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The regional assessment report on
**BIODIVERSITY AND
ECOSYSTEM SERVICES
FOR AFRICA**

SUMMARY FOR POLICYMAKERS



SUMMARY FOR POLICYMAKERS OF THE IPBES REGIONAL ASSESSMENT REPORT ON BIODIVERSITY AND ECOSYSTEM SERVICES FOR AFRICA

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The regional assessment report on BIODIVERSITY AND ECOSYSTEM SERVICES **FOR AFRICA**

SUMMARY FOR POLICYMAKERS

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FOREWORD

The objective of the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services is to provide Governments, the private sector, and civil society with scientifically credible and independent up-to-date assessments of available knowledge to make informed decisions at the local, regional and international levels.

This regional and subregional assessment of biodiversity and ecosystem services for Africa has been carried out by 127 selected experts, including 7 early career fellows, assisted by 23 contributing authors, primarily from Africa, who have analyzed a large body of knowledge, including about 2,400 scientific publications. The Report represents the state of knowledge on the Africa region and subregions. Its chapters and their executive summaries were accepted, and its summary for policymakers was approved, by the Member States of IPBES at the sixth session of the IPBES Plenary (18 to 24 March 2018, Medellín, Colombia).

This Report provides a critical assessment of the full range of issues facing decision-makers, including the importance, status, trends and threats to biodiversity and nature's contributions to people, as well as policy and management response options. Establishing the underlying causes of the loss of biodiversity and nature's contributions to people provides policymakers with the information needed to develop appropriate response options, technologies, policies, financial incentives and behavioral changes.

The Assessment concludes that biodiversity and nature's contributions in Africa are economically, socially and culturally important, essential in providing the continent's food, water, energy, health and secure livelihood, and represent a strategic asset for sustainable development and achievement of the Sustainable Development Goals. However, the Assessment also notes that the current

The Regional Assessment Report on Biodiversity and Ecosystem Services for Africa produced by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) provides a critical analysis of the state of knowledge regarding the importance, status, and trends of biodiversity and nature's contributions to people. The assessment analyses the direct and underlying causes for the observed changes in biodiversity and in nature's contributions to people, and the impact that these changes have on the quality of life of people. The assessment, finally, identifies a mix of governance options, policies and management practices that are currently available to reduce the loss of biodiversity and of nature's contributions to people in that region.

The assessment addresses terrestrial, freshwater, and coastal biodiversity and covers current status and trends, going back in time several decades, and future projections, with a focus on the 2020-2050 period.

The present document, the Summary for Policymakers of the Assessment Report, was approved by the sixth session of the Plenary of IPBES (Medellín, Colombia, 18-24 March 2018). It is based on a set of chapters which were accepted at this same Plenary session. The chapters are available as document IPBES/6/INF/3/Rev.1 (www.ipbes.net).



loss and decline of biodiversity, which is due to human activities, is reducing nature's contributions to people, and undermining human well-being. Unregulated land cover change, i.e., habitat change and over-exploitation, has been the primary cause of biodiversity loss to date, but given Africa's extreme vulnerability to the impacts of climate change, climate change is likely to be a dominant driver of change in the future. The likely doubling of Africa's population by 2050, coupled with rapid urbanization, will place tremendous additional pressure on the continent's biodiversity and nature's contributions to people.

The Assessment notes that many African countries are implementing their national biodiversity strategies and action plans and are making some progress in meeting the Aichi Biodiversity Targets, but that progress in many of these actions is insufficient. For example, there has been some degree of recovery of threatened species through the establishment of effective management of terrestrial and marine protected areas. Africa is also progressively addressing both direct and indirect underlying threats to biodiversity and nature's contributions to people through a range of existing policies, strategies, plans and programmes at the national, subregional and regional levels. The Assessment identifies a range of possible options for more effective multi-stakeholder and multi-level adaptive governance, recognizing the value of local and indigenous knowledge.

While much is known about Africa's biodiversity and nature's contributions to people, there are still significant scientific uncertainties that need to be addressed through national and regional research programmes.

We would like to recognize the excellent and dedicated work of the co-chairs, Dr. Emma Archer (South Africa), Dr. Luthando Dziba (South Africa) and Prof. Kalemani Jo

Mulongoy (Democratic Republic of the Congo), as well as of the coordinating lead authors, lead authors, review editors, fellows, contributing authors and reviewers, and warmly thank them for their commitment. We would also like to thank Michele Walters and Anicia Malebajoa Maoela, from the technical support unit located at the Council for Scientific and Industrial Research, Pretoria, South Africa, as well as Felice van der Plaats, coordinator of the implementation of the regional assessments, because without their dedication this Report would not have been possible. We would also like to thank the Government of South Africa for their generous support.

This Regional Assessment Report provides invaluable information for African policymakers to make informed decisions regarding the conservation and sustainable use of biodiversity, the promotion of access to genetic resources, as well as the fair and equitable sharing of benefits arising from their use. It also provides valuable information for the ongoing IPBES global assessment, to be released in May 2019 and is expected to inform discussions regarding the post-2020 global biodiversity framework under the Convention on Biological Diversity, as well as to inform action on implementing the 2030 Agenda for Sustainable Development and the Sustainable Development Goals.

Sir Robert T. Watson

Chair of IPBES

Anne Larigauderie

Executive Secretary of IPBES

STATEMENTS FROM KEY PARTNERS



“ The Sustainable Development Goals aim to “leave no one behind”. If we don’t protect and value biodiversity, we will never achieve this goal. When we erode biodiversity, we impact food, water, forests and livelihoods. But to tackle any challenge head on, we need to get the science right and this is why UN Environment is proud to support this series of assessments. Investing in the science of biodiversity and indigenous knowledge, means investing in people and the future we want.”

Erik Solheim

Executive Director,
United Nations Environment Programme
(UNEP)



“ Biodiversity is the living fabric of our planet - the source of our present and our future. It is essential to helping us all adapt to the changes we face over the coming years. UNESCO, both as a UN partner of IPBES and as the host of the IPBES Technical Support Unit on Indigenous and Local Knowledge, has always been committed to supporting harmony between people and nature through its programmes and networks. These four regional reports are critical to understanding the role of human activities in biodiversity loss and its conservation, and our capacity to collectively implementing solutions to address the challenges ahead.”

Audrey Azoulay

Director-General,
United Nations Educational,
Scientific and Cultural Organization (UNESCO)



“ The regional assessments demonstrate once again that biodiversity is among the earth’s most important resources. Biodiversity is also key to food security and nutrition. The maintenance of biological diversity is important for food production and for the conservation of the ecological foundations on which rural livelihoods depend. Biodiversity is under serious threat in many regions of the world and it is time for policymakers to take action at national, regional and global levels. ”

José Graziano da Silva

Director-General,
Food and Agriculture Organization of the
United Nations (FAO)



“ Tools like these four regional assessments provide scientific evidence for better decision making and a path we can take forward to achieve the Sustainable Development Goals and harness nature’s power for our collective sustainable future. The world has lost over 130 million hectares of rainforests since 1990 and we lose dozens of species every day, pushing the Earth’s ecological system to its limit. Biodiversity and the ecosystem services it supports are not only the foundation for our life on Earth, but critical to the livelihoods and well-being of people everywhere. ”

Achim Steiner

Administrator,
United Nations Development Programme
(UNDP)

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As the Co-Chairs of The IPBES Regional Assessment of Biodiversity and Ecosystem Services for Africa, it is a great privilege to have worked with our expert group and Technical Support Unit in the development of this, the most recent Assessment of biodiversity and ecosystem services for the continent of Africa. It is our hope that the Assessment will find use and value by decision-makers and policymakers, and we, as co-chairs and as an expert group, are committed to supporting that process as our way forward.

We sincerely thank our experts, especially the Coordinating Lead Authors, Lead Authors and Contributing Authors, as well as their nominating governments and organizations who supported them. These authors were generous with their time and effort in this significant and demanding process and this is greatly appreciated. We thank Sebsebe Demissew, Chimère Diaw, Otieno Oguge, Alfred Oteng-Yeboah and Laura Pereira for joining the co-chairs to finalize the Summary for Policymakers (SPM) in late November in Pretoria. We also thank graphic designers Maro Haas and Yuka Estrada for producing excellent graphics that significantly improved data visualization and for the design and layout of the SPM. We further thank external reviewers and Review Editors whose comments helped to improve the quality of the Assessment Report and the SPM.

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We would like to express our gratitude for the support of the Chair of IPBES, Sir Bob Watson; Anne Larigauderie, IPBES Executive Secretary, as well as all members of the IPBES Multidisciplinary Expert Panel (MEP) and Bureau. We would particularly like to thank our management committee for their unwavering support and oversight role during the whole Assessment process – namely, Sebsebe Demissew, Fundisile Mketeni, Jean Bruno Mikissa, and Alfred Oteng-Yeboah.

We would also like to thank Felice van der Plaats for her support and her coordinating role in the multi-year development of this Assessment, which ensured learning across the Regional Assessments.

We also express sincere thanks to the Council for Scientific and Industrial Research (CSIR) for hosting the Technical Support Unit (TSU) in Pretoria, South Africa. We also thank



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The Capacity Building TSU are to be sincerely thanked for their continual support, including, but not limited to, the Fellows programme, our additional workshops (including our writing workshop at Golden Gate and the SPM workshop in Oslo). We thank the Fellows for their commendable contribution to the IPBES Assessment for Africa. The science-policy dialogue with National Focal Points held in Ethiopia in early August 2017, which was funded by the Capacity Building TSU, prepared the government representatives to comment on the latter stages of the Assessment and for engagement with the SPM in Colombia in March, 2018.

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Emma Archer
Co-Chair, South Africa

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KEY MESSAGES

KEY MESSAGES

A. AFRICA'S NATURAL ASSETS ARE UNIQUE

A1 Africa's extraordinary richness in biodiversity and ecosystem services, and wealth of indigenous and local knowledge, comprises a strategic asset for sustainable development in the region. Africa is the last place on Earth with a significant assemblage of large mammals. Africa has significant regional, subregional and national variations in biodiversity that reflect climatic and physical differences, as well as the continent's long and varied history of human interactions with the environment. This natural richness, accumulated over millions of years, coupled with the wealth of indigenous and local knowledge on the continent, is central to, and constitutes a strategic asset for, the pursuit of sustainable development in the region.

A2 Africa's rich and diverse ecosystems generate flows of goods and services that are essential in providing for the continent's food, water, energy, health and secure livelihood needs. More than 62 per cent of the population depend directly on these services in rural areas, while the urban and peri-urban population supplement their incomes, as well as their energy, medicine and other essentials, from ecosystem-based resources. Tangible and intangible assets such as food, water, medicinal plants, sacred rituals, as well as religious and cultural spaces, underpin nature's contributions to the economy and are central to a multitude of other livelihood strategies. Nature's contributions to people are generally of immense benefit to the inhabitants of the continent and others across the globe, although their impact may occasionally be detrimental, as in cases of diseases, and where there is conflict over their uses.

A3 The full story of Africa's endowment by nature is yet to be told and, as a result, the true value of biodiversity's contributions to human well-being is underappreciated in decision-making processes. This is because the study of nature's contributions to people is still in its infancy. In particular, the number of published studies on the valuation of ecosystem services in Africa is relatively low. The majority of these studies were conducted in Southern Africa (22 per cent), East Africa and adjacent islands (37 per cent), as well as in marine and coastal

ecosystems (23 per cent), inland waters and forests (20 per cent). Existing and forthcoming studies of this nature can provide the evidence to help African policymakers in establishing priorities in the use and conservation of biodiversity and related contributions to people, and in identifying the best trade-offs among different biodiversity components and their services for different uses.

A4 Africa has opportunities to fully realize the benefits of having such rich biodiversity and to explore ways of using it in a sustainable way to contribute to its economic and technological development. Existing indigenous and local knowledge on management of biodiversity and nature's contributions to people appears to be declining in parts of the continent. Africa has the advantage of low ecological and carbon footprints compared with other parts of the world, but is still likely to face challenges associated with balancing increasing economic growth, rising population and population densities with the need to protect, conserve and enhance biodiversity and ecosystem services. It is important that the people of Africa do not lose both the rich natural resources and the indigenous and local knowledge to manage these resources, especially at a time when knowledge is increasingly recognized as vital to the development of a low-carbon, ecological, knowledge-based economy.

A5 Certain ecosystems found in Africa are of great ecological, biological and cultural importance at regional and global levels. As a strategic measure to protect them, and also the species, knowledge and genetic resources that they harbour, countries have declared 14 per cent of the continent's land mass and 2.6 per cent of the seas as protected areas, while some sites have been designated as wetlands of international importance; important bird and biodiversity areas; Alliance for Zero Extinction sites, where endangered or critically endangered species occur; ecologically and biologically significant marine areas; community conserved areas; United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites; and Biosphere reserves.

A6 Africa has important genetic diversity that reflects its unique and varied biological and cultural heritages, and is the product of interactions with, and adaptation to, an ever-changing environment, and of exchanges with other cultures. This diversity



strengthens the resilience of African food systems and communities. It can be seen in the livestock breeds and crop varieties, which were essentially bred from their wild relatives. Africa is home to many subsistence farmers, small-scale livestock herders and pastoralists who maintain a range of plant and animal genetic resources for food and agriculture, which tends to mitigate the consequences of drought, pests and changing environmental conditions. Many food crops originate in Africa, including species of wheat, barley, millet and sorghum; teff (*Eragrostis tef*); coffee (*Coffea arabica*); rooibos tea (*Aspalathus linearis*); cowpea (*Vigna unguiculata*); and oil palm (*Elaeis guineensis*).

A7 Indigenous and local knowledge in Africa underpins the way nature benefits people. It is at the forefront of biodiversity conservation and is critical to the African vision for a good quality of life. It deserves more attention from Governments and society. Successful natural resource management often relies on the improved knowledge gained from communities' insights into the ecology and biology of resources and ecosystems. Indigenous and local knowledge holders can complement the lack of sufficient scientific information on species and environments and help in the management of natural resources. Biodiversity conservation in any cultural landscape requires an understanding of the cultural fabric of societies. There is also growing recognition of the need to protect cultural diversity and to document and value the use of, and meanings bestowed on, nature

in endangered cultural landscapes. Indigenous and local knowledge is a key asset in the African research and development agenda, for instance in terms of genetic resources and the synergies that can be made with advanced technologies to bring about the innovations and transformations needed on the African continent.

B. AFRICA UNDER PRESSURE

B1 The decline and loss of biodiversity is reducing nature's contributions to people in Africa, affecting daily lives and hampering the sustainable social and economic development targeted by African countries. The number of microorganisms, plants, invertebrates, fish, amphibians, reptiles, birds and mammals threatened by a range of human-induced drivers such as climate change, habitat conversion, over-harvesting, poaching and illegal wildlife trade, pollution and invasive alien species, as well as natural drivers such as diseases, pests and natural disasters, has increased over the last two decades. These drivers enhance climate-related risks, land degradation, loss of habitat for migratory and other species, and loss of soil fertility, productivity and economic opportunities, further threatening food, water, energy and health security with serious negative impacts on livelihoods. All the plausible future scenarios analysed in the Africa

assessment highlight that these drivers will increase overall, with associated negative impacts on biodiversity, nature's contributions to people and human well-being.

B2 Indirect drivers, including rapid population growth and urbanization, inappropriate economic policies and technologies, poaching and illegal wildlife trade as well as socio-political and cultural pressures have accelerated the loss of biodiversity and the loss of nature's contributions to people.

