Species (CITES), or more accurately, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, was drafted in 1963, adopted in 1973 and entered into force in 1975. It is aimed at ensuring that the international trade of species of wild animal and plants does not threaten their chances of survival.[23] The convention identifies three categories of endangered species classified, respectively, into Appendices I, II and III and provides for explicit conditions under which species in each category may be traded, allowing parties to penalize possession of, or trade in or altogether confiscate such species within the framework of international cooperation, including by way of return of the species in question. Since coming into force, there has been a steady rise in the number of recorded trading transactions in endangered species and it is estimated that the Convention currently accords protection to some 35,000 endangered species, including those endemic to Africa.

Indicators 15 a.1 and b.1 Official development assistance (ODA) and public expenditure on conservation; and sustainable use of biodiversity and ecosystems.

Most of the MEAs explicitly outline the financing mechanisms for realizing their stated objectives, embodying North-South cooperation and partnership in the spirit of common but differentiated responsibility with the donor countries expected to avail increasingly higher ODA to reach at least the 0.7 per cent of the Gross National Income (GNI) mark. The AAAA and SDG 17 (Means of Implementation) further reinforce these financing mechanisms by envisaging a multiplicity of funding sources, beyond

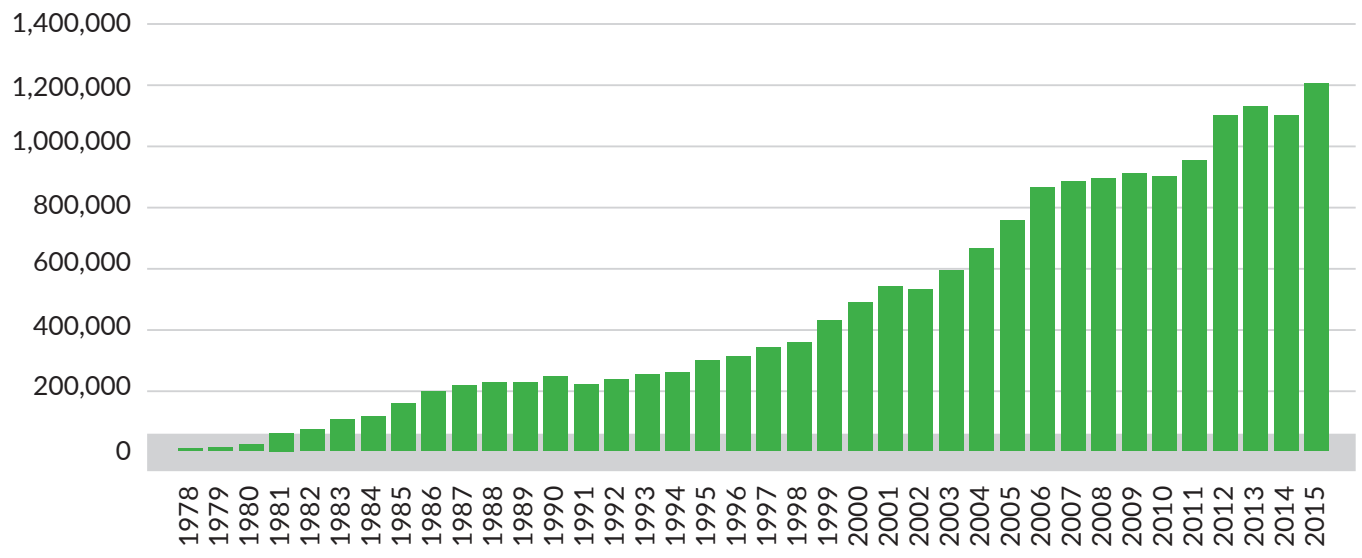
23 https://www.cites.org/sites/default/files/eng/disc/CITES-Convention-EN.pdf

FIGURE 5.15 TOTAL REPORTED NUMBER OF SMTAS BY SELECTED AFRICAN COUNTRIES



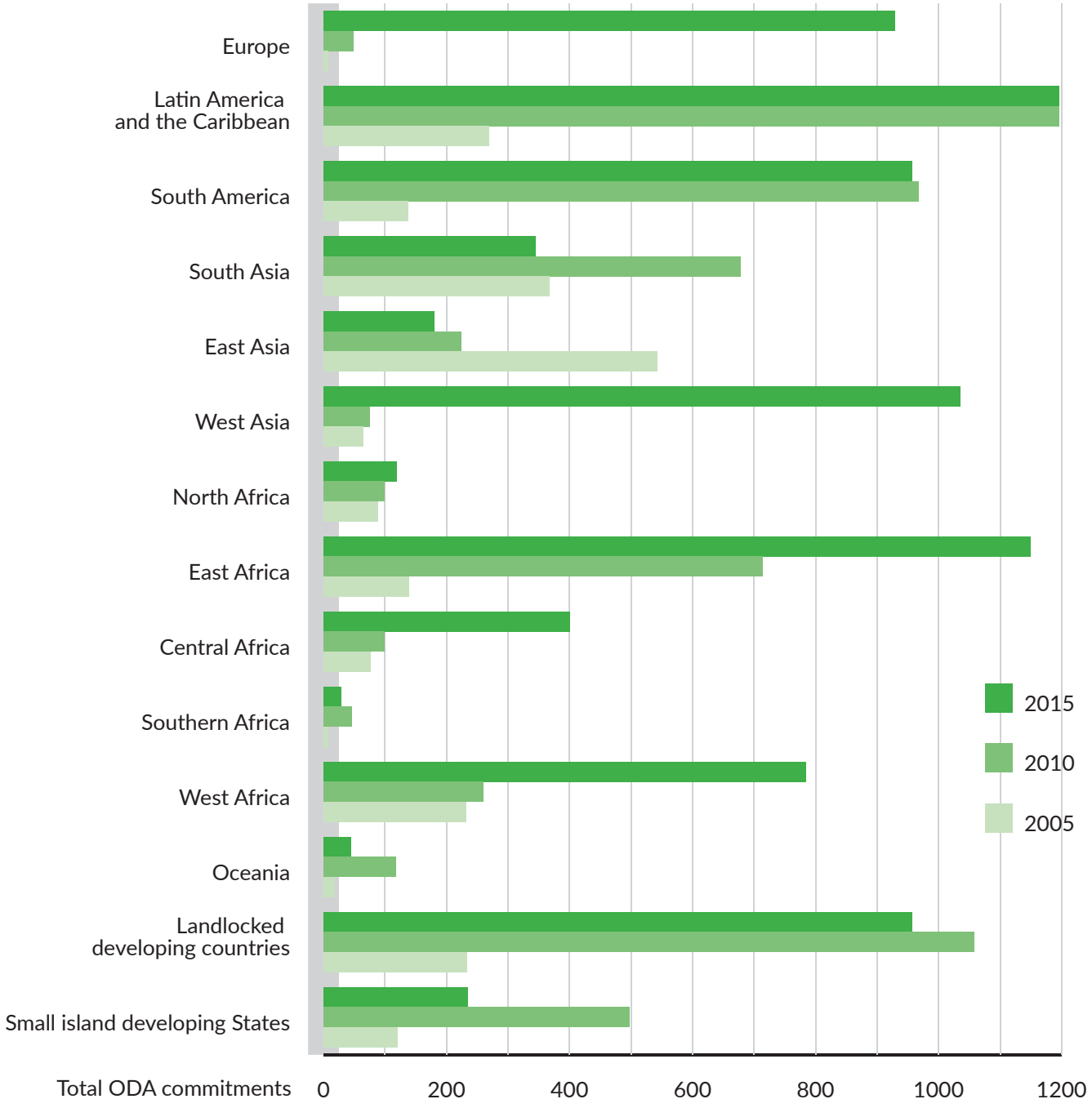
Sources: https://unstats.un.org/sdgs/indicators/database/?indicator=15.6.1; https://www.cbd.int/abs/nagoya-protocol/signatories/default.shtml; https://absch.cbd.int/, http://www.fao.org/plant-treaty/countries/membership/en/; http://faoitpgrfa.ort-production.linode.unep-wcmc.org; https://mls.planttreaty.org.

FIGURE 5.16 RECORDED TRADING TRANSACTIONS IN ENDANGERED SPECIES



Source: Convention on International Trade in Endangered Species of Wild Fauna and Flora. https://www.cites.org/eng/disc/what.php.

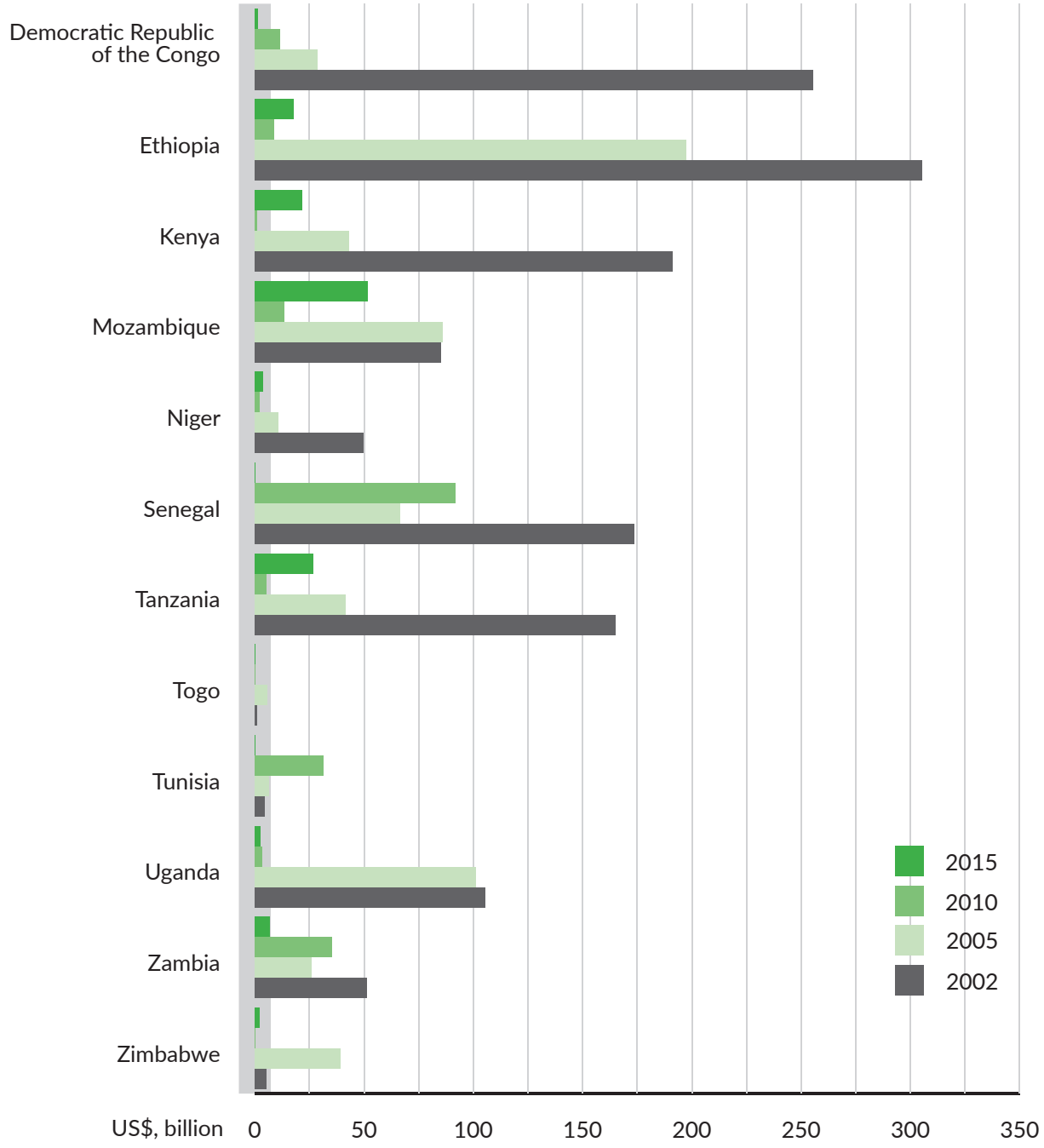
FIGURE 5.17 TOTAL ODA COMMITMENTS ON CONSERVATION AND SUSTAINABLE USE OF BIODIVERSITY AND ECOSYSTEMS



Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.a.1 based on Organization for Economic Cooperation and Development, Creditor Reporting System database (2017).