A failure to address these underlying causes of biodiversity loss will continue to threaten or undermine efforts to protect biodiversity and improve the quality of life of the people of Africa through conservation, sustainable use and equitable sharing of benefits from natural resources. Other factors that cause biodiversity loss and a decline in nature's contributions to people include the unregulated development of infrastructure and human settlements; overharvesting of biological resources; introduction of invasive alien species; and air, water and soil pollution. Climate change, manifested by a rise in temperature and sea-level rise, and changes in rainfall pattern, distribution and quantity, exacerbates all the other direct drivers of biodiversity loss.

B3 Africa's current population of 1.25 billion is likely to double by 2050, putting severe pressure on the continent's biodiversity and nature's contributions to people, unless appropriate policies and strategies are adopted and effectively implemented. Africa is also one of the most rapidly urbanizing continents.

Rapid and unplanned urbanization puts immense pressure on urban infrastructure and demand for services, including water supply, food supply, pollution control and waste management, as well as energy supply for households and industrial development. Urban communities produce large quantities of solid and other wastes that lead to environmental pollution. There is a need for policies that encourage sustainable and equitable development by, for example, directing development opportunities to rural areas and redirecting planned urban expansion to economic development zones in rural settings, in particular those that have adequate water and renewable energy supply.

B4 Africa is extremely vulnerable to the impacts of climate change. Temperatures in all African countries are rising faster than the global rate, and in some areas, at double the global rate of warming. Since the 1970s, droughts have been more frequent and more severe, thereby driving land degradation. Future rainfall variability is projected to increase over most areas, with most models suggesting fewer, but higher-intensity rainfall events. Rainfall distribution, pattern and intensity is affected by climate change, with severe consequences for smallholder farmers and poor communities. The latter are also likely to be affected more severely by flooding. Climate change is likely

to result in significant losses of many African plant species, some animal species, and a decline in the productivity of fisheries in inland waters of Africa during the twenty-first century. Future disease trends and climate change will have substantial effects on the livestock sector in Africa by impacting the distribution of disease vectors and water availability. The conservation of biodiversity and ecosystems enhances adaptive capacity, strengthens resilience and reduces vulnerability to climate change, thus contributing to sustainable development.

B5 Unregulated land cover change is detrimental to biodiversity, which in turn is detrimental to Africa's long-term sustainable development. Further, this unregulated conversion of forest, rangelands and other natural areas, such as wetlands, for food production and urban development is happening at a fast pace following the rapid transformation of African societies. Such conversion leads to habitat loss and fragmentation, degradation of water catchments, and soil erosion leading to loss of biodiversity and livelihoods.

The fragmentation that results from these land uses contributes to biodiversity loss, since many wildlife species are migratory, and conservation areas do not provide sufficient habitat or corridors for their migration. The erosion of indigenous knowledge exacerbates this, as communities change their cultural use of space and resources. Land, considered as Africa's most valued asset, faces competing development needs for urban development, mining and agricultural expansion. Sustainable land-use planning could ensure that critical ecosystems such as freshwater streams, wetlands, indigenous forests, or endemic ecosystems that are key reservoirs of biodiversity, are sufficiently protected.

B6 Marine and coastal environments are of significant ecological and socio-economic importance to the African continent and are under immense threat from human activities. Biodiversity and ecosystems in marine and coastal areas are diverse and provide significant economic, social and cultural contributions to the people of Africa. In some regions, they contribute more than 35 per cent of the gross domestic product (GDP). These environments are, however, under threat owing to a number of human-induced factors such as climate change, infrastructural development (e.g., ports), urbanization, tourism, mining and overharvesting of marine and coastal resources leading to loss of biodiversity and extensive damage to key ecosystems including coral reefs, estuaries and mangroves. Damage to coral reef systems, mostly due to pollution and climate change, has far-reaching implications for fisheries, food security, tourism and overall marine biodiversity. Moreover, with overexploitation, habitat degradation and loss, acidification, pollution from land-based sources, alien invasive species and sea-level rise, highly valuable ecosystem services are under severe threat.





C. STRENGTHENING AFRICAN TRANSFORMATION FRAMEWORKS

C1 Africa's unique and abundant biodiversity is an asset for the achievement of the Sustainable Development Goals and can be sustainably and equitably used to reduce inequality and poverty on the continent. The value of biodiversity and ecosystem services is critical to achieving Sustainable Development Goals 14 and 15, which are focused on conservation and the sustainable use of natural resources in the context of contributions to human well-being (e.g., Goals 1, 2, 3, 6 and 7). Further, biodiversity may benefit from the achievement of Goals 11 and 13, which offer nature-based solutions. Unfavourable conditions, such as limited financial and institutional capacity to make effective and efficient use of natural resources, may undermine development. Favourable conditions for achieving the Sustainable Development Goals include abundant arable land and water resources, and highly diverse ecosystems. The close alignment between the strategic priorities of African Governments and the Sustainable Development Goals, such as the protection, restoration, conservation and sustainable use of biodiversity, will also improve the chance of achieving the Goals.

C2 The alignment of Agenda 2063 goals, Sustainable Development Goals and Aichi Biodiversity Targets, linked to the conservation of biodiversity and nature's contributions to people that enhance human well-being in Africa, facilitates the development of interventions that can achieve multiple positive outcomes. African Union member states have committed themselves to fully implementing key multilateral environmental agreements. Harnessing synergies in these multilateral environmental agreements with Sustainable Development Goals and other related regional and national initiatives can foster the effective implementation of policies and strategies at different levels and scales, helping to ensure resource efficiency. Using existing opportunities, such

as regional economic communities, national, bilateral and international funding instruments such as the Global Environment Facility, the Green Climate Fund, the Land Degradation Neutrality Fund and other environment finance initiatives, to leverage synergies, can be particularly effective for policy implementation at the regional and national levels. Countries may take advantage of opportunities presented by regional economic communities, technical agencies, as well as national, bilateral and international funding sources to include support for the implementation of biodiversity-related policies at the regional and national levels in broader environmental projects. Governance options, such as ecosystem-based adaptation, that deliver multiple benefits can help to address equity and contribute to poverty alleviation.

C3 Effective conservation and sustainable use of biodiversity and nature's contributions to people will contribute to the achievement of the objectives of the 2015 Paris Agreement on climate change to keep global temperature increase in this century below the 2-degree centigrade mark, and to strengthen the ability of countries to deal with the impacts of climate change. Taking into account some of the climate change impacts currently experienced and projected to increase, Africa has the opportunity to manage its biodiversity so as to contribute to international efforts to mitigate observed and projected climate change impacts, including the frequency and intensity of extreme events, through improved efforts in afforestation, restoration of degraded ecosystems, encouraging appropriate agriculture systems and commitment to reducing greenhouse gas emissions. The expansion and effective management of terrestrial and marine protected areas and the provision of a network of corridors that connect protected environments are also critical for efforts in mitigating and adapting to climate change.

C4 African countries are implementing their respective national biodiversity strategies and action plans and are making some progress in meeting commitments in the global Strategic Plan

for Biodiversity 2011–2020, but progress in many of these actions remains insufficient. Many African countries have developed their national biodiversity strategies and action plans in conformity with the Strategic Plan for Biodiversity 2011–2020 and its Aichi Biodiversity Targets. There are opportunities for African countries to enhance biodiversity conservation targets through the appropriate revision and implementation of these national biodiversity strategies and action plans. Notwithstanding the efforts made by African countries, enhanced implementation requires additional funding and capacity-building that can benefit from international cooperation, partnerships and biodiversity-related financing mechanisms, including from national sources. Addressing the obstacles that are hindering progress, such as financial and capacity constraints, may enhance the sustainable use and the equitable sharing of benefits arising from biological resources.

D. AFRICA HAS OPTIONS

D1 Africa has a range of possible options for the governance of its biodiversity for the benefit of its people. The selection of appropriate options is critical to delivering benefits to its people through the conservation and sustainable use of biodiversity, and the promotion of access to genetic resources and the fair and equitable sharing of benefits arising from their utilization. Furthermore, the value of local and indigenous knowledge, innovations and practice should be acknowledged and promoted in support of human well-being. Decision-making in Africa takes place against an array of continent-specific challenges, including the need for industrialization; fast population growth; food, water and energy insecurity; extensive urbanization; climate change; land degradation; ineffective governance; and unsustainable historical development decisions. Africa now has the opportunity to undertake transformational development pathways. Overall improvements in human well-being are expected under most scenarios, but these improvements typically come at the expense of the environment. Consequently, a range of targets aimed at facilitating transformative changes that achieve both human well-being and environmental sustainability outcomes have been adopted in Africa and globally. To achieve such positive outcomes, African countries could concentrate their development (including urban human settlements, mining, agriculture and other forms of development) with a view to balancing priority development needs with progressive and proactive conservation of the continent's natural and cultural heritage. The identification of feasible options could be supported by considering a range of plausible futures through scenario development and by providing an enabling environment (supportive policy and governance options) for short-term and long-term planning.

D2 Africa's existing policies, strategies, plans and programmes at the national, subregional and regional levels are progressively addressing both direct and indirect underlying threats to biodiversity and nature's contributions to people. Where these mechanisms encourage inclusive development and a transition to green² and blue³ economies in the context of sustainable development, they support good quality of life. These policies, strategies, plans and programmes are among the tools for the implementation of multilateral environmental agreements and a range of regional treaties on the environment. The goals and targets from these regional and global agreements shape the international and continental policy context for the governance of Africa's biodiversity and its contributions to people. For their achievement, actions could take into account social, political, environmental and economic conditions, bearing in mind ongoing changes at all levels.

D3 Measures taken by African Governments to protect biodiversity and nature's contributions to people have contributed to some degree of recovery of threatened species, especially in key biodiversity areas, and these efforts could be enhanced. Such measures include the establishment and effective management of terrestrial and marine protected areas, including community and privately conserved areas; the restoration of degraded ecosystems; and the sustainable use of indigenous cereals, coffee, tea and other ornamental plants. Other efforts in the control of invasive alien species and reintroduction of wild animals are also yielding positive results in enhancing biodiversity and nature's contributions to people, especially in improving forage for wild and domestic animal species, providing ecotourism income and employment.

D4 Scenarios are underused in decision-making processes in Africa. The majority of the identified scenario studies were exploratory (80 per cent) and

2. As defined in the UNEP 2011 study, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers*, available from www.unep.org/greeneconomy, a green economy is one that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities". In its simplest expression, a green economy is low-carbon, resource-efficient, and socially inclusive. In a green economy, growth in income and employment are driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services.
3. As described by the Economic Commission for Africa in its 2016 publication, *Africa's Blue Economy: A policy handbook*, available from www.uneca.org/sites/default/files/PublicationFiles/blue-eco-policy-handbook_eng_1nov.pdf, the Blue Economy concept includes recognition that the productivity of healthy freshwater and ocean ecosystems is a pathway for aquatic and maritime based economies and can ensure that islands and other coastal countries, and also landlocked States, benefit from their resources. It also requires an integrated, holistic and participatory approach that includes sustainable use and management. The Blue Economy promotes the conservation of aquatic and marine ecosystems and sustainable use and management of associated resources and builds on principles of equity, low carbon development, resource efficiency and social inclusion.

relied mainly on climate change as a single driver of biodiversity change. Concerted effort is needed to build the capacity of African researchers, policymakers and institutions to understand, carry out and make beneficial use of scenario analyses for intervention planning and informed decision-making. The selected scenario archetypes (range of plausible futures) provide an overview of how interactions between nature and society or between current environmental and developmental conditions, existing driving forces, and optional management interventions could shape possible future trajectories of change across Africa in the coming decades, as well as the potential implications for nature and nature's contributions to people. There is also, generally, a dearth of accessible peer-reviewed and grey literature to support a comprehensive assessment of policy and governance options for Africa. Such a limitation creates challenges when identifying policy options, but presents an opportunity for more frequent and comprehensive ecosystem assessments. It further presents an opportunity for the development of case studies and pilot projects that explore the different policy options and instruments that are specifically relevant in the African context. Data collected from such efforts will help strengthen scenarios and models about plausible futures for Africa.

D5 Achieving the African Union's vision of an integrated, prosperous and peaceful Africa by 2063 and associated Sustainable Development Goals and Aichi Biodiversity Targets is problematic under the type of plausible future⁴ that prioritizes national sovereignty, self-reliance and security. Those plausible futures that balance strong economic growth with minimizing environmental consequences are also unlikely to fully meet the aforementioned vision, given their higher propensity to undermine the natural resource-base in the long term. The plausible futures characterized by heightened environmental caution, social equity and human welfare, however, provide the most likely options for achieving multiple goals. Transformative outcomes will be fully attained if concerted efforts are taken to mobilize financial resources and build the capacity of African researchers, policymakers and institutions to understand, carry out and use scenario analyses as guidance mechanisms for decision-making, bearing in mind that Africa is increasingly interconnected with the rest of the world, especially through global markets and trade.

4. Our assessment clustered African scenario studies into five archetypes emphasizing market forces, policy reform, security (fortress world), regional sustainability and local sustainability. These scenario archetypes provide an overview of how interactions between nature and society, or between current environmental and developmental conditions; existing driving forces; and optional management interventions could shape possible future trajectories of change across Africa in the coming decades, and the potential implications for nature and nature's contributions to people. An overall description of the scenario archetypes used to categorize the scenarios of relevance to Africa is given in **Table SPM.4 and Box SPM.1**.

E. THE FUTURE WE WANT MAKING IT HAPPEN TOGETHER

E1 Africa can move towards achieving its development aspirations, while at the same time improving the conservation of its valuable natural assets and meeting its biodiversity commitments and targets through multi-stakeholder and multilevel adaptive governance, as well as improved integration of indigenous and local knowledge through recognition of traditional institutions (hereafter referred to as polycentric governance).

Such a polycentric governance approach bridges sectors and operates at multiple levels and scales, over different time frames and also offers an alternative to top-down approaches that are less sensitive to local constraints and to bottom-up approaches that are sometimes inadequate for dealing with issues at higher levels. Mainstreaming biodiversity and ecosystem services into policies and actions at different levels is vital to, and also consistent with, traditional polycentric governance approaches on the continent, by bringing together stakeholders (both public and private) with different perspectives and supported by enhanced international cooperation and multilevel partnerships, and through the provision and mobilization of sustainable, predictable and adequate means of implementation. These approaches can be resource-intensive in the short term, but can provide agility in responding to changing drivers, thereby reducing conflict. They may also help with achieving balance between conservation and use of biodiversity and ecosystem services when supported by appropriate legal, regulatory, economic and financial instruments.

E2 Governance options that harness synergies and deliver multiple benefits, supported by an enabling environment, can help to balance patterns of access and allocation of ecosystem services in Africa. Policy coherence may also contribute towards poverty reduction and help to build resilience. Harnessing synergies in multilateral agreements, protocols, Sustainable Development Goals, Agenda 2063 aspirations and related targets and initiatives can foster effective implementation of policies and strategies at different governance levels and temporal and spatial scales and help to ensure efficient and sustainable resource use. Using existing entry points and mechanisms that draw on a mixture of policy instruments can help to leverage synergies, by facilitating the implementation of policy at regional and national levels. Africa's radical transformation towards sustainability in line with the 2030 Sustainable Development Goals and Agenda 2063 will depend on targeting multi-stakeholder, multilevel adaptive governance and requisite resource investment in transformative programmes.



The image features a soft-focus background of lush green trees and foliage. A thin, dark branch extends diagonally across the lower half of the frame. The text "BACK-GROUND" is centered in the middle of the image in a large, white, bold, sans-serif font.