ODA, including private finance through blended finance, placing domestic resource mobilization (DRM), principally through taxation, at the centre stage of sustainable development financing. The total number of ODA commitments on conservation and sustainable use of biodiversity and ecosystems has been on a rising trend since 2002 in many regions of the world, Central and East Asia being the only exceptions. Between 2002 and 2015, the increase in Africa, excluding Northern Africa, although characterized by wide inter-state variations, compared favourably with the figure for LDCs and other developing regions of the world.

FIGURE 5.18 TOTAL ODA FOR BIODIVERSITY BY SELECTED RECIPIENT COUNTRIES



Source: https://unstats.un.org/sdgs/indicators/database/?indicator=15.a.1 based on Organization for Economic Cooperation and Development, Creditor Reporting System database (2017).

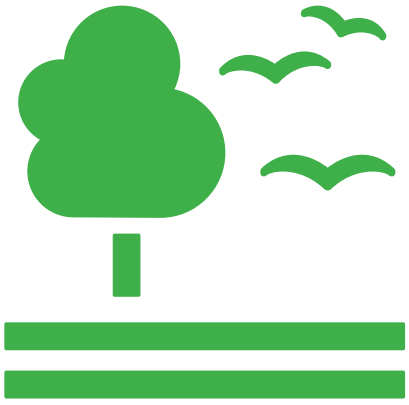
5.4 Conclusions

Over the past one and a half decades, Africa registered mixed progress with respect to conservation and sustainable use of terrestrial and freshwater ecosystems. Faced with the growing threat of biodiversity loss and an increasing risk of the extinction of the major species of animals, the region is taking concrete steps to conserve and sustainably manage its abundant biological resources. Since 2000, important sites for both terrestrial and freshwater biodiversity, as well as mountain biodiversity, have been brought within the domain of protected areas, although wide inter-state variations persist. Between 2002 and 2015, Africa recorded the largest increase in total ODA commitments for conservation and sustainable use of biodiversity as part of Agenda 21 of the UNCED commitments on financing. However, with the exception of a few countries, the region experienced the fastest rate of deforestation during the 1990-2015 period, which can be attributed to population pressure, commercial exploitation of forests and encroachment for agricultural and other purposes. Gaps in policy, legal frameworks, as well as institutional capacity to implement existing policies and report progress, are also challenges. Desertification is an important ecological and development challenge for many African countries, with the Sahelian countries on the southern fringes of the Sahara Desert being most affected.

African countries need to design and implement long-term management plans for forest areas, and establish partnerships with the private sector and with individual owners of large portions of forested areas that are legally outside protected areas.

African governments, supported by the RECs and development partners need to rally all stakeholders, including political leaders, non-state actors, and private and local communities, to implement urgent actions to conserve and preserve the ecosystem. The centrality of the issues covered under this goal to the livelihoods and sustenance of life in this region and elsewhere cannot be overstressed.

Unlike the other SDG targets, which are to be achieved by the year 2030, the targets under this goal, with the exception of Target 15.3 (combating desertification) and Target 15.4 (conserving mountain ecosystems), are to be met by 2020, underlining the urgency with which action is needed. Therefore, increased attention to all the 2020 targets in terms of strategies and investment for their realization in the next two years is required.



CHAPTER 6

Science, Technology and Innovation

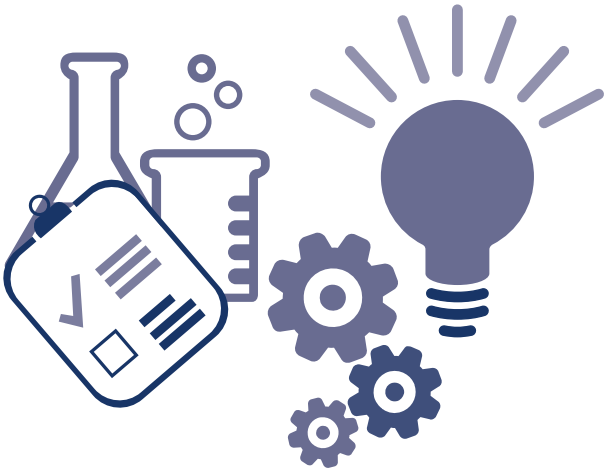
6.1 Introduction

Science, technology and innovation (STI) are key drivers of development and constitute an opportunity for most African countries to leapfrog to middle and upper income countries. As latecomers, developing countries need not reinvent the wheel. They can use existing technology to address their development challenges simply by building the capacity to find, adapt and adopt mutually agreed-upon terms, and proven off-the-shelf technology developed elsewhere.

When appropriately disseminated and adapted to local contexts, STI can reduce costs of production, enhance competitiveness and economic diversification. Additionally, STI promotes inclusion and sustainable development by creating new opportunities for entrepreneurship, supporting the development of renewable energy and resilient infrastructure, supporting the production of new and more effective drugs, and enhancing agricultural productivity by developing climate friendly pesticides and drought-resistant seeds. Mobile telephones, for instance, have made it possible for large numbers of the unbanked to gain access to financial services. In effect, when appropriately applied, STI facilitates the realization of SDGs related to energy, climate, water, sanitation, health, industry and ultimately employment and poverty reduction. However, despite a growing recognition of the critical role played by STI in economic growth, several challenges remain.

most African countries have not made the requisite investments in STI are needed to transform their economies.

First, the limited distribution of the benefits of technological innovation have not accrued to large segments of society. Second, most African countries have not made the requisite investments in STI are needed to transform their economies. Third, most of the entities responsible for STI policymaking have operated in isolation from other policy agencies with weak links to the private sector and academia. Moreover, the STI infrastructure such as broadband internet access, access to electricity, telecommunication and transport networks are weak. In addition, most of the officials involved in or responsible for drafting STI-related policy documents lack the necessary expertise. Finally, STI development has been shaped by bilateral and multilateral partnerships, which have not necessarily promoted African ownership, accountability and sustainability (African Union Science, Technology and Innovation Strategy for Africa 2024).



6.2 STI in the 2030 Agenda and Agenda 2063

To address the critical challenges associated with STI development, both the 2030 Agenda for Sustainable Development and Agenda 2063 prioritize STI as critical enablers of development. The 2030 Agenda advocates for South-South cooperation to promote access to STI by developing countries on mutually-agreed terms (Target 17.6). It also calls for the development, transfer and diffusion of environmentally-friendly technologies (Target 17.7). Target 17.8 underscores the need to fully operationalize the Technology Bank and STI capacity-building mechanism for LDCs by 2017 and enhance the use of enabling technology, in particular information and communications technology.

Data on the share of the budget allocated to research and STI-driven entrepreneurship are limited. Thus, the discussion focuses on expenditure on R&D, as well as on internet access. Agenda 2063 prioritizes space exploration, access to the internet, increased spending on R&D and STI-driven entrepreneurial development as mechanisms for structural transformation in Africa. The STI priorities of Agenda 2063 derive largely from the African Union Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024), which places STI at the epicenter of Africa's socio-economic development and growth. The strategy further defines four mutually reinforcing pillars which are prerequisites for success: building and/or upgrading research infrastructure; enhancing professional and technical competencies; promoting entrepreneurship and innovation; and providing an enabling environment for STI development in the African continent. Coverage of STI in the two agendas is summarized in TABLE 6.1.

6.3 Status of STI in Africa

6.3.1 Overview

Africa's STI landscape is evolving, largely embryonic and dominated by a small number of countries such as Egypt, Morocco, Kenya. South Africa and Tunisia. This chapter reviews the status of STI in Africa drawing on the indicators of performance of the Agenda 2030 and the First Ten Year Implementation Plan of Agenda 2063. The analysis focuses on indicators for which data is readily available, hence, the scope of the analysis is circumscribed by the availability of data.

In the evaluation of the STI landscape, we examine the status and trends in education, access to electricity and the internet, as well as investments in R&D and a functional innovation system. This is followed by an assessment of the extent to which the enabling environment has facilitated the development of STI-related outputs and outcomes (e.g., the number of patents applied for, the value of high-tech products exported by a country and the per cent of firms generating new products or devising new was of producing existing products). The rationale underlying the methodology described here is the development of STI products, such as high-tech exports, requires access to critical inputs, such as access to the internet, electricity and investments in R&D.

The key message of the chapter is that beyond a sound infrastructure and robust R&D systems, countries require a vibrant innovation system to nurture and sustain STI. Citing examples from best practice countries, the report examines the factors that distinguish some of the high performing STI countries in Africa from the rest. We find that in addition to the quality of infrastructure, an important marker of STI success is the capacity to establish an institutional architecture or innovation system that effectively coordinates and funds the STI-related efforts of government, the private sector and the science community. Effective innovation systems make it possible to commercialize ideas incubated through R&D. In addition, they crowd in private sector funding for R&D, thereby mitigating the fiscal burden of STI expenditures on the budget.

TABLE 6.1 SCIENCE AND TECHNOLOGY - ALIGNMENT BETWEEN THE 2030 AGENDA AND AGENDA 2063

	ALIGNMENT WITH AGENDA 2063	
THE 2030 AGENDA TARGETS	AGENDA 2063 GOALS	TARGETS
17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism.	**19** Africa as a major partner in global affairs and peaceful co-existence.	**7.19.1.1** National infrastructure for African networked space research and exploration in place.
		7.19.1.2 National systems/ infrastructure for research and development is fully functional.
	10 World class infrastructure crisscrosses Africa.	**2.10.1.6** Realize at least 70% increase in broadband accessibility by 2020.
17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed.		No matching target.
17.8 Fully operationalize the Technology Bank and science, technology and innovation capacity-building mechanism for least-developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology.	**1** A high standard of living, quality of life and well-being for all	**1.1.4.6** Access and use of electricity and internet is increased by at least 50% of 2013 levels.
	4 Transformed economies and job creation.	**1.4.3.6** At least 1% of gross domestic product is allocated to science, technology and innovation research and STI driven entrepreneurship development.
	10 World-class infrastructure crisscrosses Africa.	**2.10.1.5** Double ICT penetration and contribution to gross domestic product.
		2.10.1.6 Realize at least 70% increase in broadband accessibility by 2020.
		2.10.1.7 Digital broadcasting is achieved as the norm by 2016.
	19 Africa as a major partner in global affairs and peaceful co-existence	**7.19.1.2** National systems / infrastructure for research and development t is fully functional.
		7.19.1.1 National infrastructure for African networked space research and exploration in place.

Source: African Union (2017) Agenda 2063–Sustainable Development Goals. Mapping exercise. https://au.int/en/ea/statistics/a2063sdgs.