**BACK-
GROUND**

BACKGROUND

The Africa regional Assessment is the first of its kind for the continent and constitutes one of four Regional Assessments conducted under IPBES. This Assessment is a synthesis of the state of knowledge on biodiversity and nature's contributions to people.

To achieve its objectives and address the central themes, this Assessment involved the development of credible, robust and inclusive evidence from a range of knowledge systems, including peer-reviewed literature, grey literature, and indigenous and local knowledge. The Assessment aims to provide the foundation for a meaningful dialogue across the full range of stakeholders involved in African development.

A number of key thematic challenges are considered by the Africa Assessment, including the food-energy-water-livelihood nexus; climate-related risks; land degradation;

invasive alien species; sustainable use; and technological innovations. The Assessment pays attention to questions of equity, poverty reduction, rights, social relationships, economic contributions, spirituality and cultural heritage in its investigation of biodiversity, ecosystem functions and nature's contributions to people. The Africa Assessment further considers the impacts of trade and investment, along with the contribution of low-carbon, ecological and social transformations of the economy. Finally, the Assessment seeks to understand policy options for decision-makers to manage biodiversity and nature's contributions to people under different future scenarios. By focusing on biodiversity and nature's contributions to people, this Regional Assessment is critical to African policymakers, all constituents of African communities, civil society, the private sector, and other stakeholders involved in environmentally sensitive investments and land-use decisions.

A. Africa's natural assets are unique

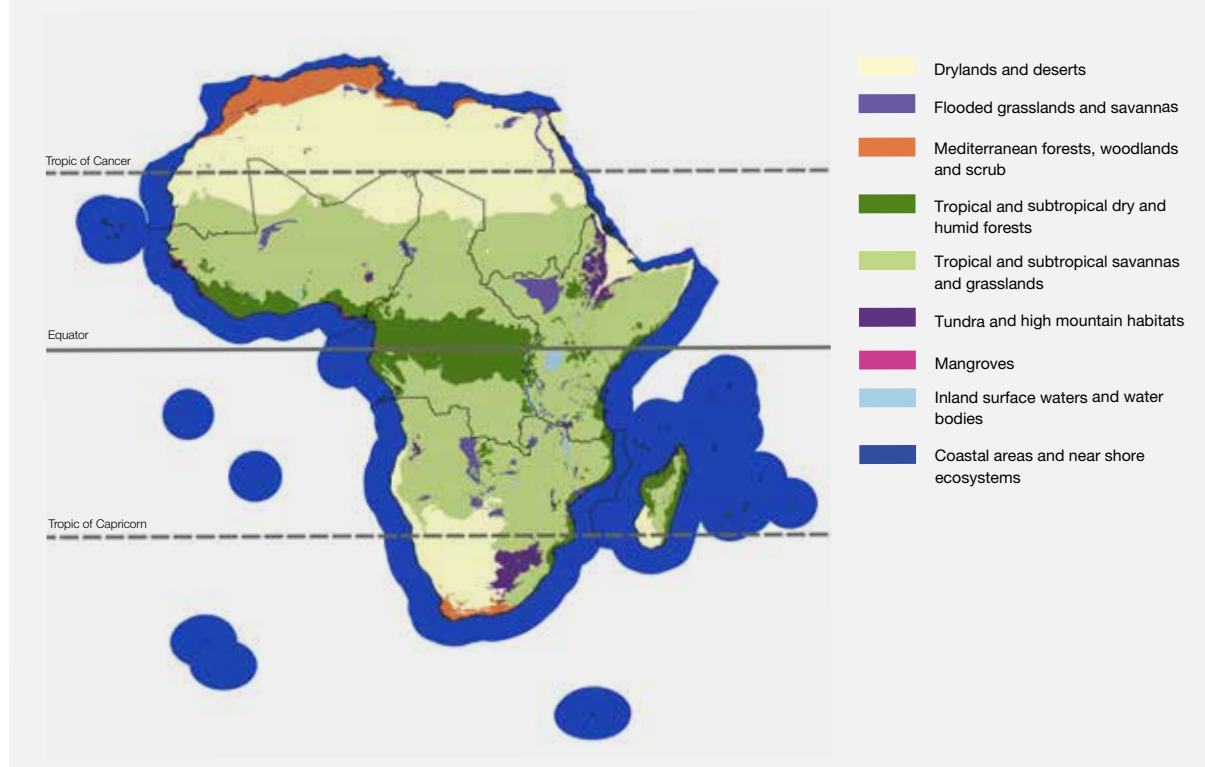
A1 Africa is very rich in biodiversity and is the last place on Earth with a significant assemblage of large mammals. The continent has significant regional, subregional and national variations in biodiversity that reflect climatic and physical differences, together with its long and varied history of human interactions with the environment. Africa's natural richness, coupled with the wealth of indigenous and local knowledge on the continent, is central to, and constitutes a strategic asset for, the pursuit of sustainable development (*well established*). Overall, 23 per cent of Africa's land area consists of forests and woodlands and 27 per cent is arable land, of which about one fifth is under cultivation. The rest consists of savannah, grasslands, arid zones and deserts (**Figure SPM.1**). Africa has diverse wetlands, inland surface waters and water bodies rivers, lakes and estuaries scattered throughout the continent, with the Nile, Congo, Zambezi and Niger rivers, and lakes Tanganyika and Victoria, featuring among the largest freshwater bodies in the world. Wetlands in Africa, including Sudd and Okavango, which are among the world's biggest, constitute 1 per cent of Africa's total land surface area and comprise natural and constructed freshwater marshes, river floodplains, swamps, peat lands, mangroves, estuaries and

coastal lagoons. Africa is surrounded by six large marine ecosystems: the Agulhas Current, the Somali Current, the Benguela Current, the Canary Current, the Guinea Current, and the Mediterranean. Three of these six large marine ecosystems rank within the four most productive large marine ecosystems in the world. {1.3.4.1.1, 1.3.4.1.2, 3.3.2, 3.4}.

A2 Africa's rich biodiversity and diverse ecosystems generate a flow of goods and services that are essential in supplying food, water, energy, health and secure livelihoods for the continent. These tangible and intangible assets underpin Africa's economy and constitute strategic capital for the pursuit of sustainable development in the region (*well established*). Whether material, non-material or regulating in form, they constitute nature's contributions to human well-being. Coupled with the wealth of indigenous and local knowledge accumulated over thousands of years, they are generally of immense benefit to the inhabitants of the continent but can occasionally be detrimental because of impacts such as disease or of conflicts over their uses. More than on any other continent, many people in rural Africa remain closely dependent on wild nature and its services to survive. Africa is also endowed with many rivers,

Figure SPM 1 **Map of Africa showing subregions and ecosystem units of analysis.**

Africa comprises five subregions under different climatic conditions: a Mediterranean climate at the northernmost and southernmost fringes; an equatorial and tropical climate characterized by high mean rainfall in Central Africa and across the southern part of West Africa; climates ranging from hyper-arid to semi-arid, with very sparse or no rainfall, in a great part of North Africa and West Africa, and also part of Southern Africa; and a subtropical climate in East Africa and adjacent islands and a great part of Southern Africa. These climatic variations have contributed towards a wide range, and significant richness, of biodiversity at the ecosystem, species and genetic levels. Source: Map layers adapted from Olson *et al.* (2001).⁵



lakes, wetlands and groundwater reservoirs. Water abundance offers significant potential for energy production through hydropower in certain areas, with a potential estimated at 1.5 million GWh per year. Yet Africa is currently experiencing an increasing incidence of water stress. Many sites in Africa have either been classified as protected, heritage or sacred sites that contribute to human well-being. Regulating contributions include, for example, services provided by nesting, feeding and mating sites for birds and mammals, e.g., the important bird and key biodiversity areas; services provided by insect pollinators such as bees and butterflies; regulation of air quality, climate, ocean acidification, freshwater and coastal water quality; and protection and decontamination of soils and sediments

{1.1.4, 1.3.4.3, 1.3.7.1, 1.3.8.1.2, 1.3.9, 2.2.1.2, 2.4.1.1, 3.3.2.1, 3.3.3.1, 4.2.1.3, 4.2.2.4, 4.5.1.1}

A3 The true value of biodiversity and nature's contributions to human well-being tend to be under-appreciated in decision-making processes in Africa, in particular for non-material and regulating contributions. Existing studies on the valuation of biodiversity and nature's contributions to people in Africa are few and limited in both geographical scope and the types of ecosystems covered (established but incomplete). Valuation of biodiversity and its contributions to people is a tool used in decision-making and in communicating their importance to humanity, thus serving as support for their conservation and sustainable use as well as the sharing of benefits from the use of biological resources. Knowing the value of biodiversity components and their contributions to people can thus encourage investments for their management through the most appropriate methods, and assist in assessing the trade-offs between different policy options and also the cost and benefits of biodiversity conservation

5. Olson, D. M., Dinerstein, E., Wikramanayake, E. D., Burgess, N. D., Powell, G. V. N., Underwood, E. C., D'Amico, J. A., Itoua, I., Strand, H. E., Morrison, J. C., Loucks, C. J., Allnutt, T. F., Ricketts, T. H., Kura, Y., Lamoreux, J. F., Wettengel, W. W., Hedao, P., & Kassem, K. R. (2001). Terrestrial ecoregions of the world: A new map of life on earth. *BioScience*, 51(11), 933–938. [https://doi.org/10.1641/0006-3568\(2001\)051\[0933:TEOTWA\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2001)051[0933:TEOTWA]2.0.CO;2).

and use policies. Failure to reflect values in decision-making often results in unsustainable use and depletion of biodiversity and ecosystem services. Valuation of biodiversity and nature's contributions to people has received limited attention across Africa (Figure SPM.2). As shown in Figure SPM.3, more studies were conducted in coastal and marine areas, inland waters and forests than in the other ecosystems. Most value studies were conducted in Southern Africa and East Africa and adjacent islands {2.2}.

A4 Africa has opportunities to fully realize the benefits of its rich biodiversity and to explore ways of using it in a sustainable way to contribute to its economic and technological development (established, but incomplete). These opportunities are exciting for the future of Africa, but the process of realizing them comes with challenges and risks. For instance, strong population growth inevitably presents challenges, which need to be effectively managed, but, it also presents opportunities. Africa's population is relatively young,

Figure SPM 2 Indicative lists of economic values of nature's contributions to people in Africa.

Sample values of some ecosystem services in selected ecosystems (freshwater, marine and coastal areas and forests) in Africa. Data come from various sources, with methodological differences, which means that comparisons of values between subregions or ecosystems is not currently possible. For further explanation on the methodology for Figure SPM.2, see supporting material Appendix 1.1 available from <https://www.ipbes.net/supporting-material-e-appendices-assessments>

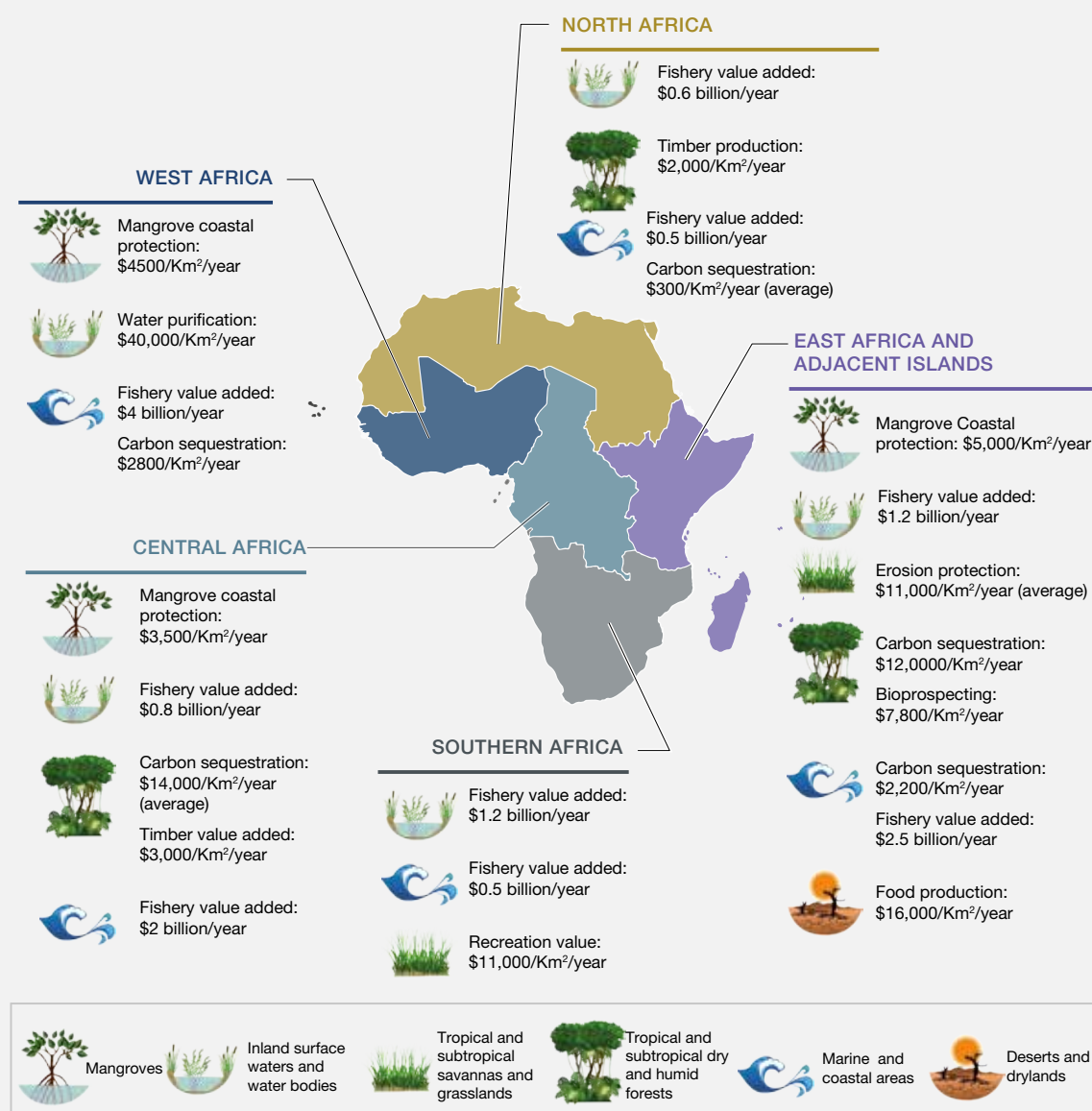
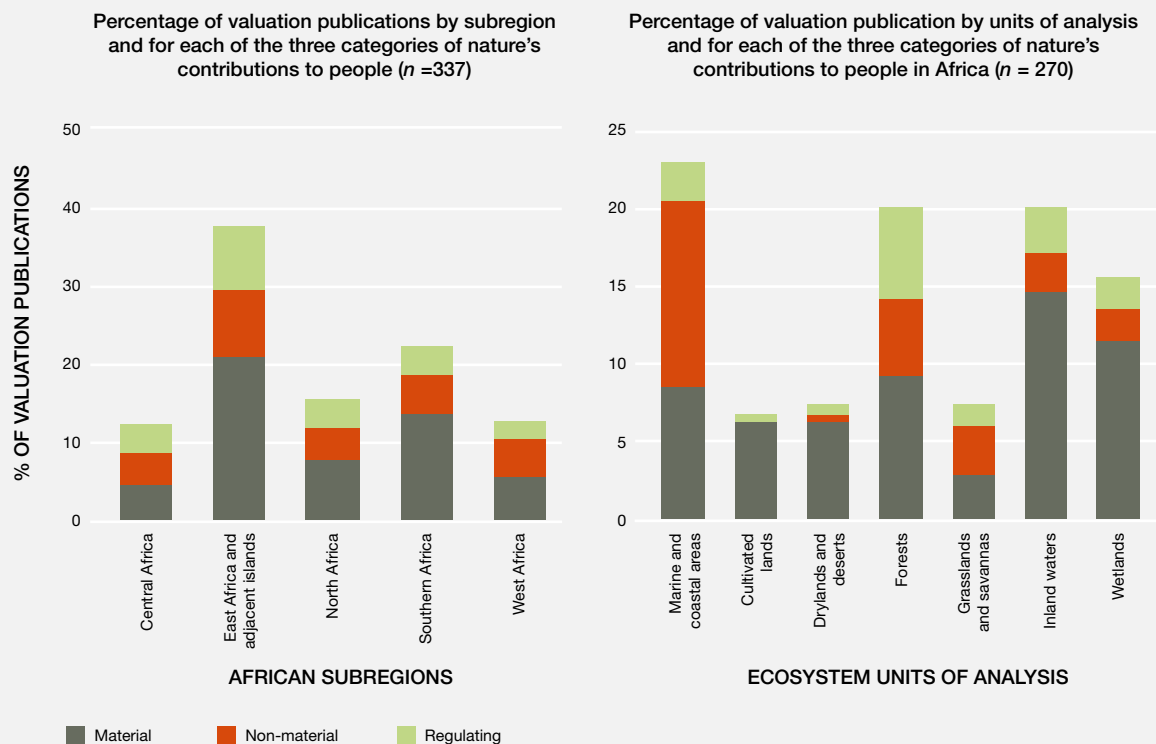


Figure SPM 3 **Comparison of the number of published papers on the valuation of three different types of nature's contributions to people, by subregion and by ecosystem unit of analysis.**



with more favourable ratios between working and non-working aged people compared to other parts of the world. Urban areas are still largely developing and there are opportunities to build towns and cities based on the principle of sustainable resource use. Africa is also the only region that has not completed industrialization. Consequently, Africa can take action to harness the green-blue economy, using the abundant opportunities offered by its lands, waters, seas and oceans. It can accelerate its structural transformation by reconsidering several paradigms on sustainable use and poverty reduction. The paradigm shift is already being made by the Governments that are seeking to unite with the rest of the world. Africa is in a unique position to adopt a more balanced approach to development through the use of technology acquisition, innovation, investment seeking finance mechanisms and internal means. In order for a transition to a green-blue economy in the context of sustainable development to succeed, African societies must also work with indigenous and local knowledge to manage their resources and protect the rights and livelihoods of those living in, and dependent on, terrestrial and marine ecosystems in Africa. Without full appreciation of the less-tangible benefits derived from ecosystems, natural resource use is likely to remain unsustainable, leading

to the potential collapse of important ecosystem functions and services {1.3.7, 1.3.9, 2.2, 4.4.1.1}.

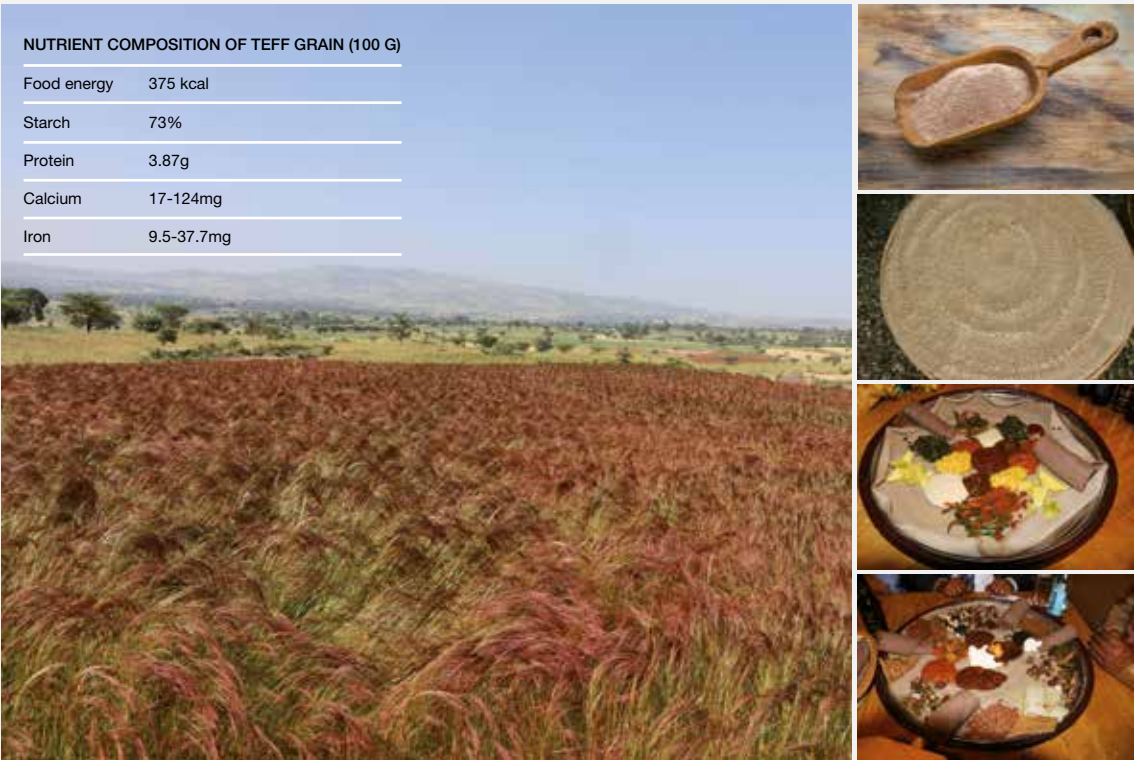
A5 Ecosystems found in Africa are of great ecological, social, economic and cultural importance at the national, regional and global levels. Such ecosystems are a source of immense genetic resources and knowledge (*established but incomplete*). As a strategic measure to protect them, countries have classified as protected 14 per cent of the continent's land and 2.6 per cent of the seas within national jurisdiction, while some sites have been designated as important or for special conservation reasons. Africa boasts 369 wetlands of international importance (Ramsar sites), 142 UNESCO World Heritage Sites, 1,255 important bird and biodiversity areas and 158 Alliance for Zero Extinction sites where endangered or critically endangered species occur. The continent hosts eight of the world's 36 biodiversity hotspots. These hotspots are the Earth's most biologically rich and threatened areas, with large numbers of endemic or threatened species. They include the Cape Floristic Region, the Eastern Afrotropical, Coastal Forests of Eastern Africa, the Guinean Forests of West Africa, Madagascar and the Indian Ocean Islands,

the Maputaland-Pondoland-Albany, the Mediterranean Basin, the Horn of Africa, and the Succulent Karoo. Hotspots are all integrated in protected areas at levels ranging from 2.5 to 17.5 per cent. The Congo forests of Central Africa, the Miombo-Mopane woodlands and grasslands, the Serengeti, the Okavango, the Sahara-Sahel, the Kalahari Desert, and the Namib Desert are among the world's most renowned wilderness areas. Many areas also serve as important components of the flyways for migratory species recognized in the Agreement on the Conservation of African-Eurasian Migratory Waterbirds. Many of these important ecosystems are fragile or have become vulnerable to anthropogenic actions and environmental changes, such as climate change, while others appear to be more naturally resilient, and can serve as refugia for species shifting their range in response to such environmental changes. Africa's biodiversity has global importance. The African continent (20.2 per cent of the Earth's land) hosts a quarter of the world's mammal species; East and Southern African rangelands shelter the greatest diversity of large mammals in the world; the continent is also home to approximately one fifth of the world's bird species, high levels of amphibian diversity and endemism in Central Africa, and at least

one sixth of the world's plant species, which are endemic to Africa. Several global centres of species richness and endemism for freshwater fish, molluscs and crustaceans are in Africa. The genetic diversity of the continent's biological resources can be seen in its livestock breeds and crop varieties, which were essentially bred from their wild relatives. This diversity reflects not only Africa's unique and varied biological and cultural heritages, but is also the product of interactions with, and adaptation to, an ever-changing environment and through exchanges with other cultures. Africa is home to many subsistence farmers, small-scale livestock herders and pastoralists who maintain a range of plant and animal genetic resources for food and agriculture, which tends to mitigate the consequences of drought, climate change, pests and changing environmental conditions, and strengthen resilience and adaptation to climate change. Many food crops originate in Africa, including species of wheat, barley, millet and sorghum; teff (*Eragrostis tef*) (Figure SPM.4); coffee (*Coffea arabica*); rooibos tea (*Aspalathus linearis*); cowpea (*Vigna unguiculata*); and oil palm (*Elaeis guineensis*). {1.1.3, 3.3.1, 3.3.2, 3.4.1.1.5, 3.4.2.1.6, 3.4.3.1.5, 3.4.4.1.5, 3.4.5.1.6}.

Figure SPM 4 Teff - example of an indigenous food crop from Ethiopia.

Teff (*Eragrostis tef*) is one of many crops that have been neglected and are currently underused. It has now gained recognition at the national, regional and global levels for its nutritional value, as an important source of income in the local and also regional markets, and for its significant contribution to food security.



Photos: © Sebsebe Demissew ■ @ Shutterstock/MarekUlasz

B. Africa under pressure

B1 Decline and loss of biodiversity, and the reduction of nature's contributions to people in Africa are having an increasing impact on daily lives and hampering the continent's socioeconomic development (*well established*).

The decline in biodiversity and nature's contributions to people threatens food, water, energy and health security with negative impacts on livelihoods. Drivers of biodiversity loss also exacerbate climate-related risks, land degradation and desertification, loss of habitats for migratory species, loss of soil fertility and productivity and lead to loss of tourism opportunities. Increasing numbers of mammals, birds, amphibians, reptiles, fish and plants are directly or indirectly threatened by various natural or anthropogenic drivers. Threats to biodiversity also affect environmental health and create conditions in some areas for the spread of zoonotic diseases and the establishment and spread of invasive alien species. The loss of nature's contributions to people, owing to the degradation of biodiversity, strains social relations, contributing to inequities among people that are the basis of many conflicts on the continent of Africa. Numerous species are under serious pressure and, increasingly, many of these species are under threat of extinction (**Figure SPM.5,**

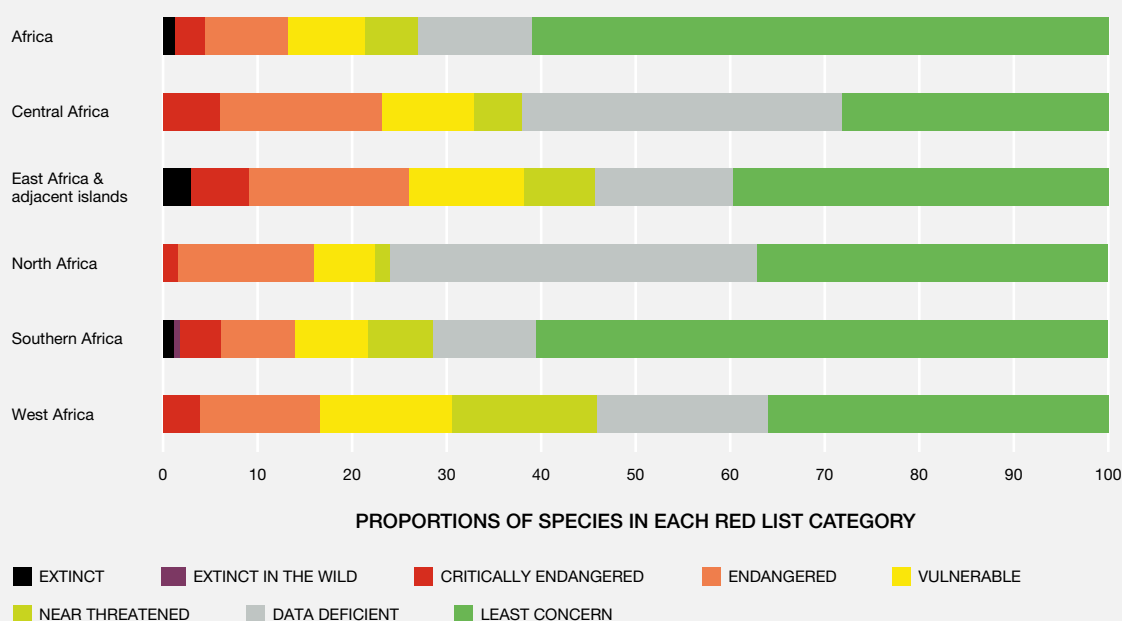
Figure SPM.6). All the plausible future scenarios analysed in the Africa assessment highlight that these drivers will increase overall, with associated negative impacts on biodiversity, nature's contributions to people and human well-being. {3.1, 3.3, 4.2.2, 4.2.2.4}.

B2 The various natural and human drivers causing biodiversity loss and decline in nature's contributions to people in Africa include the conversion of natural habitats into agricultural lands and urban settlements. Other factors include unregulated development of infrastructure and human settlements; overharvesting of biological resources; introduction of invasive alien species; and air, water and soil pollution (*established*).

Climate change, manifested by a rise in temperature, sea level rise and changes in rainfall pattern, distribution and quantity exacerbates all the other direct drivers of biodiversity loss. The frequency of natural hazards, in particular drought, floods, hurricanes and earthquakes, further contributes to pressures and threats to various species. Africa is also developing at a fast pace, at an average of 4 to 5 per cent growth in GDP, with growing

Figure SPM 5 Extinction risk of species endemic to Africa and its subregions.

The Red List categories presented include species that are Critically Endangered, Endangered, Extinct in the Wild, Extinct, of Least Concern, Near Threatened, and Vulnerable while in some cases, there was data deficiency. The data show that extinction risks vary with regions and provides a basis for policy interventions. Source: Brooks *et al.* (2016).⁶

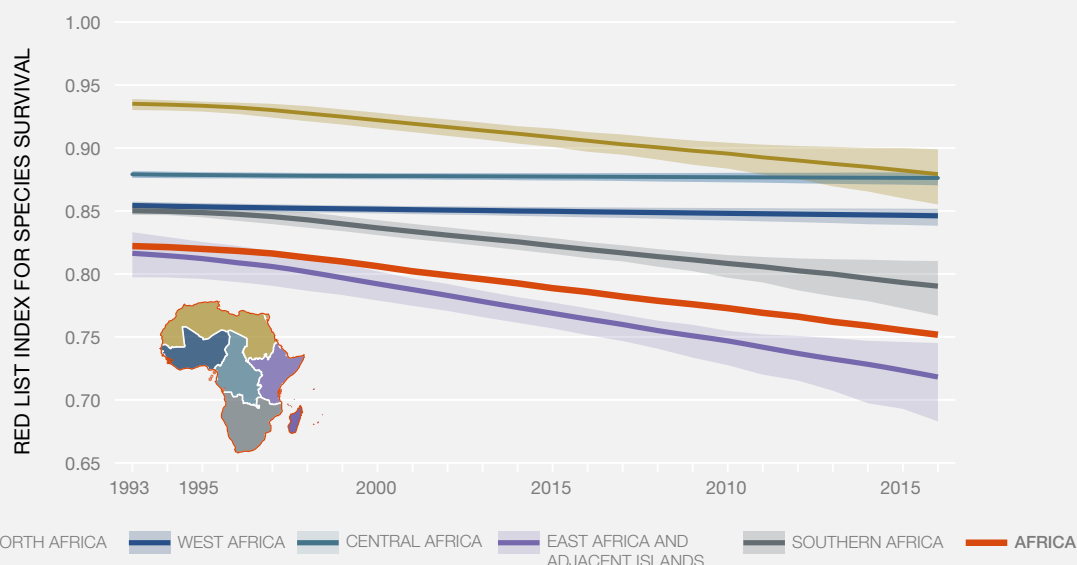


6. Brooks, T. M., Akçakaya, H. R., Burgess, N. D., Butchart, S. H. M., Hilton-Taylor, C., Hoffmann, M., Juffe-Bignoli, D., Kingston, N., MacSharry, B., Parr, M., Perianin, L., Regan, E. C., Rodrigues, A. S. L., Rondinini, C., Shennan-

Farpon, Y., & Young, B. E. (2016). Analysing biodiversity and conservation knowledge products to support regional environmental assessments. *Scientific Data*, 3, 160007. <https://doi.org/10.1038/sdata.2016.7>.