6.3.2 Environment for STI in Africa

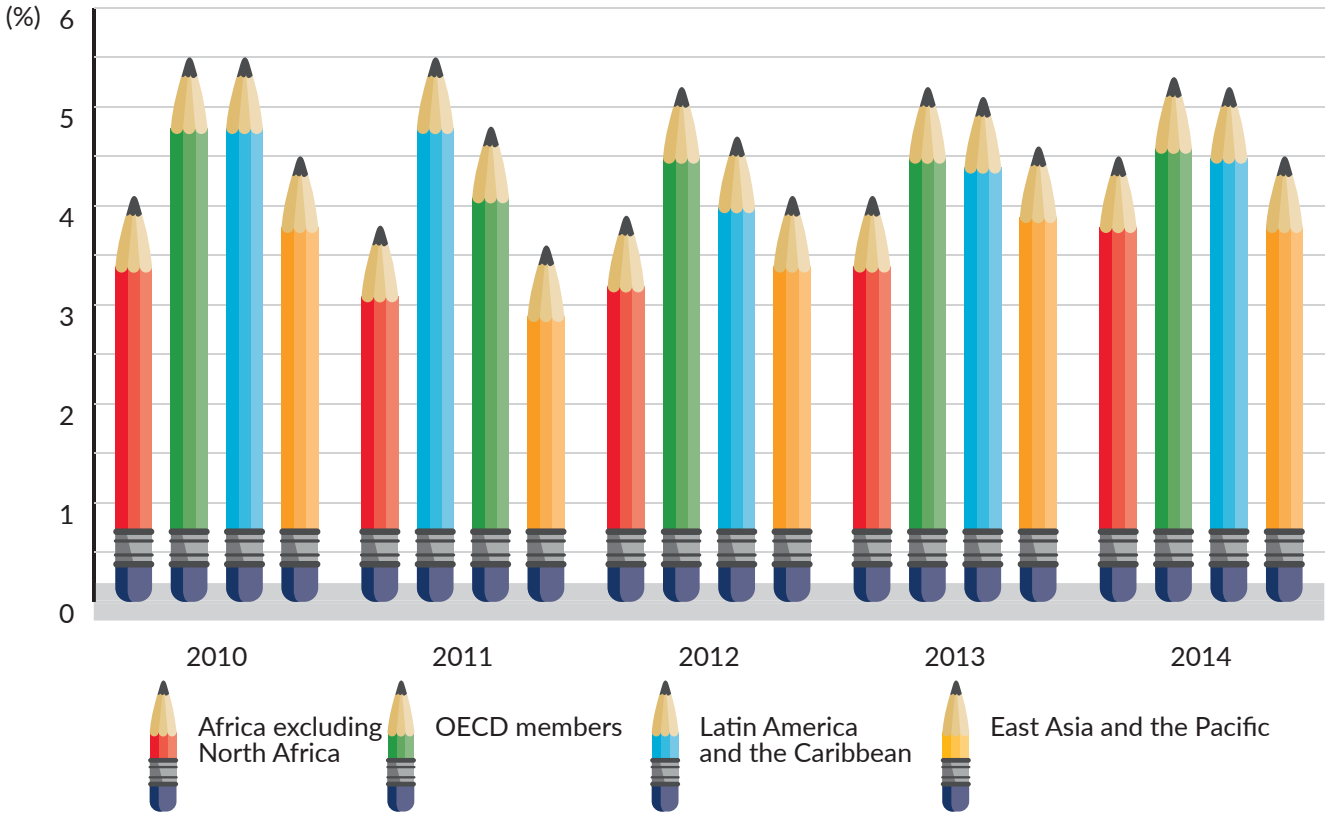
In this section, we describe the environment of STI in Africa, including its underlying components of access to electricity, education and skills development, access to the internet and R&D expenditure as a proportion of GDP. The state of and the levels of both public and private investments in these areas underscore their importance and overall contribution of STI in a country's development path.

ACCESS TO ELECTRICITY. Access to electricity is an important component of the STI infrastructure. As noted in Chapter 2, electricity is an important factor for economic and social transformation. For example, without reliable access to electricity, access to the internet, lighting and basic services such as water, processing and high-tech manufacturing are compromised. While Africa is experiencing a steady increase in access to electricity, the overall levels of access are less than half the corresponding figures for East Asia and the Pacific, and there are large disparities by geographic location and income.

EDUCATION AND SKILLS DEVELOPMENT. The development of STI depends on the availability of a well-educated population. Trends in education indicators, particularly in Southern, Central, West and East Africa combined, suggest that completion rates are low and decline at higher levels of education. Specifically, fewer than one out of every two pupils complete primary education; a mere 15 out every 100 secondary school students complete their education, and only eight out of every 100 post-secondary school students complete a full course of education in Africa, excluding, North Africa, (UNESCO Institute for Statistics, 2017). This raises the legitimate question of whether African countries are underinvesting in education.

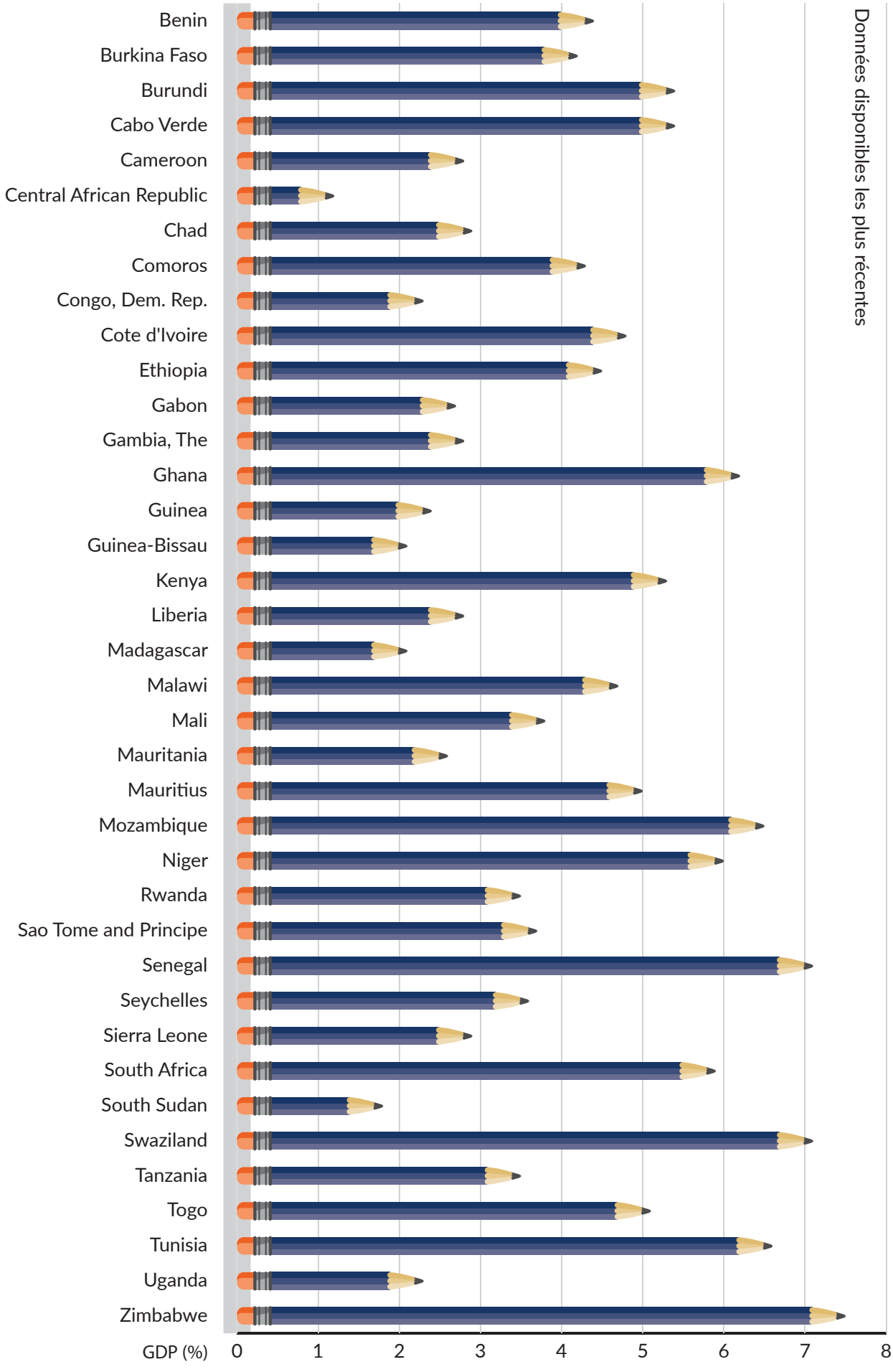
While government expenditure on education as a per cent of GDP in Africa is relatively lower than in other regions, such as East Asia and the Pacific, the difference is marginal and does not convincingly explain the low completion rates even within the continent. For instance, Togo and South Africa spend 5.1 and 5.9 per cent respectively of GDP on education. However post-secondary completion rates are 5.4 per cent in Togo and 15.2 per cent in South Africa. This suggests that education outcomes are the result of a more complex set of factors than just financial investments by the public sector.

FIGURE 6.1 GOVERNMENT EXPENDITURE ON EDUCATION AS A PER CENT OF GDP BY REGION, 2010-2014



Source: World Bank (2018) World Development Indicators. Last updated 21 May 2018.

FIGURE 6.2 GOVERNMENT EXPENDITURE ON EDUCATION AS A PER CENT OF GDP BY REGION AND COUNTRY



Source: World Bank (2018) World Development Indicators. Last updated 21 May 2018.

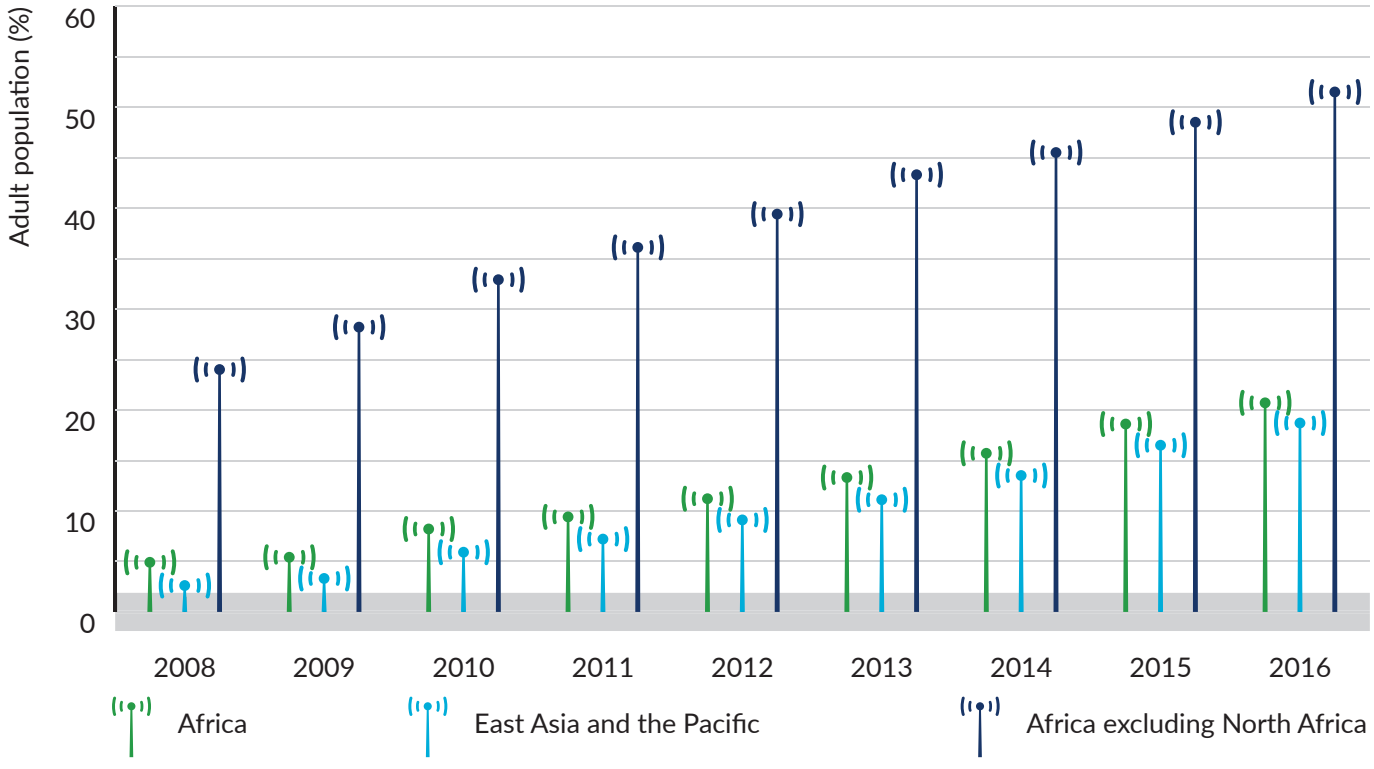
ACCESS TO THE INTERNET. Expanding access to the internet in Africa is vital to strengthening the STI infrastructure and consequently, improving R&D, as well as STI. Internet access promotes research and collaboration among scientists and development practitioners across countries and regions. Coupled with access to mobile phones, internet access can promote financial inclusion through innovations in mobile banking and entrepreneurship, as manifested by the growth in the so-called 'gig economy.' Access to the internet in Africa is rising, but coverage remains relatively low (Figure 6.3). On average, North African countries have a higher access to the internet than the rest of Africa.

Over the five-year period 2011-2016, internet access in Africa doubled, from 10.7 per cent to 22 per cent of the population. The trend is even more impressive for Africa, excluding North Africa, where internet access increased by a factor of 2.3, rising from 8.5 per cent of the population in 2011 to 20 per cent in 2016. Nevertheless, there are substantial cross-country variations in internet access across Africa. Data for 2016 suggests that Morocco (58.3 per cent) has the highest internet access in Africa, followed by Seychelles (56.5 per cent), South Africa (54 per cent) and Tunisia (50.4 per cent). On the other hand, internet access is extremely low in Eritrea (1.2 per cent in 2016) and Somalia (1.9 per cent in 2016).

Notwithstanding the impressive increase in internet access in Africa, the figures are less than half the corresponding levels in East Asia and the Pacific, where access rose from 37.8 per cent to 52.8 per cent during the 2011-2016 period. It is noteworthy, however, that Morocco's internet access of 58.3 per cent exceeds the East Asia and Pacific average (FIGURE 6.4).

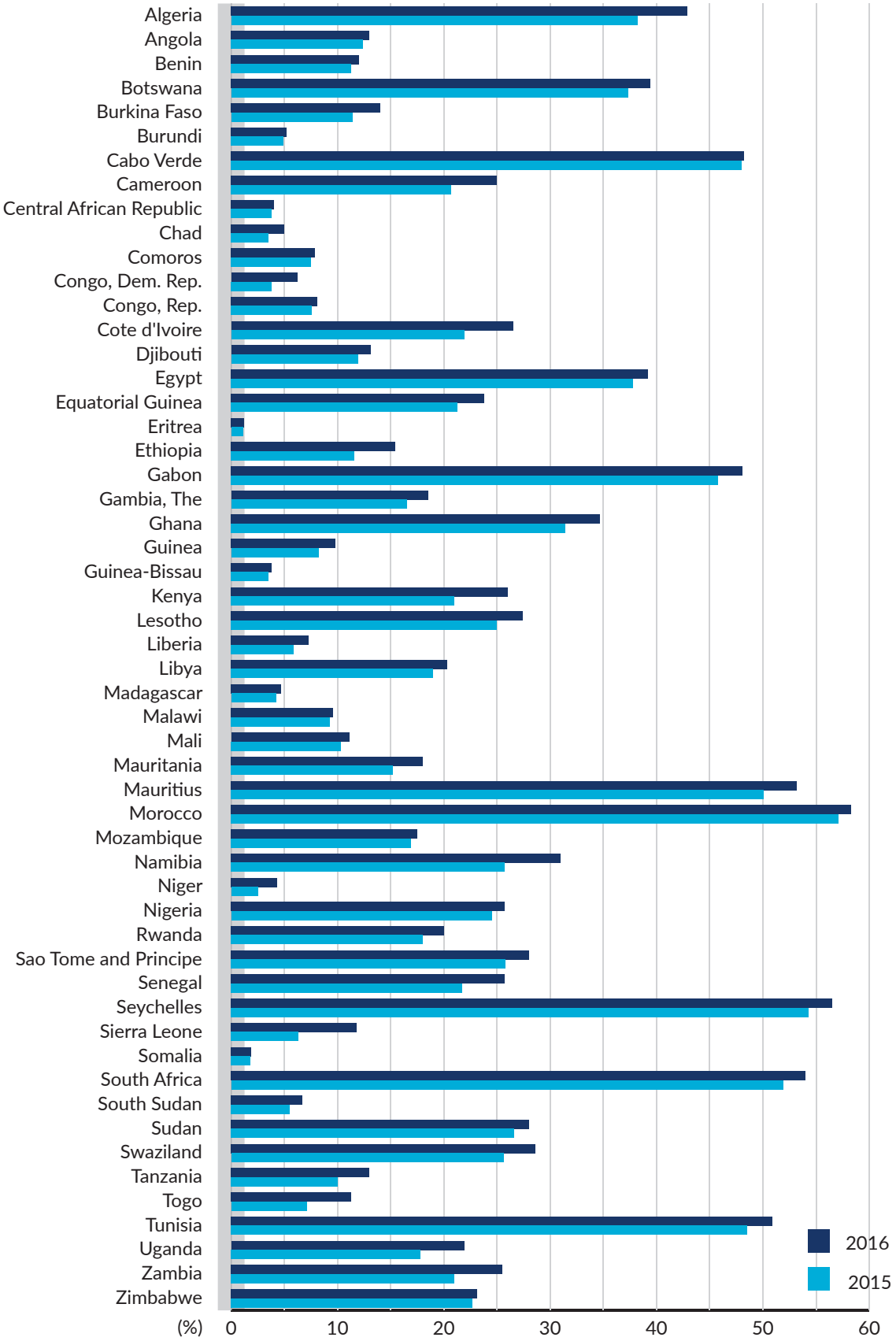
Internet access promotes research and collaboration among scientists and development practitioners across countries and regions.

FIGURE 6.3 PER CENT OF POPULATION USING THE INTERNET BY REGION



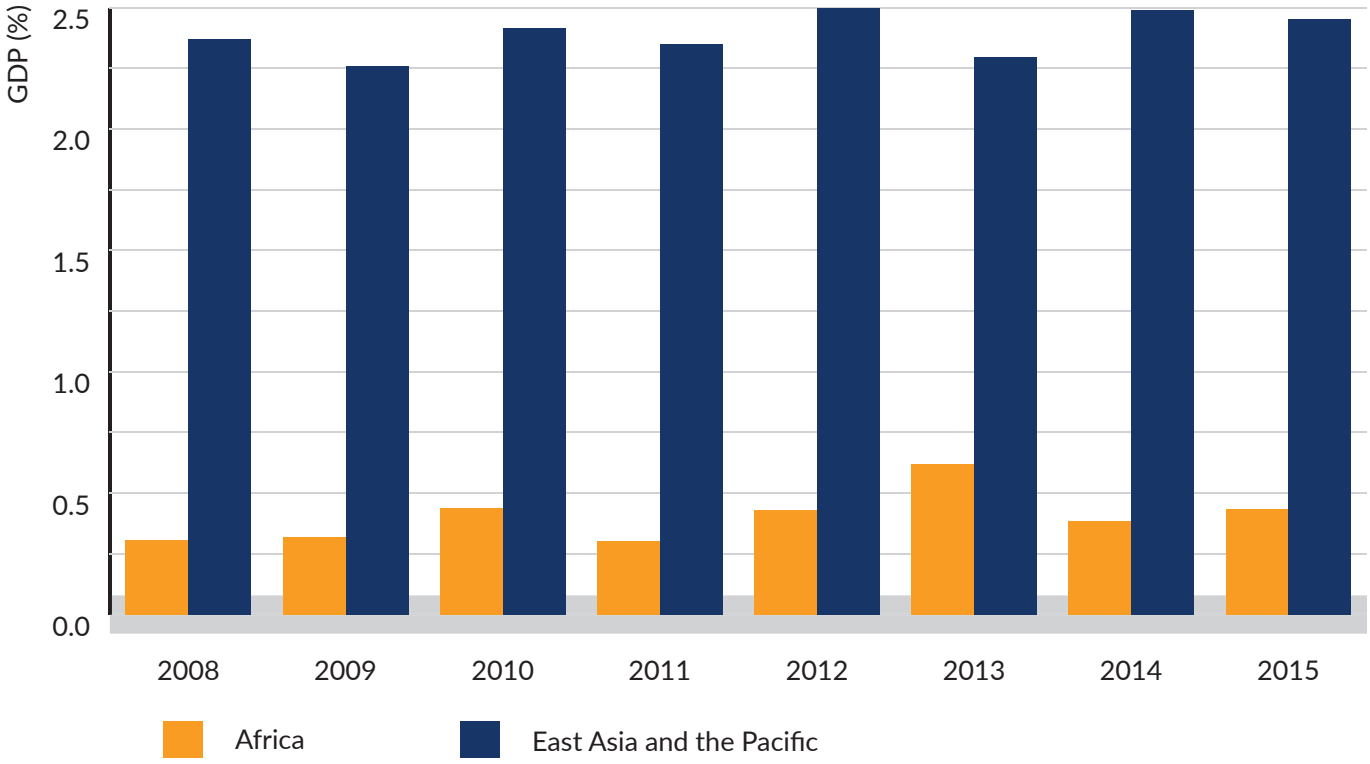
Source: World Bank (2018) World Development Indicators. Last updated 21 May 2018.

FIGURE 6.4 PROPORTION OF POPULATION USING THE INTERNET BY COUNTRY



Source: World Bank (2018) World Development Indicators. Last updated 21 May 2018.

FIGURE 6.5 AVERAGE R&D EXPENDITURE AS A PER CENT OF GDP BY REGION, 2008-2015



Source: World Bank (2018) World Development Indicators. Last updated 21 May 2018.

R&D EXPENDITURE AS A PROPORTION OF GDP. R&D is a vital source of knowledge generation that can lead to the upgrading of existing products and the design of new ones. Investments in R&D are, therefore, an indicator of the vibrancy of STI. Such investments can be sourced from both the public and private sectors. Recognizing the importance of R&D for STI, Agenda 2063 is a call to governments to allocate a minimum of 1 per cent of GDP to R&D.

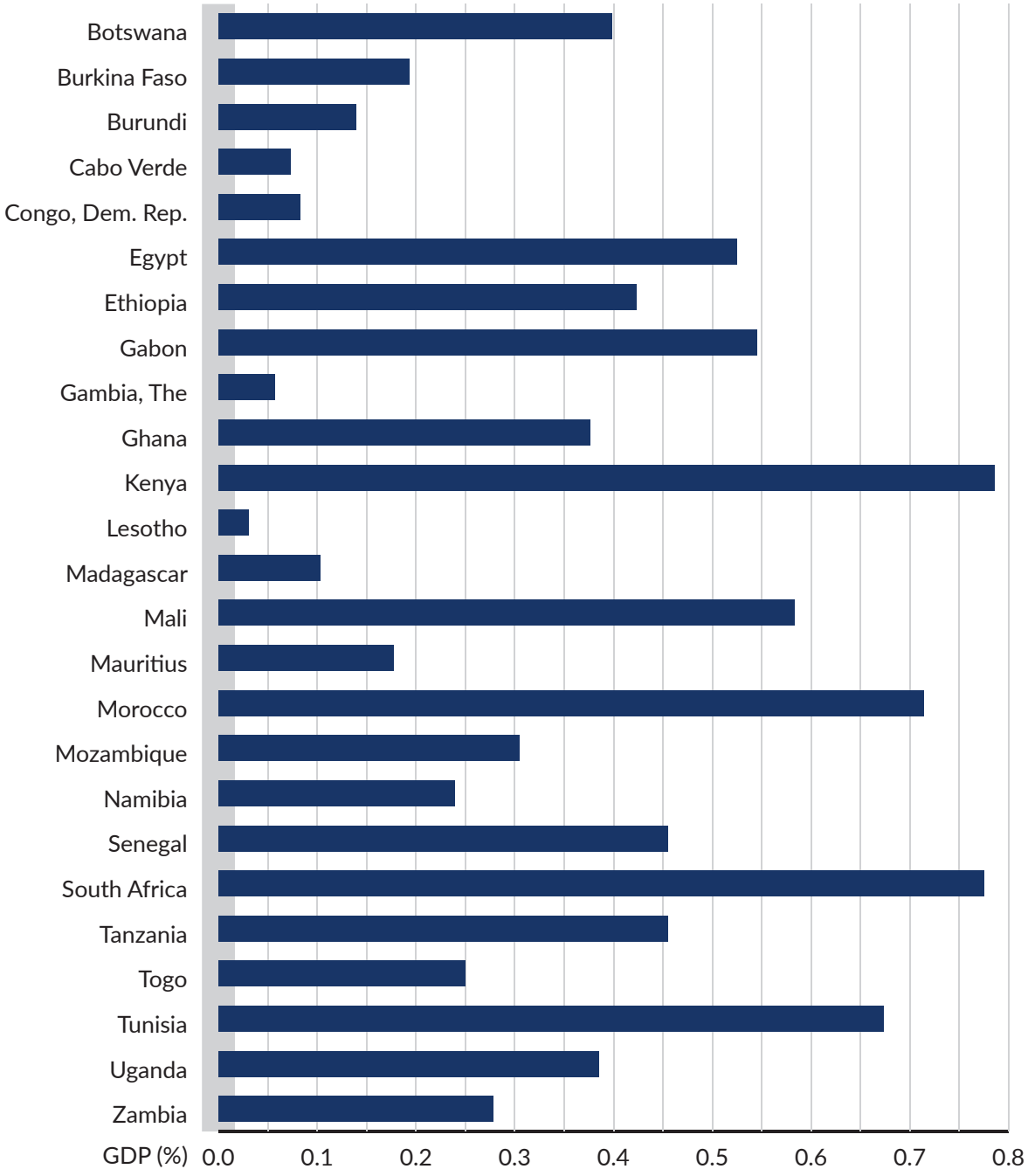
With the exception of 2013, R&D expenditure in Africa was below 0.5 per cent of GDP, which is only half the target of 1 per cent of the GDP target set by Agenda 2063.