Figure SPM 6 **Red List Indices of species survival for five taxonomic groups (mammals, birds, amphibians, corals and cycads) in Africa, weighted by the fraction of each species' distribution occurring within each subregion.**

The figure below shows trends in threatened species for five taxonomic groups (mammals, birds, amphibians, corals and cycads) in each African subregion. The Red List of Threatened Species of the International Union for Conservation of Nature (IUCN) stresses that the figures for these groups should be interpreted as the number of species known to be threatened within those taxa that have been assessed to date, and not as the overall total number of threatened species for each group. Overall, the pattern revealed by the assessment indicates that the status of the five taxonomic groups analysed deteriorated steadily between 1993 and 2016 except in Central Africa. Source: Brooks *et al.* (2016)⁷; IUCN (2017)⁸.



investments targeting infrastructure development, including in the telecommunications, energy, transport, resource-extractive and large-scale agro-industrial sectors. Such developments can pose serious threats to biodiversity and its contributions to people. A variety of development and industrial activities, including the building or expansion of roads, dams, hydroelectric projects, petroleum and gas pipelines, mines, oil and gas fields, ports and cities, are already causing significant deforestation, land degradation, pollution, soil erosion and biodiversity loss (Table SPM.1). Poaching and illegal trafficking of animals (e.g., pangolins, rhinos, elephants, primates), plants (e.g., orchids, rosewood, sandalwood, and many medicinal species) and derived products is driven by illicit trade, imposing negative impacts on biodiversity and nature's contributions to people and leading to loss of income and the loss of Africa's natural and cultural heritage. The illicit trade in wildlife is in many cases linked with international criminal gangs involved in the drug trade, human trafficking and terrorism. African countries, however, have options to reconcile biodiversity conservation

with sustainable development (see sections C and D) {3.3.3.3, 4.2.2.2, 4.2.1.4, 4.2.2.6, 4.4.4}.

B3 Africa's current population of 1.25 billion is likely to double by 2050, putting severe pressure on the continent's biodiversity and nature's contributions to people, unless appropriate policies and strategies are adopted and effectively implemented. Africa is also one of the most rapidly urbanizing continents (well established). Rapid and unplanned urbanization puts immense pressure on urban infrastructure and demand for services, including water supply, food supply, pollution control and waste management, and also on energy supply for households and for industrial development. Urban communities are also producing large quantities of solid and other wastes that are leading to environmental pollution. Much of what determines the extent of the environmental impacts is how the urban populations behave—their consumption and living patterns—and not just how large they are. In 2003, 39 per

7. Brooks, T. M., Akçakaya, H. R., Burgess, N. D., Butchart, S. H. M., Hilton-Taylor, C., Hoffmann, M., Juffe-Bignoli, D., Kingston, N., MacSharry, B., Parr, M., Perianin, L., Regan, E. C., Rodrigues, A. S. L., Rondinini, C., Shennan-Farpon, Y., & Young, B. E. (2016). Analysing biodiversity and conservation knowledge products to support regional environmental assessments. *Scientific Data*, 3, 160007. <https://doi.org/10.1038/sdata.2016.7>.

8. IUCN. (2017). The IUCN Red List of Threatened Species. Version 2017-3. Gland, Switzerland: International Union for Conservation of Nature. Retrieved from <http://www.iucnredlist.org>.

Table SPM 1 **Key drivers of biodiversity change in Africa shown per subregion and ecosystem type.**

This table shows a general qualitative assessment of the various drivers of change of biodiversity and nature's contributions to people in Africa. It assesses the trend of the impact (high, moderate or low increase) of respective drivers on the various ecosystem types. The thickness of the arrows indicates the level of agreement for the countries sampled.

Subregions	ECOSYSTEM TYPE	DRIVERS OF BIODIVERSITY CHANGE							
		Direct drivers						Indirect drivers	
		Climate change	Habitat conversion	Overharvesting	Pollution	Invasive alien species	Illegal wildlife trade	Demographic change	Protected areas
CENTRAL AFRICA	Terrestrial/Inland waters	↗	↑	↑	↑	↑	↑	↑	↗
	Coastal/Marine	↗	↑	↑	↗	↗	↑	NI	↔
EAST AFRICA AND ADJACENT ISLANDS	Terrestrial/Inland waters	↑	↗	↑	↗	↗	↑	↑	↗
	Coastal/Marine	↑	↔	↗	↗	↗	↑	↑	↔
NORTH AFRICA	Terrestrial/Inland waters	↑	↗	↗	↗	↑	↔	→	→
	Coastal/Marine	↗	↗	↗	↗	↑	NI	→	→
SOUTHERN AFRICA	Terrestrial/Inland waters	↗	↗	↑	↗	↑	↗	↗	↗
	Coastal/Marine	↗	↗	↗	↗	↑	↗	↗	↗
WEST AFRICA	Terrestrial/Inland waters	↑	↑	↑	↗	↗	↑	↗	→
	Coastal/Marine	↑	↗	↗	↗	→	↑	↗	→

Width of an arrow = Level of agreement for countries sampled

Arrow = Trend of the respective impact of the driver

↑ High Increase ↗ Moderate Increase → Low Increase ↓ Decrease NI = No Information available ↔ Unchanged/Under control

cent of Africa's 850 million people lived in urban and peri-urban areas while, by 2030, this will rise to 54 per cent. At the same time, there are large variations in the patterns of urbanization across African regions. Searching for alternative livelihoods or economic opportunities mostly influences rural-urban migration, leading to informality and unplanned urban settlements. There is, therefore, a great need for policies to encourage sustainable and equitable development by, for example, directing development opportunities to rural areas and redirecting planned urban expansion to economic development zones in rural settings, in particular those that have adequate water and renewable energy supply. {1.3.7, 4.2.2.2, 4.2.2.2.3, 4.4.4, 5.4.2}.

B4 Africa is extremely vulnerable to the impacts of climate change (well established). Temperatures in all African countries are expected to rise faster than the global rate with some areas, such as the Kalahari basin, warming at a rate close to double the global mean. Future rainfall projections show less agreement, although rainfall variability is projected to increase over most areas. There is a strong probability of an increased frequency of high-intensity rainfall events. Climate change could result in significant losses of African plant species, over 50 per cent of some bird and mammal species, and in the decline of the productivity of Africa's lakes by between 20 and 30 per cent by 2100. Future disease trends and climate change are likely to have substantial effects on the livestock sector in Africa,

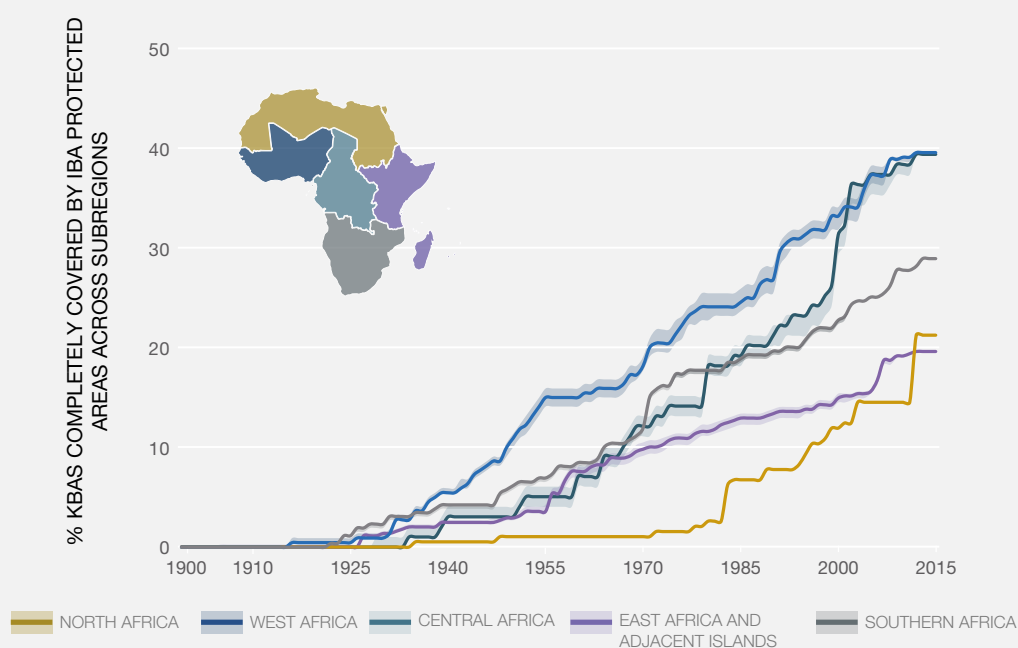
including through impacts on the distribution of disease vectors and water availability. Impacts on both inland waters and coastal systems may also be severe, with sea-level rise, changes in upwelling, sea surges, and changes in sea surface temperature further likely to have an impact on coastal ecosystems. Some species, in certain areas and under certain conditions, will need to migrate across landscapes and seascapes to track suitable habitats. The conservation of biodiversity and ecosystems enhances adaptive capacity, strengthens resilience and reduces vulnerability to climate change thus contributing to current and future sustainable development. The ability of species to migrate will differ by taxon, will be dependent on the existence of migratory corridors, and in certain areas will be hindered by land cover change and habitat fragmentation driven by human activity. Current protected area networks may need to be re-aligned to account for the climate change (see **Figure SPM.7** for trends in protection of Key Biodiversity Areas). The direct impact of the globally raised level of carbon dioxide (CO₂) is further likely to have profound impacts on species distributions within the

terrestrial environment, and may conceivably be a direct contributor to biome level change. Increases of CO₂ in the oceans will increase water acidity and this, coupled with increased temperature, will have profound impacts, including coral bleaching and the decalcification of shells of molluscs. At high CO₂ concentrations, this may lead to the total collapse of coral systems and the multitude of ecosystem functions that they support (including compromising their support function to many fisheries) {1.3.3, 4.2.2.3}.

B5 Land-cover change in Africa results in loss of the land's capacity to sustain biodiversity and provide nature's contributions to people. Unregulated conversions of forest (including logging) and rangelands for crop production, mining, urban and infrastructure development, among other human-induced changes, have led to habitat loss, degradation of catchments and soil erosion, leading to loss of biodiversity and livelihoods (established but incomplete). Land,

Figure SPM 7 Trends in proportions of Key Biodiversity Areas (specifically, Important Bird & Biodiversity Areas) completely covered by the Protected Area Systems (PAs) in the African subregions between 1900 and 2012.

The key biodiversity areas referred to on the graph represent sites critical to global persistence of biodiversity. Over the century, percentage Key Biodiversity Areas (KBAs) show steady increase towards complete coverage by the Protected Area systems (PAs), with West and Central African regions achieving 40 per cent coverage, and other regions (Southern (29 per cent), Northern (21 per cent), and East (20 per cent)) lagging. This index provides an indication of how well a region's existing PAs represent species in terms of capturing a minimum portion of their global distribution. Source: Brooks *et al.* (2016)⁹.



9. Brooks, T. M., Akçakaya, H. R., Burgess, N. D., Butchart, S. H. M., Hilton-Taylor, C., Hoffmann, M., Juffe-Bignoli, D., Kingston, N., MacSharry, B., Parr, M., Perianin, L., Regan, E., Rodrigues, A. S. L., Rondinini, C., Shennan-Farpon, Y., & Young, B. E. (2016). Analysing

biodiversity and conservation knowledge products to support regional environmental assessments. *Scientific Data*, 3, 16007. <https://doi.org/10.1038/sdata.2016.7>.

considered as Africa's most valued asset for all aspects of life and development, is facing increasing challenges of competing development needs for urban and infrastructure development, extractive industries and agricultural expansion. Some 20 per cent of Africa's land surface (6.6 million km²) is estimated to be degraded because of soil erosion, salinization, pollution and loss of vegetation or soil fertility. This is a result of a combination of factors (such as deforestation, unsustainable agriculture, overgrazing, uncontrolled mining activities, invasive alien species and climate change). Agricultural expansion is the dominant driver of biodiversity loss, in particular the conversion of natural habitat to cultivated land. There has been an expansion of cash crops, much of this exacerbated by the growing land-grab phenomenon where foreign investors are being allocated large pieces of land for bioenergy and food production, with significant impacts on the resources of indigenous and local populations, their knowledge and well-being. The total area cultivated is strongly associated with loss of indigenous plant abundance and indirectly results in loss of mammals and birds. The fragmentation that results from various land uses contributes to local extinctions of sedentary and non-sedentary species, since many wildlife species are migratory and conservation areas do not provide sufficient habitat and corridors for their dispersal or migration. Such limitation leads to loss of biodiversity, in particular of vulnerable species, as their natural habitat is lost or degraded. The erosion of indigenous knowledge exacerbates this process, as communities change their cultural use of space and resources {1.3.6, 4.1, 4.2.1.1, 4.2.2.1, 4.2.2.3.1, 4.2.2.4, 4.2.2.5, 4.4.2.2.1, 5.5.1}.

B6 Marine and coastal environments, although of significant ecological and socioeconomic importance to the African continent, are under immense threat from human activities. Biodiversity and ecosystems in marine and coastal areas are diverse and provide significant economic, social and cultural contributions to the people of Africa (well established). The direct contribution of marine and coastal resources to the African economy is significant, contributing more than 35 per cent of GDP in some regions. These environments are, however, under threat owing to a number of human-induced factors resulting from climate change, infrastructural development (e.g., ports), urbanization, tourism, mining and overharvesting of marine and coastal resources leading to the loss of biodiversity and extensive damage to key ecosystems including coral reefs, estuaries and mangroves. As the world's human population grows, so does the demand for marine food sources and the number of individuals whose livelihoods fully or partly depend on it. Hence, local and global demand for fish and rapidly growing populations that depend on fisheries is a major cause of overfishing in the coastal and marine environments of Africa. Such overfishing has had a considerable impact on coastal and marine resources leading to threats to a number of species and a decline in fish stocks. In particular, damage to coral reef systems has far-reaching implications for fisheries, food security, tourism and overall marine biodiversity. Moreover, with overexploitation, habitat degradation and loss, acidification, pollution from land-based sources, alien invasive species and sea-level rise, highly valuable ecosystem services are being threatened {4.2.2.3.4}.