With the exception of 2013, R&D expenditure in Africa was below 0.5 per cent of GDP (FIGURE 6.5), which is only half the target of 1 per cent of the GDP target set by Agenda 2063. It is noteworthy that during the period 2008-2015, only 7 of 25 African countries with data had R&D investments exceeding 0.5 per cent of GDP (FIGURE 6.6). Furthermore, R&D expenditures in Africa in 2015 (0.4 per cent) is almost five times lower than the corresponding figure for the East Asia and Pacific region (2.5 per cent).

Kenya (0.79 per cent), South Africa (0.78 per cent), Morocco (0.71 per cent) and Tunisia (0.67 per cent) are the top investors in R&D in Africa as a per cent of GDP based on the average for the period 2008-2015. There are, however, wide variations among African countries (FIGURE 6.6). R&D and expenditures are as low as 0.03 per cent and 0.05 per cent in Lesotho and The Gambia, respectively, over the same period.

As discussed below, the relatively high R&D expenditure of Kenya, Morocco, South Africa and Tunisia are not accidents of fate but the result of deliberate government policies aimed at leveraging STI for development. The next section evaluates the extent to which investments in strengthening the STI infrastructure translate into tangible outputs and outcomes.

FIGURE 6.6 AVERAGE R&D EXPENDITURE BY COUNTRY, PER CENT OF GDP, 2008-2015



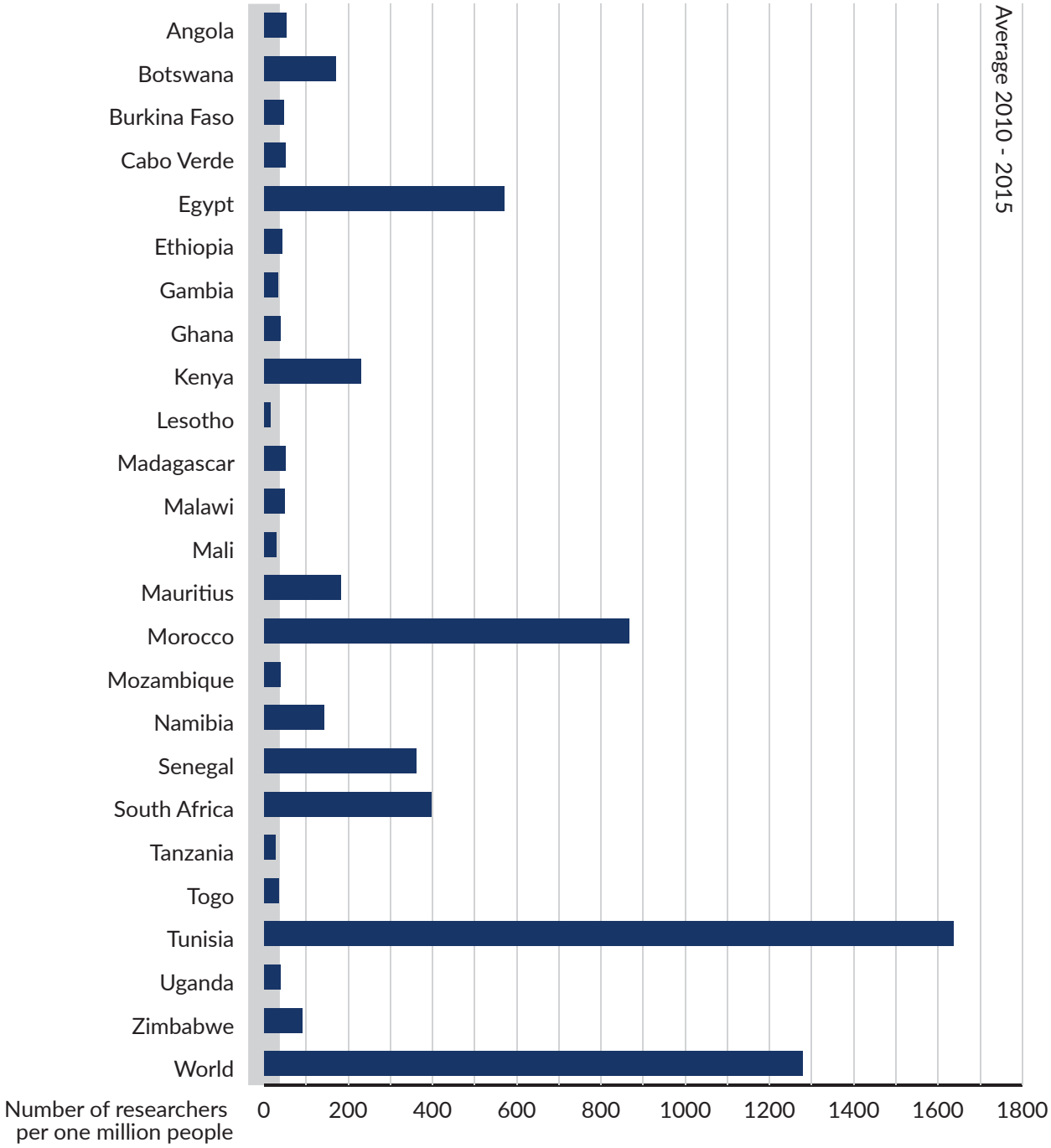
Source: World Bank (2018) World Development Indicators. Last updated 21 May 2018.

6.3.3 STI outputs and outcomes in Africa

Countries with an enabling STI environment tend to be characterized by a high number of researchers, rising numbers of patent applications, continual improvements in product and process innovations and the export of sophisticated or high-tech goods and services. Using indicators that capture trends in STI outputs and outcomes this section evaluates the state of STI development in Africa in the context of the enabling environment discussed in the previous sections

RESEARCHERS IN R&D PER MILLION PEOPLE. Researchers undertake the necessary investigations to generate new ideas and explore new ways of tackling existing or emerging challenges. Thus, the number of researchers as a proportion of the population is an indication of the STI capability of a country. North African countries have the highest numbers of researchers for every one million people. Specifically, Tunisia, Morocco and Egypt are the top three African countries in this respect (FIGURE 6.7). Remarkably, Morocco exceeds the global average. Other African countries include South Africa, Senegal and Kenya.

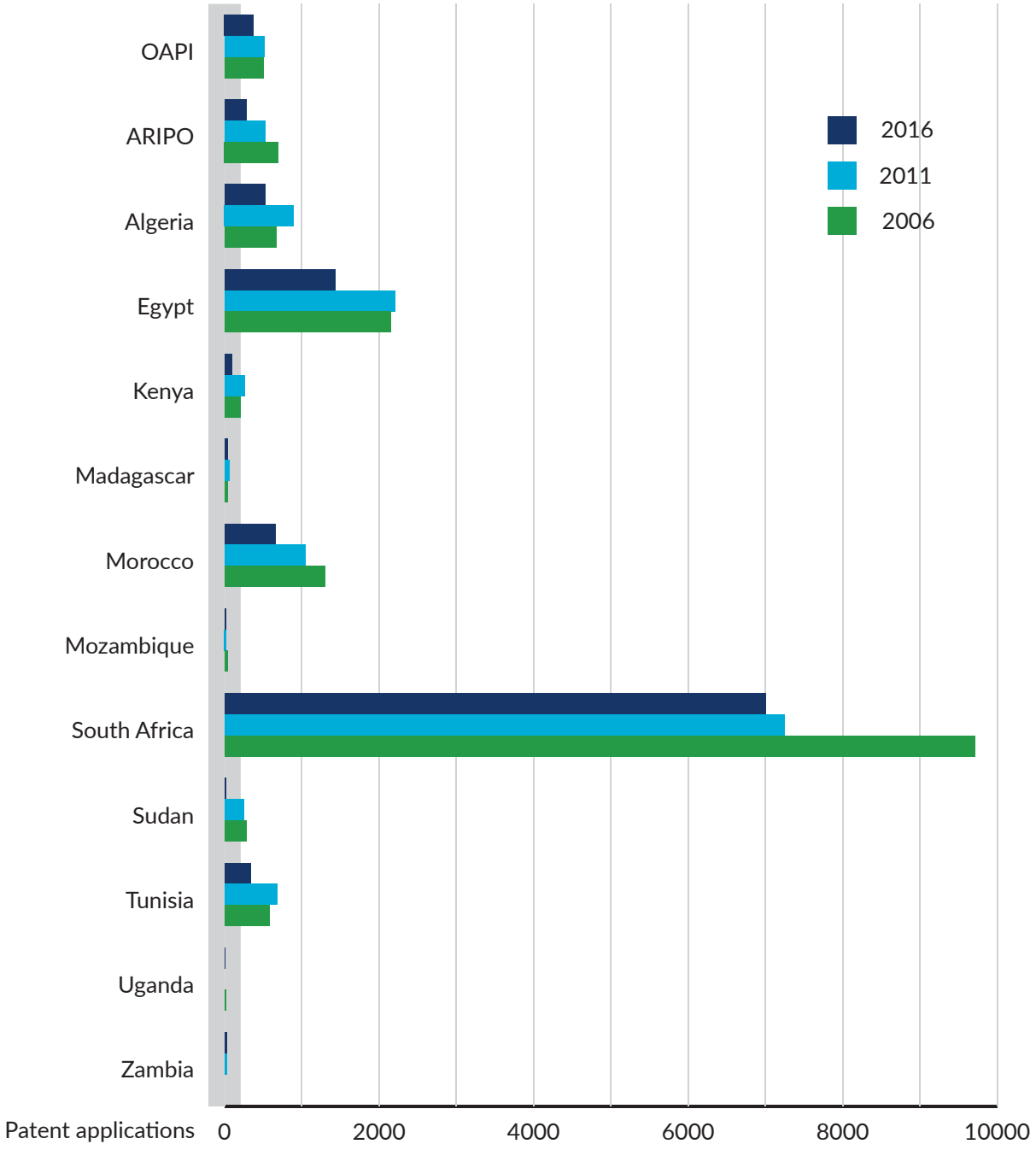
FIGURE 6.7 RESEARCHERS IN R&D (PER ONE MILLION PEOPLE, AVERAGE 2010-2015)



Source: World Bank (2018) World Development Indicators. Last updated 22 February 2018.

North African countries have the highest numbers of researchers for every one million people. Specifically, Tunisia, Morocco and Egypt are the top three African countries in this respect

FIGURE 6.8 TOTAL NUMBER OF PATENT APPLICATIONS

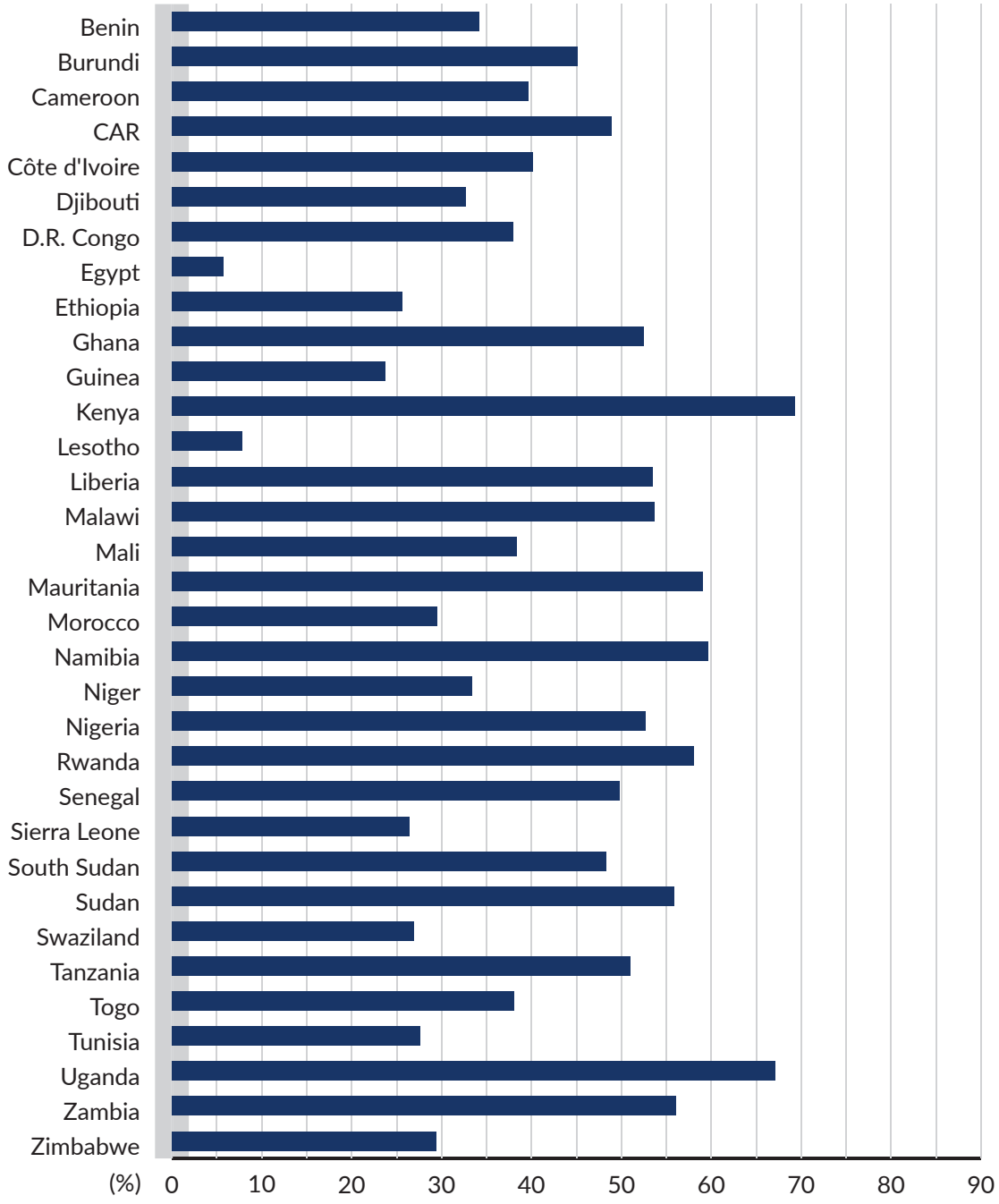


Source: World Intellectual Property Office statistics database. Accessed December 2017.

PATENT APPLICATIONS. The number of patent applications is an indication of the vibrancy of innovations and intellectual property generated by the scientific community and private sector. Investments in R&D are likely to translate into innovations and consequently increased patent applications to protect the intellectual property. Among the top five countries that invest in R&D, South Africa stands out as the country with the highest number of patent applications in Africa. This is followed by Egypt and Morocco, which spend 0.5 per cent and 0.7 per cent, respectively, of their GDP on R&D (FIGURE 6.8). However, investments in R&D do not automatically result in an increase in patent applications. A deliberate strategy is often required. In this context, Morocco's strategy to increase the number of patents in the country is instructive.

The **Moroccan Innovation Strategy** set and achieved its target of producing 1,000 Moroccan patents and creating 200 innovative start-ups by 2014. By 2016, it had produced 1,303 patent applications. In parallel, the Ministry of Industry, Commerce and New Technologies, in partnership with the Moroccan Office of Industrial and Commercial Property, created a Moroccan Club of Innovation in 2011. The idea is

FIGURE 6.9 PROPORTION OF FIRMS THAT DEVELOPED A NEW PRODUCT/SERVICE



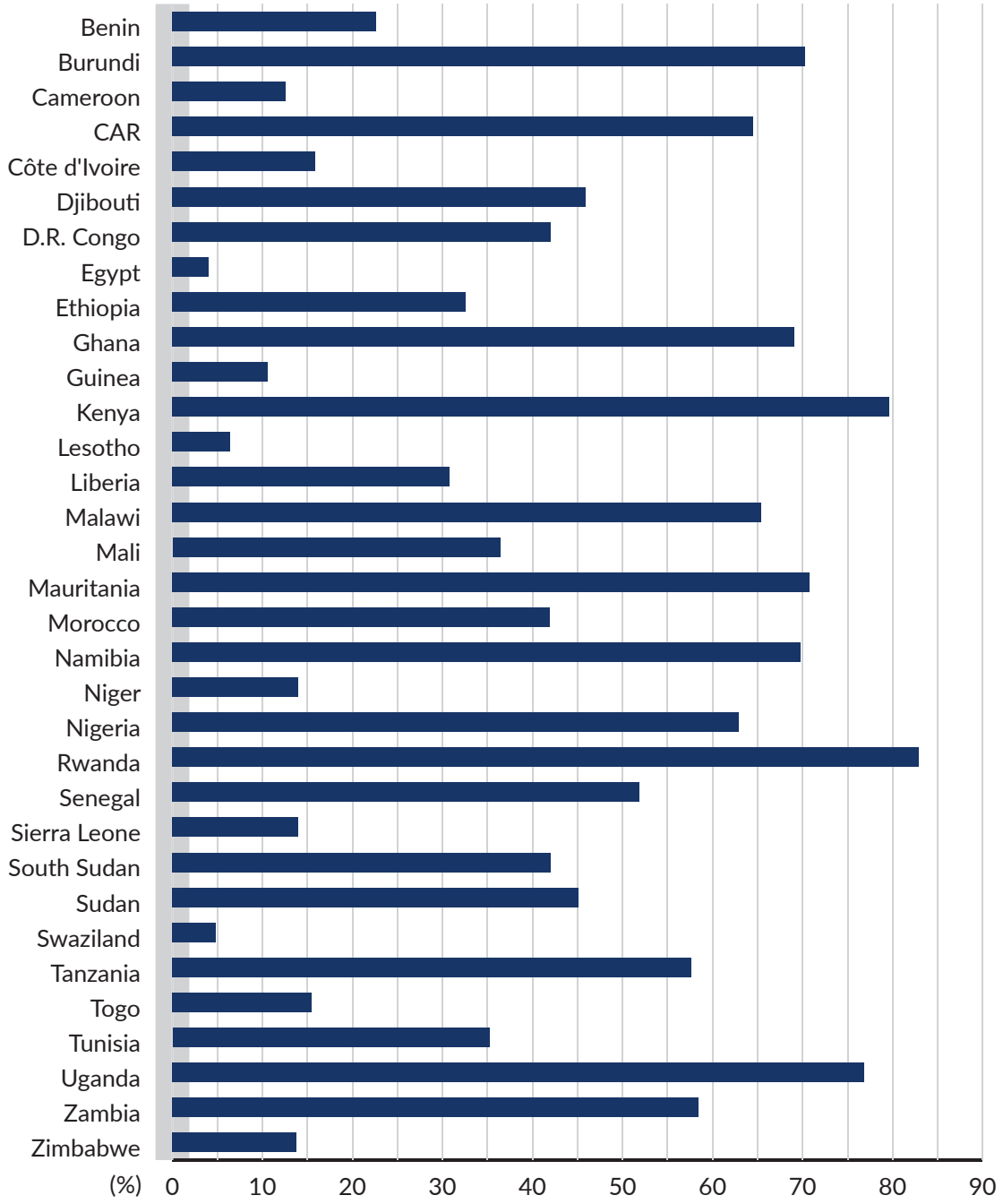
Source: Enterprise survey.

Investments in R&D are likely to translate into innovations and consequently increased patent applications to protect the intellectual property.

to create a network of collaborators in innovation, including researchers, entrepreneurs, students and academics, to help develop innovative projects.

PRODUCT AND PROCESS INNOVATION. Investments in R&D can also lead to innovative ways of producing goods and services and to the development of new products. Kenya, Rwanda and Uganda stand out as countries where a large per cent of their firms have developed new products or services and made innovations in how such goods and services are produced (FIGURE 6.10).

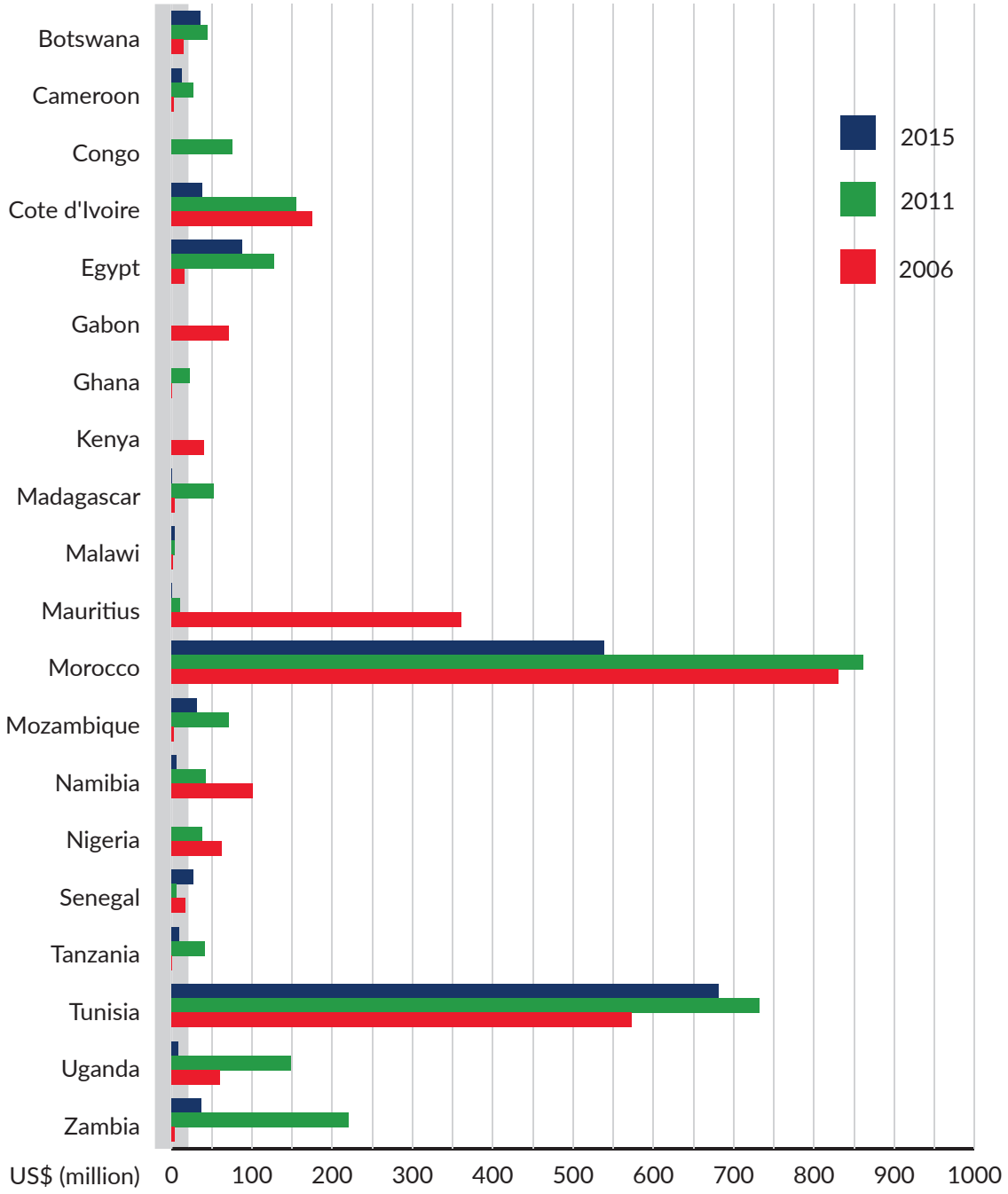
FIGURE 6.10 PROPORTION OF FIRMS THAT INTRODUCED A PROCESS INNOVATION



Source: Enterprise survey.