C. Strengthening African transformation frameworks

C1 Africa's unique and abundant biodiversity is an asset for the achievement of the Sustainable Development Goals and can be sustainably and equitably used to reduce inequality and poverty on the continent (established but incomplete). Africa has experienced robust growth and enjoyed increased financial opportunities over the last two decades, but it is also the only region that emerged from the Millennium Development Goals with increasing extreme poverty, although some nations have shown good progress. The value of biodiversity and ecosystem services is critical to achieving Sustainable Development Goals 14 and 15, which are focused on conservation and the sustainable use of natural resources in the context of contributions to human well-being (e.g., Sustainable Development Goals 1, 2, 3, 6,

and 7). Further, biodiversity may benefit from the achievement of Goals 11 and 13, which offer nature-based solutions. Favourable conditions for achieving the Sustainable Development Goals include abundant biodiversity, arable land, and highly diverse ecosystems, which are essential building blocks of sustainable development. Unfavourable conditions, such as limited financial and institutional capacity to make effective and efficient use of its natural resources, may undermine development. The close alignment between the strategic priorities of African Governments and the Sustainable Development Goals such as the protection, restoration, conservation and sustainable use of biodiversity will improve chances for their achievement. {5.1, 5.7, 5.9}

(Table SPM.2).

Table SPM 2 **Synthesis of the likelihood of achieving key policy targets, Agenda 2063 of the African Union Aspirations for a prosperous Africa, Sustainable Development Goals and targets and Aichi Biodiversity Targets, under different scenario archetypes in Africa.**

This table shows the summary of an assessment (Section 5.7) that seeks to understand the likelihood of achieving aligned Agenda 2063 aspirations (1st column), Aichi Biodiversity targets (2nd column) and Sustainable Development Goals (3rd column) in Africa under five different scenario archetypes namely: one fortress world scenario (FW), two business as usual scenarios, market forces (MF) and policy reform (PR); and two managed transformation scenarios, local sustainability (LS) and regional sustainability (RS). These scenario archetypes follow a similar classification to those outlined by Hunt *et al.* (2012) and align with well-known scenario assessments that have been done for the continent (see section 5.3, Table 5.1 and Table 5.2 for more information). The colour of the cell indicates a synthesis of the overall trends found in the assessment under different scenario options where green indicates an overall increase in the likelihood of achieving the desired policies (Agenda 2063 aspirations, Aichi biodiversity targets and SDGs), purple indicates contradictory trends found (i.e., some reports in the assessment mentioned an increase in the likelihood of achieving certain outcomes, while others reported a decrease), and orange indicates an overall decrease in the likelihood of achieving the policy outcomes. No colour in the cells represents that there was a lack of robust information on these issues in the reports/studies. This table highlights that while there are many trade-offs to consider under each possible future scenario, there are multiple synergies and policy alignments where more desirable options for sustainable and equitable development are feasible. This table also highlights that conditions and policies under a Fortress world (see **Box SPM.1** for underlying assumptions) are the least likely to achieve multiple goals and targets and ultimately the inability to deliver on the aspirations of Agenda 2063 for a future we want in Africa. Business as usual approaches through reliance on the market (MF) and policy interventions (PR) offer some options for achieving multiple policy goals, but fail adequately to conserve biodiversity, and resulting contributions of nature to human well-being. Conditions under a more Managed transformation type of future, through policies and practices aligned with Regional sustainability and to a lesser extent Local sustainability, are shown here to offer a greater likelihood of achieving multiple sustainable and equitable development goals, targets and aspirations. An important message from this table is that while there are more desirable pathways for decision makers, there is no one scenario option that will achieve all goals, targets and aspirations. Here, efforts to co-develop a combination of proactive policies, inclusive and responsible economic tools with a focus on a well-being economy routed in the conservation and sustainable use of biodiversity, ecosystems and their contributions to people are key, Section 6.7 and Tables 6.2, **Table SPM.3**, **Table SPM.4** and **Figure SPM.9** provide some governance options in this regard.

POLICY ALIGNMENT			SCENARIO ARCHETYPES				
Agenda 2063 Goals	Aichi Biodiversity Targets	SDGs and Targets	Fortress-based	Business as usual	Policy reform	Local sustainability	Regional sustainability
			FW	MF	PR	LS	RS
3 Healthy, well-nourished citizens		Ecosystem services	1 No poverty (Target 1.4)				
			2 Zero hunger (Target 2.3)				
			3 Good health and well-being (Target 3.3)				
			5 Gender equality (Target 5.A)				
5 Modern agriculture for increased productivity and production		Sustainable agriculture, aquaculture and forestry	2 Zero hunger (Target 2.3, 2.4, 2.A)				
			12 Responsible consumption & production (Target 12.2, 12.3)				
			15 Life on land (Target 15.2, 15.B)				
6 Blue ocean economy for accelerated growth		Sustainable management of aquatic living sources	2 Zero hunger (Target 2.3)				
			14 Life below water (Target 14.2, 14.4, 14.7, 14.B, 14.C)				
7.1 Sustainable natural resource management		Pollution reduced	3 Good health & well-being (Target 3.9, 3.11)				
			6 Clean water & sanitation (Target 6.3)				
			11 Sustainable cities & communities (Target 11.6, 11.8)				
			12 Responsible consumption & production (Target 12.4)				
		Invasive alien species prevented and controlled	14 Life below water (Target 14.C)				
			15 Life on land (Target 15.8)				

POLICY ALIGNMENT			SCENARIO ARCHETYPES				
			Fortress-based	Business as usual		Managed transition	
Agenda 2063 Goals	Aichi Biodiversity Targets	SDGs and Targets	 FW	 MF	 PR	 LS	 RS
7.2 Biodiversity conservation, genetic resources and ecosystems	 13	Safeguarding genetic diversity					
	 15	Habitat loss halved or reduced					
	 12	Reducing risk of extinction					
	 11	Protected Areas					
7.3 Sustainable production and consumption patterns	 4	Sustainable production and consumption					
	 1	Awareness of biodiversity increased & Biodiversity values integrated					
7.4 Water security	 14	Ecosystem services					
7.5 Climate resilience and natural disasters preparation and prevention	 15	Ecosystem restoration and resilience					
	 10	Ecosystems vulnerable to climate change					
7.6 Renewable energy							

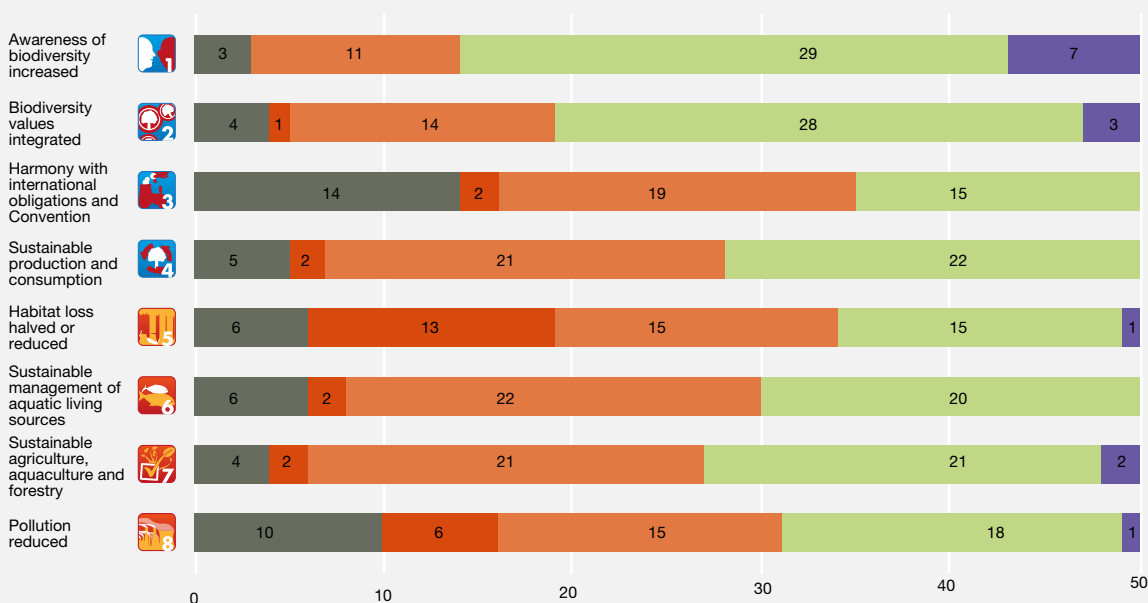
C2 The achievement of the African Union Agenda 2063 Aspiration 1, for a prosperous Africa based on inclusive growth and sustainable development, is dependent upon the conservation and sustainable use of biodiversity and nature's contributions to people (established but incomplete).

Good governance mechanisms and strong institutions are critical to achieving aspirations and targets for a prosperous Africa. Agenda 2063 (Appendix 3) is an ambitious action plan for driving the change, development, and transformation that Africa needs to achieve significant poverty reduction and enhance human well-being. The transformation needed to achieve development may lead to increased agricultural production and productivity, industrialization, expansion and creation of large cities, bridging the infrastructure and technology gaps including for energy production, value-added manufacturing, transport and regional economic integration. Such transformation requires significant resources, together with effective institutions and good governance. Africa now has the opportunity to embark on such transformational

development pathways. To achieve this, African countries need to reconcile priority development needs (including urban human settlements, mining, agriculture and other forms of development) with the progressive and proactive conservation of the continent's natural heritage. Such a balanced approach will ensure that critical ecosystems such as inland waters, forests or endemic ecosystems that are reservoirs of high biodiversity, are sustainably used and protected. Africa's regional economic communities have a significant role to play in coordinating the development of Africa's subregions in a way that is compatible with regional development and conservation objectives. Existing regional conventions such as the Benguela Commission, Abidjan Convention, Nairobi Convention, and Commission for Lakes, together with instruments such as transboundary conservation areas, peace parks and other transboundary catchment management frameworks, offer opportunities for enhancing access to, and sharing of, benefits from nature's contributions to people. Governance options that deliver multiple benefits can help to balance patterns of access and

Figure SPM 8 **Overview of the current and anticipated contribution of African countries towards the achievement of the Aichi Biodiversity Targets based on the fifth national reports submitted to the secretariat of the Convention on Biological Diversity as of September 2017 (50 African States).**

The figure paints a mixed picture with progress towards some targets substantially outperforming that of others. For example, there are worrying trends where more than 50 per cent of countries are not on course to meet Targets (e.g., Targets 3, 4, 6, 12 and 20 show no countries on track). Of particular concern is target 5, where more than 25 per cent of countries are moving away from the target, while targets 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, and 15 show no significant change for more than 25 per cent of countries. Overall, progress is being made, but at an insufficient rate by more than 50 per cent of countries towards Targets 1, 2, 11, 12, 14, 15, 17 and 19. Target 16, however, has one country set to exceed the target. All targets face a lack of information on progress from some countries. The figure was developed based on data gathered by the secretariat of the Convention on Biological Diversity and is based on fifth national reports from 50 African States. Source: UNEP-WCMC (2016)¹⁰.

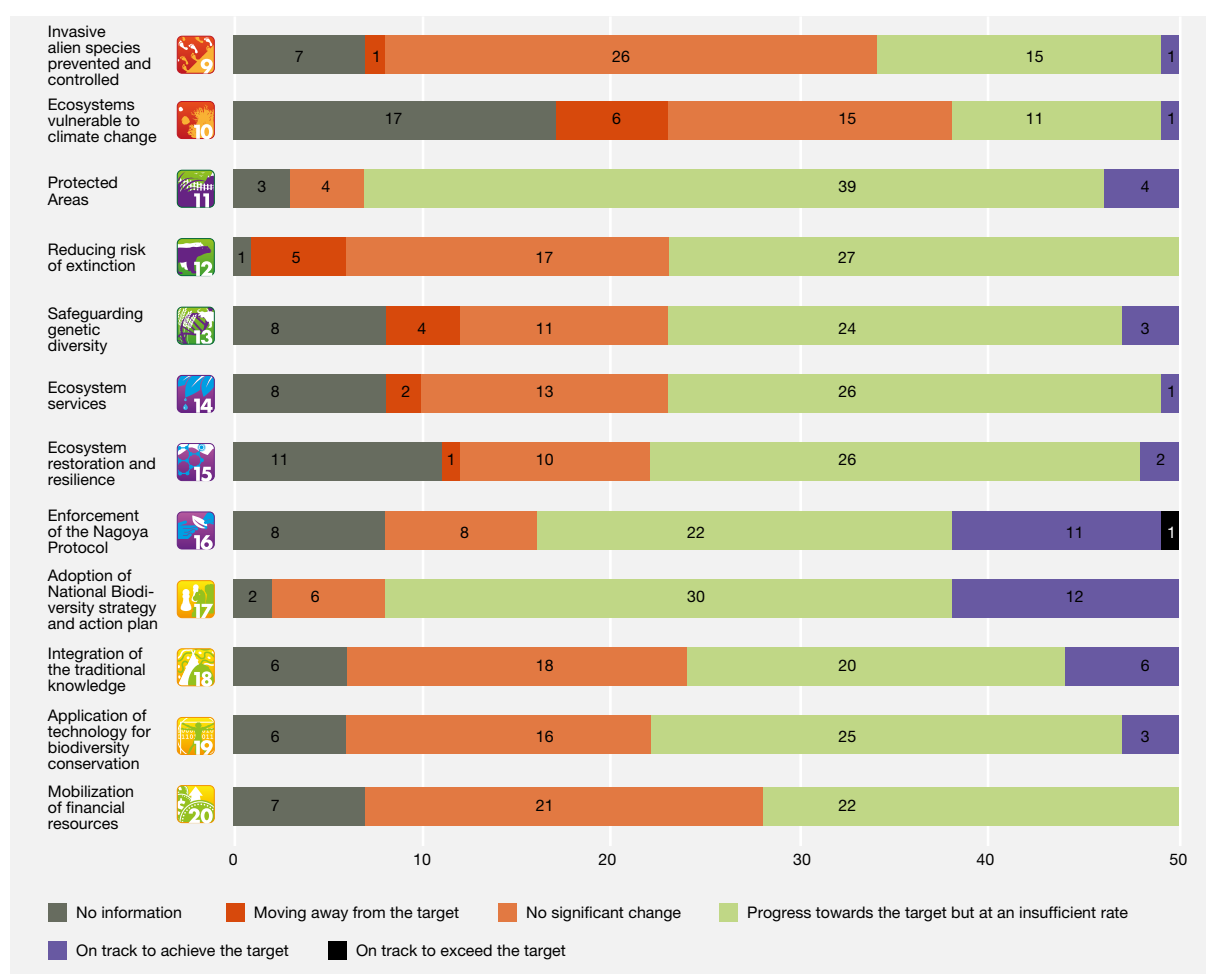


allocation of ecosystem services {5.7, 6.3.3, 6.6} (see also Section E and **Figure SPM.8**).

C3 Effective conservation and the sustainable use of biodiversity and nature's contributions to people will contribute to the achievement of the objectives of the 2015 Paris Agreement on climate change to keep global temperature increase in this century below the 2-degree centigrade mark and to strengthen the ability of countries to deal with the impacts of climate change (established but incomplete).

Africa is the continent most vulnerable to climate change with relatively weak adaptive capacity. Africa's plan to address climate change impacts is enshrined in the 2014 African Strategy on Climate Change and consists of climate adaptation strategies to reduce vulnerability to climate change, enhance resilience and enhance mitigation through low-carbon development. African countries consider adaptation as the continent's climate investment priority and have taken actions to enhance resilience through the establishment and effective

management of well-connected protected areas and other conservation areas, taking into account future species ranges; exploration of appropriate renewable energy sources; appropriate agriculture systems such as cultivation of economic halophytes in saline affected lands; and restoration of vegetation cover and soil protection against erosion of degraded lands. Mitigation measures also include reduced deforestation and reforestation to sequester carbon from greenhouse gas emissions and the use of low-carbon technologies. The extent of climate change impacts will be strongly influenced by development pathways pursued by decision-makers. As shown in sections D and E, Africa has options, including the choice of whether to follow a low-carbon, climate-resilient development pathway (including commitments under the 2015 Paris Agreement on climate change; see **Figure SPM.9**) or continue with business as usual. Such choices, including those taken by countries around the globe, will help in determining the extent of impacts, as well as the continent's ability to adapt {4.2.2.3, 5.4.5}.



10. UNEP-WCMC. (2016). *The State of Biodiversity in Africa: A mid-term review of progress towards the Aichi Biodiversity Targets*. Cambridge,

UK: UNEP-WCMC. Retrieved from <https://wedocs.unep.org/rest/bitstreams/32269/retrieve>.

C4 By implementing their respective updated national biodiversity strategies and action plans, African countries are making some progress towards the achievement of the Aichi Biodiversity Targets adopted as part of the global Strategic Plan for Biodiversity 2011–2020. The vision of this Strategic Plan and its targets is to value, conserve, restore and wisely use biodiversity, maintain ecosystem services, and thus sustain a healthy planet, while delivering benefits essential for all people. The contributions of African countries to the achievement of the Aichi Biodiversity Targets will be insufficient, partly as a consequence of many national targets being significantly lower than those adopted for the globe (*well established*). In adopting the Strategic Plan for Biodiversity 2011–2020 and its Aichi Biodiversity Targets in 2010 (Appendix 4), the Conference of the Parties to the Convention on Biological Diversity invited parties to establish their own national targets while updating their national biodiversity strategies and action plans. African countries took into account their respective national needs and priorities, while bearing in mind their commitments under various multilateral environmental agreements and regional and subregional agreements. Harnessing synergies in multilateral environmental agreements and other related regional initiatives fosters the

effective implementation of policies and strategies at different levels and scales, helping to ensure resource efficiency. Existing opportunities, such as partnerships relating to terrestrial and marine transboundary ecosystems, regional economic communities as well as national, bilateral and international funding instruments, such as the Global Environment Facility, the Green Climate Fund, the Land Degradation Neutrality Fund and other environment financing instruments, can be used to mobilize resources for capacity building in order to improve policy implementation at the regional and national levels. Furthermore, it is important to stress that sustainable, predictable and adequate means of implementation, in particular finance and capacity-building, would be a cornerstone for ensuring the effective implementation of policies. As of September 2017, 50 out of 54 African countries had submitted their fifth national reports and 49 had submitted their revised national biodiversity strategies and action plans. About 16 per cent of all the targets adopted by African countries were commensurate with, or exceeded, the Aichi Biodiversity Targets, while about 50 per cent of the adopted targets were similar to the Aichi Biodiversity Targets but at lower or significantly lower levels (i.e., did not cover all elements), owing to national considerations. The remaining targets adopted by African countries were not relevant to the global Aichi Biodiversity Targets {6.3.3} (**Figure SPM.8**).

D. Africa has options

D1 Africa has a range of possible governance options for addressing the threats to biodiversity and nature's contributions to people, including the conservation and sustainable use of biodiversity and its contributions to people, to mitigate impacts of the challenges that the continent is facing (see section B above). The identification and selection of feasible options needs to be facilitated by considering a range of plausible futures using scenarios and by providing an enabling environment for long-term planning (*established, but incomplete*). Various policy instruments and measures can help decision-makers to integrate biodiversity and ecosystem services into development planning and implementation. Furthermore, enacting proactive legal and regulatory instruments for access and benefit sharing legislation is of vital importance for preserving the rights to local knowledge, genetic resources and sustainable utilization of biodiversity (**Table SPM.3**). African policy options for conserving and using biodiversity, sustainably adapting to and mitigating climate change, and sustainably managing genetic resources, have global impacts. Subregional policies are equally necessary and significant,

considering the transboundary nature of Africa's freshwater and marine systems, fisheries and migration-dependent ecosystems, including transhumant systems. Progress in achieving the Strategic Plan for Biodiversity 2011–2020 and its Aichi Biodiversity Targets, the 2030 Sustainable Development Goals, the 2015 Paris Agreement on climate change and Agenda 2063, will be shaped by the governance and policy choices made, alongside steps taken towards their practical implementation. However favourable this policymaking environment may be, the implementation of governance options is constrained by the legacy of historical policies. The challenges of population growth, food insecurity, urbanization, climate change, land degradation, weak governance and path-dependent (often unsustainable) historical development decisions mean that achieving governance that works for both nature and society is not straightforward. Articulating clear processes that allow the environment to contribute to food security through Africa's agricultural biodiversity, supporting ecosystem services (e.g., pollination, pest control, soil carbon), land restoration and increased resilience to climate change, are critical to inform the decision-making process. Placing justice and fairness concerns at the centre of the continent's governance

priorities can help to improve both the environment and human well-being, while also achieving key international biodiversity and development targets {5.4, 5.7, 5.9, 6.3}.

D2 Africa's existing biodiversity policies, strategies, plans and programmes at the national, subregional and regional levels, are progressively addressing both direct and indirect threats to biodiversity and nature's contributions to people, and by ensuring inclusive development and a transition to green¹¹ and blue¹² economies in the context of sustainable development that are supportive of a good quality of life (*established, but incomplete*). These policies, strategies, plans and programmes, together with a range of regional treaties addressing and related to the environment, are among the tools for the implementation of multilateral environmental agreements. The goals and targets from these agreements shape Africa's policy context for the governance of biodiversity and its contributions to people. In order to achieve the targets set in these agreements, it is necessary to take into account both current and future social, political, environmental and economic conditions, bearing in mind ongoing changes at the global, regional, subregional and national levels. Scenarios are a useful tool for exploring different plausible futures to inform policy and decision-making about the potential risks and opportunities of different possible trajectories of social and ecological change, thereby assisting in the formulation and implementation of policies and interventions {5.7, 6.2.1, 6.3}.

D3 The establishment and effective management of terrestrial and marine protected areas and other types of conservation areas, including community and privately managed conservation areas, together with measures such as restoration of

various degraded ecosystems and sustainable use of indigenous cereals and plants, has contributed to the recovery of threatened species, especially in areas critical for biodiversity. A key challenge for the management of protected areas is to find strategic ways in which to enable such successes, including benefits beyond species and ecosystems, building on what has already been done (*established but incomplete*). Approximately 14 per cent (4 million km²) of the total land area of Africa is protected, including 6 per cent of biodiversity-rich tropical evergreen broadleaf forests. These valuable ecoregions, rich in endemic species, are concentrated in such countries as the Democratic Republic of the Congo and Madagascar, where adequate protection is needed. The acceleration of the expansion of protected area networks in these areas of rich biodiversity and endemism is urgently needed (**Figure SPM.7**), as well as attention to other measures involving the restoration of degraded ecosystems and, for example, the sustainable use of indigenous plants and resources. It is clear that barriers to the expansion of protected areas and to restoration measures do exist in certain areas, and these need to be better understood, with the consideration of strategic approaches (including enhancing multiple synergies and taking a multiple benefits approach; see Section E). In most of Africa, the opportunity still exists for proactive measures to conserve biodiversity. Efforts in the control of invasive alien species and reintroduction of wild animals are yielding positive results in enhancing biodiversity and nature's contributions to people through improved forage production by indigenous species, high ecotourism income and other factors, contributing to good quality of life. In addition, progress in the sustainable use of indigenous cereals and resources such as indigenous ornamental plants (see, for example, Section A. on products such as teff) is encouraging. Further progress is needed to improve the management effectiveness of protected areas. As a selected example, the integrity of a number of African protected areas is threatened by mining activities {3.3.2, 4.5, 4.5.1}.

D4 Scenarios are currently only used to a limited degree in decision-making processes for the conservation and sustainable use of biodiversity in Africa. In order to make scenarios more relevant for Africa, collective efforts can build the capacity of African researchers, policymakers and institutions to understand and make beneficial use of scenario analyses for intervention planning and informed decision making (*established but incomplete*). A survey of papers published between 2005 and 2016 identified 355 scenario studies and reports, with varying degrees of geographic representation and scales for Africa's future. The majority of the identified scenario studies were exploratory (80 per cent) and relied mainly on climate change as a single driver of biodiversity change. The

11. As defined in the UNEP 2011 study, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers*, available from www.unep.org/greeneconomy, a green economy is one that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities". In its simplest expression, a green economy is low-carbon, resource-efficient, and socially inclusive. In a green economy, growth in income and employment are driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services.

12. As described by the Economic Commission for Africa in its 2016 publication, *Africa's Blue Economy: A policy handbook*, available from www.uneca.org/sites/default/files/PublicationFiles/blue-eco-policy-handbook_eng_1nov.pdf, the Blue Economy concept includes recognition that the productivity of healthy freshwater and ocean ecosystems is a pathway for aquatic and maritime based economies and can ensure that islands and other coastal countries, and also landlocked States, benefit from their resources. It also requires an integrated, holistic and participatory approach that includes sustainable use and management. The Blue Economy promotes the conservation of aquatic and marine ecosystems and sustainable use and management of associated resources and builds on principles of equity, low carbon development, resource efficiency and social inclusion.

Table SPM 3 **Examples of response options towards achievement of Africa's 2063 Aspirations.**

This table outlines response options to achieve Africa's Agenda 2063 Aspirations and strategic priority areas that relate to biodiversity and nature's contributions to people. The responses are examples based mainly on findings in Chapter 6, and in particular Table 6.2, that fall into three different categories of policy instruments: legal-regulatory instruments (Section 6.5.2), economic-financial instruments (Section 6.5.1) and social-cultural instruments (Section 6.5.3). Each of these represents just one example of potential policy responses among many alternatives that could help to achieve Africa's Agenda 2063 Aspirations.

Africa's agenda 2063		Examples of responses					
Aspirations for a prosperous Africa relating to nature and its contributions to people	Strategic priority areas	Legal-regulatory		Economic-financial		Social-cultural	
A high standard of living, quality of life and well-being for all citizens	1.2 Poverty, inequality and hunger	Pro-poor and gender sensitive development policies	Section 6.5.3.1.1	Support for fair trade Payment for Ecosystem Service schemes	Box 6.3, Section 6.3.3, 6.5.3.1.3 and 6.7.1.2	Development and implementation of Social Protection Policies	Table 6.1
	1.4 Modern, affordable and liveable habitats and quality basic services	Enforced air, water and soil quality control	Section 6.5.3.1.2 and Box 6.2	Conduct of product life-cycle analyses to evaluate potential impacts	Table 6.2	Incorporation of indigenous design principles into urban planning	Box 6.22, Box 6.24, Section 6.7.1.1 and Section 6.5.3.1
Healthy and well-nourished citizens	3.1 Health and nutrition	Citizens' Rights to Food protected	Box 6.23	Elimination of agricultural export subsidies	Section 6.5.1 and Table 1	Sufficient risk insurance in place	Box 6.5, Box 6.4 and Section 6.5.3
Transformed economies	4.1 Sustainable and inclusive economic growth	Policies that decouple the environment from economic growth	Section 6.7.1.1 and 6.7.1.2	Implementation of natural capital accounting	Section 6.5.1, Box 6.9, Box 6.13 and Box 6.14	Development and promotion of public works programmes	Table 6.2 and Section 6.6.1
	4.4 Tourism/Hospitality	Development and/or implementation of Protected Area legislation	Box 6.16 and Box 6.17	Development and maximisation of ecotourism	Table 6.2, Box 1.9	Development of skills of benefit to the sector	Section 6.6.2
Modern agriculture for increased productivity and production	5.1 Agricultural productivity and production	Development and implementation of policies and programmes on land tenure (Table 6.1, Box 6.1, 6.2 -figure 6.2, 6.3.2, 6.4.1, Box. 6.11)	Table 6.1, Box 6.1, Box 6.11	Elimination of international trade distortions in world agricultural markets	Section 6.5.1, Box 6.11	Protection of indigenous knowledge and seed exchange processes	Section 6.5 and Box 6.24
Blue/ocean economy for accelerated economic growth	6.1 Marine resources and energy	New Marine Protected Areas created and/or effectively managed	Box 6.17	Fisheries quotas for large businesses	Section 6.5	Community access to marine resources is ensured	Section 6.5.3.1.3 and Box 6.12
	6.2 Port operations and marine transport	Implementation of, and adherence to, environmental impact assessment findings	Section 6.8	Promotion of technology transfer	Table 6.1, Box 6.23	Promotion of and support for Public Private Partnerships	Section 6.5, Box 6.18, Section 6.6.1 and Section 6.7.1.2

Africa's agenda 2063		Examples of responses					
Aspirations for a prosperous Africa relating to nature and its contributions to people	Strategic priority areas	Legal-regulatory		Economic-financial		Social-cultural	
Environmentally sustainable and climate resilient economies and communities	7.1 Sustainable natural resource management	Improved chemical and fertiliser regulation to include nature based solutions	Section 1.3.5	Implementation of payment for Ecosystem Services schemes	Box 6.16	Development of and support for effective community-based natural resource management	Section 6.5.3.1.3
	7.2 Biodiversity conservation, genetic resources and ecosystems	Access and benefit sharing legislation developed and implemented	Table 6.1; section 6.7.1.5	Conservation offsets Table 6.2	Table 6.2	Creation and effective management of community gene banks	Box 6.4
	7.3 Sustainable consumption and production patterns	Offsetting schemes	Table 6.2	Implementation of certification and eco-labelling schemes	Table 6.1, Section 6.5.2, Box 6.23	Incorporation of environmental education and indigenous and local knowledge into curricula	Box 6.24
	7.4 Water security	Engagement in trans-boundary water agreements	Box 6.2	Implementation and management of water accounts	Box 6.9	Development of and support for effective community watershed management	Box 6.5, Section 6.5.3.1.2 and Section 6.5.3.1.3
	7.5 Climate resilience and natural disasters preparedness and prevention	Implementation of disaster risk reduction strategies and early warning systems	Box 6.5	Implementation of REDD+, Clean Development Mechanisms (CDM) type projects	Table 6.1	Support for and development of community-based adaptation	Section 6.5.3.1.3 and Box 6.5
	7.6 Renewable energy	Improved energy efficiency standards	Section 6.5.2	Engagement in emissions trading and implement carbon taxes	Box 6.13	Implementation of energy education programmes	Box 6.13

remaining few were policy-screening or target-seeking in nature or were focused on the retrospective evaluation of policies. There are clear gaps in the geographical distribution of African scenario studies. Central, North and West Africa are poorly represented, have limited stakeholder participation and limited incorporation of indigenous and local knowledge. The prevalence of studies in Southern and East Africa and adjacent islands is due to a relatively long history of investment in biodiversity research. The same pattern was observed for valuation studies of biodiversity and nature's contributions to people. In addition to human capacity-building, there is a need to generate information, in particular quantitative data, needed for the development of scenarios and to take into account the specific contexts and diversity of the subregions, groups of people and related

differences in culture, and in ecological, social and economic conditions. There is also generally limited accessible peer-reviewed and grey literature to support a comprehensive assessment of policy and governance options for Africa. This creates challenges when identifying policy options but presents an opportunity for more frequent and comprehensive ecosystem assessments. It also presents an opportunity for the development of case studies and pilot projects that explore the different policy options and instruments that are specifically relevant in the African context. Data collected from such efforts will help strengthen scenarios and models about plausible futures for Africa (5.1.1, 5.2.1, 5.2.2).

Box SPM 1 Overview of the scenario archetypes used to categorise the scenarios surveyed in this assessment. Source: Nakicenovic *et al.* (2000)¹³; Millennium Ecosystem Assessment (2005)¹⁴; UNEP (2002¹⁵, 2007¹⁶, 2016¹⁷); O'Neill *et al.* (2014)¹⁸; WWF-AfDB (2015)¹⁹.