HIGH-TECH EXPORTS AS PERCENTAGE OF MANUFACTURED EXPORT. Investments in product and process upgrading are critical for boosting the volume and value of a country's high-tech exports. High-technology exports are products with high R&D intensity. Such products include but are not limited to aircraft, computers, and pharmaceuticals. Given the importance of R&D to high-tech exports one would expect that investments in R&D would translate into higher technology content of their exports. In reality, investments in R&D appear to be associated with the value of high-tech exports but not for all countries. Most African countries generate less than US$200

FIGURE 6.II HIGH-TECH EXPORTS BY SELECT AFRICAN COUNTRIES

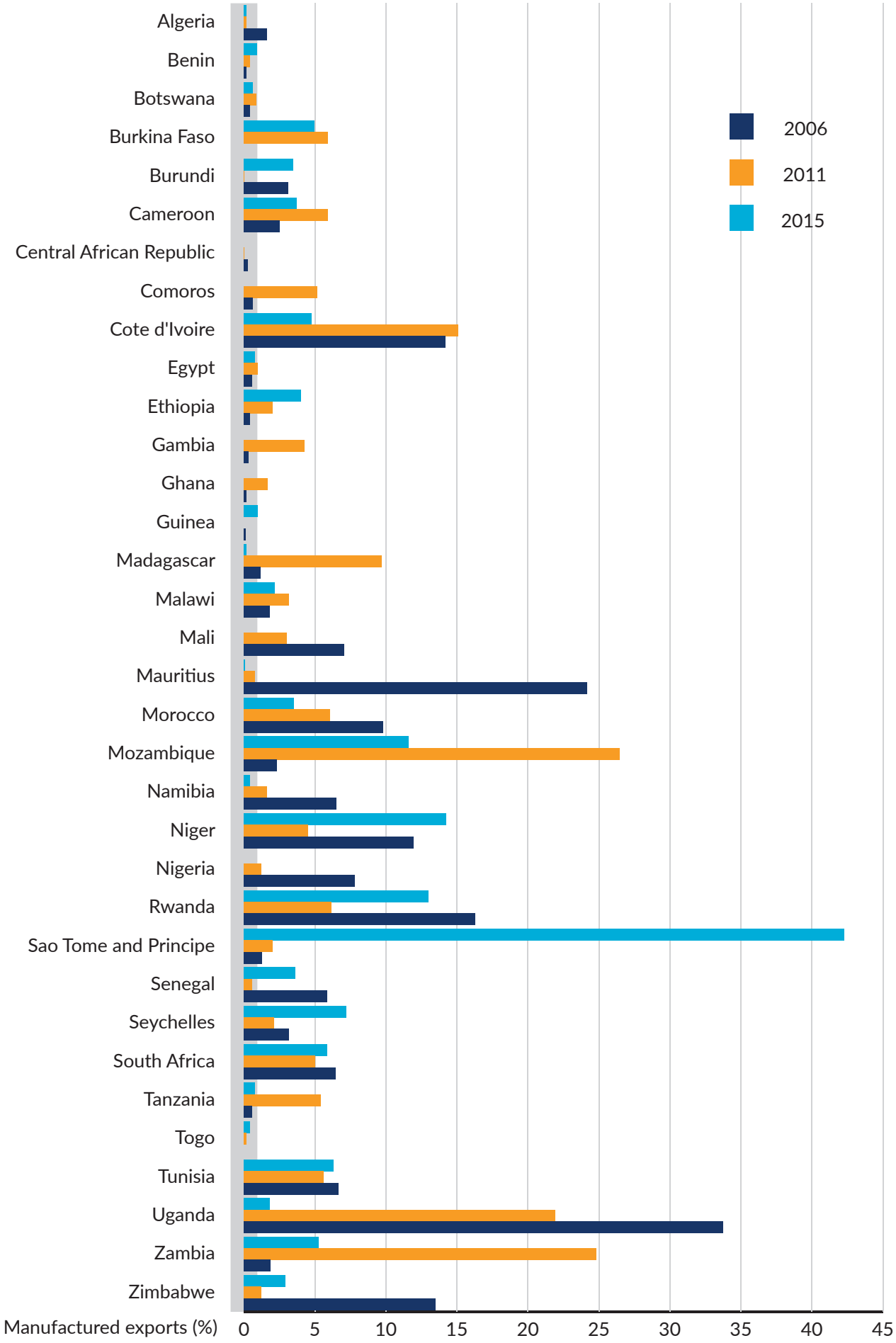


Source: World Development Indicators. Accessed 22 February 2018.

million annually from high tech exports. South Africa dominates the continent in this regard followed by Morocco, Tunisia and to a lesser extent Cote d'Ivoire and Egypt (FIGURE 6.II).

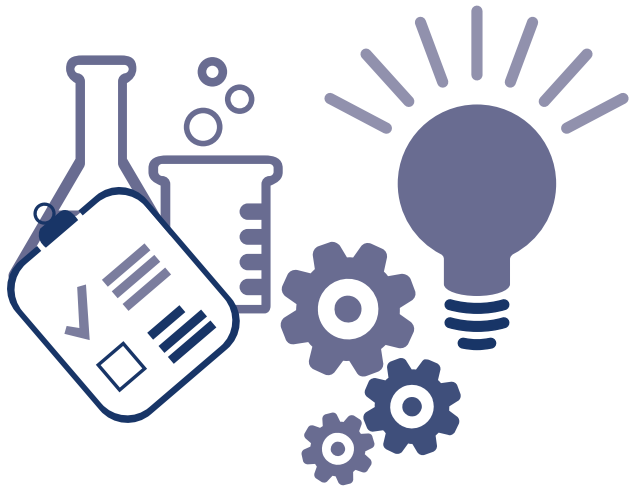
In the case of Morocco, policies aimed at fostering partnerships between the R&D community and the private sector may have contributed to the high-technology content of their exports. For instance, the Moroccan Spin-off and Incubation Network (Réseau Maroc incubation et essaimage), supports business incubation, in general, and technology transfer through university spin-offs, in particular. It provides start-ups with pre-seed capital to help them develop a solid business plan. The network is coordinated by the National Centre for Scientific and Technical Research and currently groups 14 incubators at some of the top Moroccan universities (UNESCO, 2015). The government is also encouraging citizen engagement in innovation on the part of public institutions. For instance, the Moroccan Phosphate Office (Office chérifien des phosphates) is investing in a project to develop a smart city, the King Mohammed VI Green City, at a cost of about US$479 million.

FIGURE 6.12 HIGH-TECH EXPORTS AS A PER CENT OF MANUFACTURED EXPORTS



Source: World Development Indicators. Accessed 22 February 2018.

However, as a percentage of total manufactured exports, high-tech products constitute a relatively low and declining share of Morocco's exports. In contrast, Sao Tome and Principe stands out in this regard. Slightly over 40 per cent of its manufactured exports in 2015 comprised high-tech products (FIGURE 6.12).



6.3.4 The role of policies and institutions in fostering STI in select African countries

Institutions, strategies and policy frameworks shape the STI ecosystem and largely determine its success or failure. The next section draws on the experiences of Kenya, Morocco and South Africa to distill lessons that can inform policies in other countries.

Kenya's STI institutional architecture

The institutional architecture that supports the advancement of STI in Kenya comprises the National Commission for Science Technology and Innovation (NCSTI), the Kenya National Innovation Agency (KENIA) and the National Research Fund (NRF). The NCSTI sets the national and county STI priorities and coordinates the sector across all sector ministries and in the county governments. The NRF, on the other hand, is responsible for mobilizing resources for the National Innovation System (NIS), while the KENIA largely develops and manages the NIS.

The current innovation system replaced a system that was plagued by a lack of coordination among the actors, and was fragmented and had limited linkages between academia, industry and government. The academic curricula and graduate skill sets were not well-aligned to industry needs, lacked funding and received limited support for innovation.

In its current configuration, the NRF of Kenya receives resources amounting to 2 per cent of GDP, from the treasury every financial year. In addition to such core funds, the NRF may also receive donations, endowments, grants or gifts from other sources (Republic of Kenya, 2014).

Kenya's investments in STI have been associated with positive outcomes. The World Bank's Enterprise Survey, revealed that between 2011 and 2016, 69.3 per cent of Kenyan firms surveyed introduced a new product or service, with the highest result in Africa; 79.6 per cent reported introducing a process innovation, also the highest result in Africa.

Kenya's reputation for innovation has been boosted tremendously by M-Pesa, a system of mobile money that has made financial transactions easier for many people who may not have bank accounts. The success of this native African technology, which is now expanding to other African markets and even into Asia and Eastern Europe,[1] shows that powerful African innovations can also be exported from the continent.

Morocco's STI innovation architecture

The Vision for Education in Morocco 2015–2030 aims to increase research spending to 1.5 per cent of GDP by 2030. Funding for R&D is facilitated through the National Fund for Scientific Research and Technological Development (2001), which encourages companies to support research in their sector. Indeed, the private sector provides a significant share of R&D spending in Morocco, contributing 30 per cent of the total in 2010, up from just 22 per cent in 2001. Moroccan telecom operators, for instance, allocate 0.25 per cent of their turnover to the fund. Today, about 80 per cent of all public research projects in telecommunications is financed through this fund.

The **Moroccan Innovation Strategy** was launched at the country's first National Innovation Summit in June 2009 by the Ministry of Industry, Commerce, Investment and the Digital Economy. It has three main thrusts: to develop domestic demand for innovation; foster public–private linkages; and introduce innovative funding mechanisms. The latter include Intilak for innovative start-ups and Tatwir for industrial enterprises or consortia. The ministry is supporting research in advanced technologies and the development of innovative cities in Fez, Rabat and Marrakesh (UNESCO, 2015).

1 Vodafone Website, *M-Pesa*, 2018, available at https://www.vodafone.com/content/index/what/m-pesa.html.

South Africa's innovation architecture

The Department of Science and Technology of South Africa is the primary public institution responsible for the development of STI in the country. It provides leadership, an enabling environment and resources for STI. Using tax policy, the government of South Africa encourages the private sector to contribute to STI, specifically, tax incentives for R&D are underscored in section 11D of the Income Tax Act (Act No. 58 of 1962). The fiscal incentive aims to boost innovation and private sector competitiveness through product upgrading and the development of new and innovative products.

The incentive allows any company undertaking scientific and or technological R&D in the country to deduct 150 per cent of its R&D spending when determining taxable income. Incentive is available to businesses of all sizes and in all sectors of the economy. In addition, the countryprovides direct funding for R&D through programmes, such as the Support Programme for Industrial Innovation (SPII) and the Industrial Innovation Partnership Programme (IIP). Grants, loans and equity support are also provided through the Technology Innovation Agency, which targets market-ready technology development and commercialization (Government of South Africa, 2018).

6.3.5 International support for STI: the role of the Technology Bank

The 2011 Istanbul Programme of Action called on development partners to establish a Technology Bank and a STI facilitation mechanism to strengthen the STI capacities of LDCs and partnerships, among these countries and with the developed countries (UN-OHRLLS, 2018).[2] The request for a Technology Bank was reaffirmed in the AAAA and SDGs of the 2030 Agenda. Following a positive report on the relevance and feasibility of the Technology Bank, the General Assembly requested the Secretary-General to take the steps necessary to launch and operationalize the Technology Bank by 2017.

The Technology Bank was subsequently officially established by the General Assembly in December 2016 and operationalized in September 2017 with the signing of the host country agreement and the Contribution Agreement between the Government of Turkey and the United Nations. The Technology Bank will be located in Gebze, Turkey. The establishment and operationalization of the Technology Bank makes it the first SDG to be achieved since its endorsement in 2015.

The operations of the Technology Bank will be governed by the Council of the Technology Bank for a term ending in 2019. The members of the Council are appointed by the Secretary-General and the Under-Secretary-General and High Representative for the LCDs, Landlocked Developing Countries and Small Island Developing States to serve as representatives in the Council.

It is envisaged that the activities of the Technology Bank that are directly implemented, as well as those that are promoted and catalyzed through its work, will help LDCs build STI capacities, ecosystems and regulatory frameworks that can harness the benefits of newly available technologies. This can be accomplished by attracting outside technology and facilitating technology transfer on voluntary and mutually agreed-upon terms and conditions; supporting homegrown innovation and research; and bringing imported and indigenous technologies to market.

2 The specific objectives of the Technology Bank are to strengthen:
The capacities of least-developed countries to identify, absorb, develop, integrate and scale up the deployment of technologies and innovations, including indigenous ones, as well as to address and manage intellectual property rights issues;
Develop and implement national and regional science, technology and innovation strategies;
Partnerships among science, technology and innovation related public entities and with the private sector;
Cooperation among all stakeholders (researchers, research institutions, the public and private sectors) involved in STI, within and between least-developed countries, as well as with their counterparts in other countries; and
Capacity to access, identify and utilize appropriate technologies by the least-developed countries, as well as their transfer to the least-developed countries, while respecting intellectual property rights and fostering the national and regional capacity for the effective utilization of technology in order to bring about transformative change.

6.4 Conclusions

The development of STI is vital for the achievement of the SDGs and Agenda 2063. However, a functional STI system requires an enabling environment and a vibrant institutional architecture that connects the science community and researchers to the private sector and government.

Africa has experienced a slow but steady increase in access to electricity, rising from 39.7 per cent in 2008 to 45.9 per cent in 2014. Internet access more than doubled in Africa, excluding North Africa, during the 2011-2016 period, rising from 8.5 per cent of the population in 2011 to 20 per cent in 2016. Overall, however, access to electricity in Africa is less than half the corresponding figure for East Asia and the Pacific and limited in rural areas.

The analysis suggests that STI infrastructure in Africa is improving, but is generally weak. Moreover, investments in R&D, a core enabler of STI, are well below the global average and the continental target.

Furthermore, at 0.5 per cent of GDP, investments in R&D are low and well below the 1 per cent of GDP stipulated in the Agenda 2063. Furthermore, only a fraction of exports can be classified as high-tech, and patent applications are low, implying weak innovation systems and possibly a limited capacity to protect intellectual property and indigenous knowledge systems from appropriation.

The analysis suggests that STI infrastructure in Africa is improving, but is generally weak. Moreover, investments in R&D, a core enabler of STI, are well below the global average and the continental target. These factors may have contributed to the low share of high-tech manufactured goods in Africa's export basket.

Despite the relatively weak enabling environment for STI in Africa, the private sector in several countries has achieved some success in product and process upgrading, reflecting the resilience and untapped potential of the sector. What separates high-performing STI African countries, such as Kenya, South Africa, Morocco and Tunisia, from the rest, is the vibrancy of their innovation systems. These systems have been relatively effective in coordinating the efforts of government, the private sector and the science community to nurture, fund and commercialize the research and innovations generated by the community. A critical ingredient of success is the ability to strengthen public-private sector collaboration for the funding and conduct of R&D.

CHAPTER 7

Key Messages and Policy Recommendations

7.1 Conclusions

This *Africa Sustainable Development Report 2018*, the second in series of such reports, tracks Africa's performance on the selected goals, targets and indicators of the 2030 Agenda and Agenda 2063. The key messages of the report are as follows:

1 Access to safe drinking water and improved sanitation is improving but remains very low in Africa despite increasing official development assistance (ODA) for the sector.

2 Emerging challenges, including climate change, droughts, floods and water management are major constraints in access to safe drinking water in Africa.

3 Access to electricity in Africa is increasing, albeit at a pace lower than the population growth.

4 Africa's renewable energy potential remains largely untapped despite its strong potential in solar and wind energy.

5 Efficiency in energy use in Africa is improving, but reliance on biomass poses a challenge to progress.

6 Africa is the fastest urbanizing region globally, but cities need to be well planned and managed if they are to significantly advance the reduction of poverty and inequality and foster job-rich growth and transformation.

7 Cities are becoming increasingly vulnerable to the impact of disasters. With the growing concentration of Africa's population in cities, such vulnerability will continue to intensify.

8 The air quality in most African cities is poor and poses health risks, particularly for children. Most African cities do not meet the minimum air quality standards established by the World Health Organization (WHO).

9 Africa, excluding North Africa, wastes over 30 per cent of its approximately 230 million tons of annual food production (equivalent to more than US$4 billion), due to poor post-harvest handling.

10 Africa outperforms most of the world's regions in the conservation and sustainable use of its mountain resources.

11 Globally, forest area as a proportion of total land area has been declining over the past two and a half decades, with the fastest decline registered in Africa, excluding North Africa, and least- developed countries (LDCs).

12 In addition to the decline in forest cover, Africa, like other regions of the world, faces the risk of extinction of major animal species.

13 Africa's STI infrastructure and institutional architecture are weak and characterized by low investments in Research and Development (R&D) and fragmented innovation systems; most of the entities responsible for STI policymaking have operated in isolation from other policy agencies with weak links to the private sector and academia.

7.2 Policy recommendations

A Ensure availability and sustainable management of water and sanitation for all.

Sustained and coordinated investments in water and sanitation are critical to improving access and reduce inequities, as well as the adverse effects of water-transmitted diseases. In 2015, only 23.7 per cent of people in Africa, excluding North Africa, had access to safely-managed sources of drinking water, compared with the global average of about 71 per cent. There are wide variations in coverage by geographical region and income. In the same year, the proportion of people in North Africa with access to safely-managed sanitation services was only 25.1 per cent.

To achieve universal access to improved water, sanitation and hygiene services in Africa, institutional and policy reforms, innovative financing and private sector engagement, as well as adequate monitoring and evaluation are required. African countries need to develop sustained and resilient infrastructure for water and sanitation, as well as balance the use of water resources for domestic use, production and other purposes. Mitigation measures in response to climate change are also required.

B Design and implement policy actions to promote access to electricity and modern energy.

Sustained political commitment to the national electrification programs is essential to expand access to electricity. The role of governments is critical in creating an enabling environment to spur off-grid sector growth, and entails designing smart targets, involving key stakeholders and identifying empowered champions in the design of policies.Tailored policies for individual countries are required across a range of issues, including: national sector strategy; market awareness; product standards and quality assurance; tax and duty exoneration; mobile payment facilitation; local skills development; and system recycling.

Special attention to promoting access to clean cooking solutions, including establishing cooking stoves standards, as well as wood/charcoal sector regulations, are needed. Market incentives for modern fuels and stove adoption can go a long way in increasing availability of such products. Utility providers are central players in the energy value chain, and their sustainability is important toward achieving universal access.

Measures to attract private sector investment in the energy sector are required. Market-oriented policy incentives and stronger regulations to promote private investment, as well as innovative distribution models, including applying mobile payment for fuel (e.g., gas) purchase need to be supported.

C Make cities and human settlements inclusive, safe, resilient and sustainable.

To promote inclusive and sustainable development in the urban areas, African governments and urban authorities must focus on planning for the growing urban population and promote the sprawling cities as attractive centres for quality living. Urban planning must encompass the need to upgrade slums and other informal settings in order to improve access to basic social services and amenities, for what is often the majority of the urban population. In addition, land use and infrastructure plans must proactively integrate and protect urban green spaces and forests as part of the development to create breathers for the population, protect water sources and more. This will help to accelerate reductions in poverty and inequality, as well as economic and social deprivation, including use of urban spaces.

Governments and urban authorities must invest more in building technical capacity and systems for physical planning to improve the available infrastructure and build more as the population grows. Building a capacity for collecting and analysing data, as well as developing methodologies and systems for data management is critical to good planning, monitoring and progress reporting.

Reaping the demographic dividend that the growing urban population offers requires adequate human capital development to ensure productive engagement. Therefore, in addition to physical infrastructure, governments need to plan for the provision of basic social services, including quality education and vocational training, health care, water and sanitation. Providing low-cost housing for the growing urban population is critical. Public-private partnership agreements, involving urban authorities, private contractors, pension funds and social insurance benefits, and commercial banks are needed to build such houses and offer loans at affordable rates.

The large urban infrastructure, social amenities and services requirements imply the need to devise measures to raise large amounts of funds to meet these needs. Improving domestic revenue collections and introducing new measures are needed to enhance the capacities of governments and urban authorities to finance the large and growing demands for urban infrastructure. Governments should consider measures, such as land taxes and property rates, bonds and, where needed, external financing. The fact that clean cities and urbanization have such prominence in both the 2030 Agenda and Agenda 2063, presents a good opportunity to attract and leverage resources from development partners. Urban authorities need to prepare good proposals with strategic issues, such as strengthening capacity and urban systems for better quality of life.

D Ensure sustainable consumption and production patterns.

MAINSTREAM SCP INTO AGENDA 2063 AS WELL AS INTO NATIONAL DEVELOPMENT PLANS. While methodologies underlying the indicators for Goal 12 need to be finalized, the focus should now be on advocacy, mainstreaming and the collection of data where feasible. It is important to **prioritize SCP related plans at the country level** - there is often a lack of focus on identifying priority interventions; coupled with limited enforcement capacity, this results in limited impact (ECA, 2009).

RAISE AWARENESS OF THE POTENTIAL AND SCOPE OF SUSTAINABLE CONSUMPTION AND PRODUCTION by scaling up successful initiatives and discussions. Environmental considerations continue to be perceived as an 'add-on' to doing business or making development policy, and there is considerable underpricing of environmental goods and services. Learning by doing through existing initiatives such as SAG can facilitate exchange of information on shifts in consumption and production patterns. The scale up of such initiatives would also add a lot of value to many of the countries.

TACKLE FOOD LOSSES AND WASTE CAN CONTRIBUTE TO FOOD SECURITY AND QUALITY LOCAL PRODUCE. While food insecurity and malnutrition are high, food losses are also very high (post-harvest and with local retailers), so that tackling the latter offers critical gains for the former, especially in the absence of enhanced agricultural productivity. It is also critical to secure maximum benefits from increases in productivity.

PROACTIVELY PROMOTE LEAPFROGGING INNOVATION RELEVANT TO AFRICA'S CONTEXT AND GREENING. There needs to be a focus on leveraging new technologies and approaches in both industry and for consumption goods that conserve resources or use them more effectively. Bypassing older technologies or pathways is, in fact, much more feasible in developing countries where there are no legacy systems to protect.

ADVOCATE FOR SUSTAINABLE PRODUCTION AND MARKETING WITH BUSINESSES. While the metadata for the indicator is still being developed, it is important to ramp up the advocacy for greater transparency and disclosure. There is a general lack of incentives and information for consumers to focus on buying sustainable products, such as energy-efficient appliances. Currently, private companies in only a handful of countries in Africa are taking part of sustainability reporting. Lessons need to be drawn from effective policy initiatives and business cases that have emerged.

E Protecting and promoting sustainable use of terrestrial ecosystems and forests, combating desertification, and halting land degradation and biodiversity loss.

Unlike other SDG targets that are to be achieved by 2030, most of Goal 15 targets will have to be met by 2020, underlining the urgency of action. Therefore, increased attention to designing strategies and investment plans for the realization of these targets in the next two years is required. African governments have committed to meet these very ambitious targets. It is time for a final push through concerted efforts of governments, the private sector, development partners and communities. Achieving these targets will, undoubtedly, serve as an indication of commitment by African governments and the international community to the SDGs, setting the tone for the implementation of the other SDGs.

However, Africa faces a plethora of challenges in efforts to conserve and sustainably manage ecosystems and halt and reverse biodiversity loss and desertification. Legal and economic policy reforms, as well as other institutional mechanisms, are required to halt and reverse the rapid rate of deforestation. Designing and implementing long-term management plans for forest areas, placing more forested lands within legally protected areas and promoting farm forestry (trees on farms), among other measures, are required.

To achieve traction, there is a need for greater involvement of local communities, taking into account their traditional knowledge, as appropriate. Although the regions have made great strides in conserving biodiversity – including placing more important biodiversity sites under protected areas – development partners need to meet their ODA funding commitments for biodiversity conservation, including for developing and implementing policy and institutional reforms for equitable sharing of the benefits of its abundant biological resources.

To address the risk of extinction of major species of animals, conserve and sustainably utilize the continent's diverse ecosystems, governments need to design and implement appropriate policies and legislative frameworks. They also must strengthen institutional capacities for implementation and monitoring and reporting, increase public investments and employ appropriate STI in conservation programmes.

African governments, supported by the RECs and development partners need to rally all stakeholders – political leaders, non-state actors, and private and local communities – to implement urgent actions to conserve and preserve the ecosystem. The centrality of the issues covered under this goal to the livelihoods and sustenance of life in the region and elsewhere cannot be overstressed.

F Strengthen public-private sector collaboration to promote STI.

Development of STI is critical to achieving the 2030 Agenda for Sustainable Development and Agenda 2063. Infrastructure for STI in Africa is improving, albeit slowly. At only 0.5 per cent of GDP, investments in R&D remain below the global average and the continental target, which in part, contributes to the low share of high-tech manufactured goods in Africa's export basket. The examples of Kenya, Morocco and South Africa show the importance of the private sector in driving product and process upgrading, when accorded the right environment. Therefore, African countries need to strengthen public-private sector collaboration for the funding and conduct of R&D, as well as the wider application and uptake of emerging technologies to advance production processes.

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