The Market Forces archetype emphasises the role of markets to deliver economic, social and environmental benefits through free trade and the commoditization of nature. In cases such as forests, the [re-]valuation of ecosystems as economic amenities slows habitat loss and environmental degradation. However, demand for resources such as water increases as a consequence of both more people overall, and a greater demand for water for agricultural, industrial, urban and domestic uses. The commercial exploitation of natural resources comes at the expense of local livelihoods, as well as indigenous and local knowledge, as communities are increasingly marginalised, fuelling tensions as resources degrade or become inaccessible. In many cases, exploitation of natural resources to satisfy trade demand leads to over-harvesting and habitat fragmentation, which is exacerbated by weak centralised governance, poor environmental enforcement, and illegal/unsustainable harvesting from protected areas in the absence of alternative livelihood options.



Policy Reform balances strong economic growth with minimising environmental consequences through a holistic approach to governance. Owing to low levels of population growth overall globally, habitat loss is moderate and protected areas expand due to increased social and political recognition of the value of healthy ecosystems. However, beyond these 'conservation islands', biodiversity declines. Agricultural intensification prioritises the green economy, which benefits marine systems as extraction eases. This is to the detriment of artisanal fishers as their local scales of operation prevent their participation in the marine economy that remains. Export-driven growth constrains economic diversification, and dependency on environmental resources associated with agriculture and extractive commodities exacerbates environmental degradation in the long-term.



The Fortress World archetype prioritises national sovereignty, self-reliance and security over other values, fragmenting international action around environmental issues. Expansive agriculture drives habitat loss,

soil erosion and water pollution, and crop yields are slow to improve. Fortress World predicts the largest relative habitat loss by 2050, undermining provisioning services, and water stress increases dramatically, with Africa being especially vulnerable. The intrinsic vulnerabilities of already fragmented habitats are worsened through increasing poverty levels and the over-exploitation of ecosystems. A Fortress World future raises significant challenges for both mitigation and adaptation to climate change.



In the Regional Sustainability archetype, environmental consciousness is heightened, with technological innovation driving global and regional solutions to sustainability issues. Sustainable land management and strong incentives for low impact agriculture, combined with increased crop yields, leads to less habitat transformation. More effective governance allows for more effective environmental regulation, increasing protected area function and coverage, and allowing for improved transboundary environmental cooperation. Conservation efforts are directed at sustainable use and maintenance of ecosystem services, rather than species protection. Although the rate of land-cover change remains high with agriculture and climate change significant drivers of species loss the broader trend is towards land-use changes that 'green' the landscape.



The Local Sustainability archetype prioritises environmental protection, social equality and human welfare, but action towards sustainability is largely taken only at local levels. Local agriculture operates through participatory-decision making and cooperative schemes, which, when combined with low population growth, and the eventual adoption of sustainable practices, drives lower rates of habitat loss. While local sustainable agriculture ensures 'sustainability brightspots', beyond these areas, degradation continues and habitats are fragmented as the uncoordinated nature of local agricultural choices undermine regional ecological integrity in the longer-term. This archetype has the highest likelihood for retention of ILK as a result of its particular focus on local scales.

13. Nakicenovic, N., Alcamo, J., Grubler, A., Riahi, K., Roehrl, R. A., Rogner, H. H., & Victor, N. (2000). *Special Report on Emissions Scenarios (SRES), a special report of working group III of the Intergovernmental Panel on Climate Change*. Cambridge University Press. Retrieved from <http://www.ipcc.ch/ipccreports/sres/emission/index.php?idp=0>.

14. Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Synthesis*. Washington, DC: Island Press. Retrieved from <https://www.millenniumassessment.org/documents/document.356.aspx.pdf>.

15. UNEP. (2002). *Africa Environment Outlook. Past, present and future perspectives*. Nairobi, Kenya: United Nations Environment Programme. Retrieved from <http://old.grida.no/publications/other/aeo/>.

16. UNEP. (2007). *Global Environment Outlook: Environment for Development (GEO4)*. Nairobi, Kenya: United Nations Environment

Programme. Retrieved from https://na.unep.net/atlas/datlas/sites/default/files/GEO-4_Report_Full_en.pdf.

17. UNEP. (2016). *GEO-6 Regional Assessment for Africa*. Nairobi, Kenya: United Nations Environment Programme. Retrieved from http://wedocs.unep.org/bitstream/handle/20.500.11822/7595/GEO_Africa_201611.pdf.

18. O'Neill, B. C., Kriegler, E., Riahi, K., Ebi, K. L., Hallegatte, S., Carter, T. R., Mathur, R., & van Vuuren, D. P. (2014). A new scenario framework for climate change research: The concept of shared socioeconomic pathways. *Climate Change*, 122, 387–400. <https://doi.org/10.1007/s10584-013-0905-2>.

19. WWF-AfDB. (2015). *African ecological futures report 2015*. Nairobi, Kenya: World Wide Fund for Nature & African Development Bank. Retrieved from www.panda.org/lpr/africa2012.

D5 African scenarios have been clustered into five archetypes emphasizing market forces, and policy reform, which represent in some ways a business-as-usual situation, and also fortress world, regional sustainability and local sustainability. The selected scenario archetypes provide an overview of how interactions between nature and society, or between current environmental and developmental conditions, existing driving forces, and optional management interventions, could shape possible future trajectories of change across Africa in the coming decades. Achieving the African Union's vision of an integrated, prosperous and peaceful Africa by 2063, and related Sustainable Development Goals and Aichi Biodiversity Targets, is problematic under a fortress world scenario, which prioritizes national sovereignty, self-reliance and security. The policy reform and market forces scenario trajectories are also unlikely to fully meet the aforementioned

vision, given their significant propensity to undermine the natural resource base in the long term (**Box SPM.1**). Regional sustainability and local sustainability scenarios, however, provide the most likely options for achieving multiple goals linked to the conservation and sustainable use of biodiversity and Africa's development in both the short and long term (**Table SPM.4, Box SPM.1**). Regardless of the scenario trajectory assessed, future trade-offs between certain nature's contributions to people and how they contribute to human well-being, are inevitable (*established but incomplete*). Trade-offs within the food-water-energy-livelihood nexus are apparent, and reduced biodiversity and ecological functioning are anticipated under all the five archetypes assessed. The severity of the trade-offs may, however, be mitigated by timely, progressive and proactive policy interventions and environmental safeguards, which aim to build social-ecological resilience through ecosystem-based activities. This could be complemented with improved access to ecological

Table SPM 4 **Trends in the drivers of biodiversity loss, biodiversity, nature's contributions to the people and human well-being under each of the archetypes used to categorize the scenarios surveyed in Africa, with response options that could help to minimize some of the negative drivers towards achieving targets.**

This table summarizes the results of an assessment of different drivers (Table 5.3), biodiversity and nature's contributions to people (Table 5.4), as well as dimensions of human well-being trajectories (Table 5.5) under different scenario archetypes for Africa (**Box SPM.1**). Drivers that were assessed include population, urbanization, consumption and natural resource use, regional and global resource demand and climate change. Elements of biodiversity and nature's contributions to people that were assessed include: terrestrial and freshwater habitat loss, marine habitat loss, species range shifts, food and feed production, energy production, freshwater regulation, climate and natural hazard regulation and pollination. Dimensions of human well-being that were assessed include: material well-being, poverty reduction, equity, health, security and social relations, freedom and choice. Five different scenarios archetypes were used for this assessment namely: business-as-usual scenarios (market forces (MF) and policy reform (PR)); one fortress-based scenario (fortress world (FW)), and managed transformation scenarios (regional sustainability (RS) and local sustainability (LS)). The arrows indicate an increase (up arrow), decrease (down arrow), or no change (horizontal arrow) under each of the different categories for each scenario type into the future. The colour of the cell indicates the overall impact of the results across the reports, where green indicates overall positive impact, orange indicates overall negative impact, purple indicates contradictory trends, and no colour indicates no overall change/impact. The table shows that the impact of all drivers are expected to increase under all scenarios, except for mixed results linked to regional and global resource demand under local sustainability. The final column outlines potential governance responses based on Table 6.2 that could help to navigate towards improving biodiversity, nature's contributions to people and human well-being by addressing particular negative drivers in each of the scenario archetypes. The responses are not exhaustive, but showcase examples of how scenario exercises can help to elucidate policy options for achieving desirable outcomes.

ARCHE-TYPES	SUMMARY DESCRIPTION	Drivers	Biodiversity	Nature's contributions to people	Human well-being	Potential governance responses/ Emerging implications
 FORTRESS WORLD	• Expansive agriculture drives habitat loss, soil erosion and water pollution and low crop yields. This results in the largest relative habitat loss by 2050, undermining provisioning services, and water stress increases dramatically • Ecosystem services will be reduced in significant proportion and hence nature's contributions to people will be at its lowest level • The intrinsic vulnerabilities of already fragmented habitat are worsened through increasing poverty levels and the over-exploitation of ecosystems all of which compromise human well-being • Industrialization leads to increasing disparity between the poor and the rich	↑	↓	↓	↓	• Promote investments in environmental friendly technologies (e.g. water pollution) • Strong environmental and social regulations are enforced • Human rights based approaches are enforced to meet needs and reduce inequalities

ARCHE-TYPES	SUMMARY DESCRIPTION	Drivers	Biodiversity	Nature's contributions to people	Human well-being	Potential governance responses/ Emerging implications
 MARKET FORCES	- Human well-being increases under free trade but distribution of benefits may not be equal - Habitat loss and biodiversity may increase in the long term which could compromise human well-being - Economic growth may contribute towards recovery of degraded ecosystems and improved livelihoods	↑	↓	↓	↗	- Regulatory frameworks e.g. social safety nets to ensure basic needs are met - Build government capacity to legislate and enforce community sensitive environmental policies - Ensure that value of ecosystems are incorporated into environmental management plans (Private and Public sector)
 POLICY REFORM	- Export driven growth strains economic diversification, with protected areas increasing - Outside of protected areas, the strong dependence on a few natural resources leads to degradation of ecosystems - Under low population pressure, human well-being appears to improve though it may be compromised in the long term by degradation of ecosystem services - Loss of species and habitats outside protected areas due to agricultural expansion and infrastructural development would reduce ecosystem services and nature's contributions to people	↑	↓	↓	↑	- Stimulate capacity, livelihoods and job creation in diverse sectors outside of primary industries - Ensure effective implementation of community based conservation, and ecotourism (e.g. Community-based natural resource management principles are implemented) - Ensure that private and public sector developments (e.g. industrial, agricultural) adhere to environmental and social standards
 LOCAL SUSTAINABILITY	- Social equity and welfare are prioritised which result in improved human well-being - Local sustainable agriculture ensures 'sustainability hotspots', but beyond these areas, degradation continues and habitats are fragmented - The uncoordinated nature of local agricultural choices may undermine regional ecological integrity in the longer-term - There is a high likelihood for retention of indigenous local knowledge as a result of its particular focus on local scales - Haphazard growth may result in conflicts and numerous environmental crimes while in other areas innovative local adaptation emerges	↑	↓	↗	→	- Learn from sustainability bright spots and best practice and promote linkages and exchange of knowledge (e.g. Indigenous local knowledge for sustainable development) - Promote markets for sustainably produced goods at local and subregional level
 REGIONAL SUSTAINABILITY	- More effective governance allows for more effective environmental regulation, increasing protected area function and coverage, and allowing for improved transboundary environmental cooperation - Conservation efforts are directed at sustainable use and maintenance of ecosystem services, rather than species protection - Technological innovation drives landscape homogenization and potential food security with overall increase in human well-being	↑	↓	↗	↑	- Leverage regional strength to access and develop sustainable global markets without compromising local ecosystem integrity - Build subregional resilience to shocks (e.g. climate related disasters) by maintaining global connections (e.g. markets, partnerships, resources, innovations)
 Decreasing  Mixed trends  Increasing  Current trend continues						

information, and also to enhanced technical capacity and tools to analyse trade-offs, as a step towards achieving robust development planning. Providing directly or indirectly for the livelihoods of local communities and meeting development targets under each of the archetypes considered for Africa, could happen at the expense of biodiversity and nature's contributions to people, with landscape conversion and the extraction of goods and resources, such as minerals, fish or food crops, and infrastructure development, leading to ecological degradation. The negative consequences of these trade-offs may be mitigated to a degree by governance systems that

recognize the value of biodiversity and its contributions to people, and take measures, based on spatial planning and environmental offsets, for the conservation and sustainable use and management of natural assets, or support policy processes, such as environmental impact assessment and strategic environmental assessment, under the regional and local sustainability archetypes {5.3, 5.4, 5.5, 5.6, 5.7}.

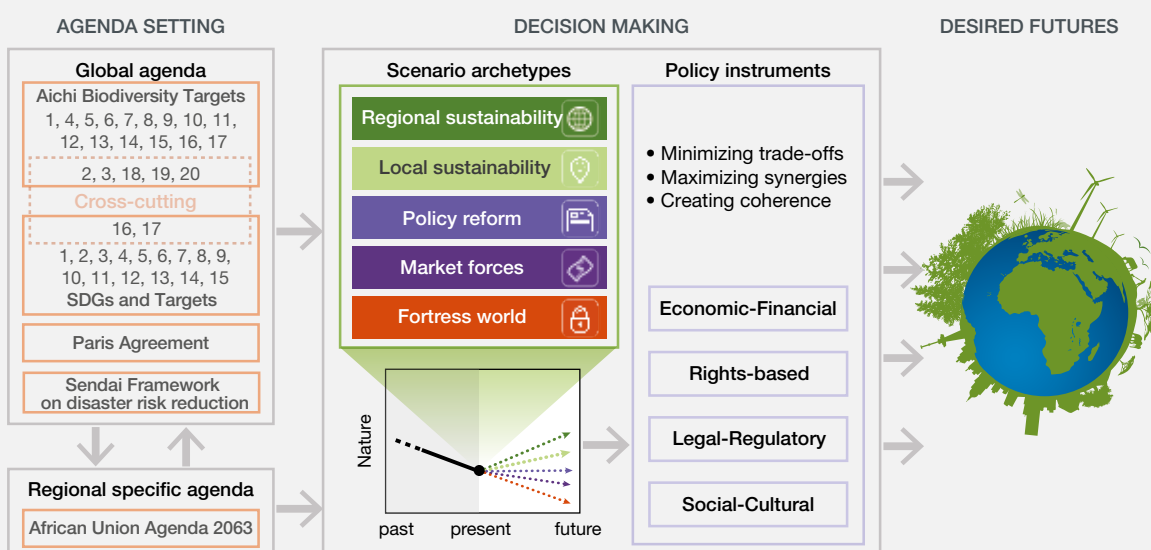
E. The future we want making it happen together

E1 Africa can move towards achieving its development aspirations, while improving the conservation of its valuable natural assets and meeting its biodiversity commitments, through multi-stakeholder and multilevel adaptive governance, along with the improved integration of indigenous and local knowledge through recognition of traditional institutions (hereinafter referred to as polycentric governance) (established but incomplete). Progress in achieving the Strategic Plan for Biodiversity 2011–2020 and its Aichi Biodiversity Targets,

the Sustainable Development Goals and targets, the 2-degree centigrade commitments under the 2015 Paris Agreement on climate change and Agenda 2063 aspirations for a prosperous Africa, will be shaped by the governance and policy choices made (Table SPM.3), alongside steps taken towards their implementation, and support through enhanced international cooperation and multilevel partnerships and through the provision and mobilization of sustainable, predictable, adequate means of implementation (Figure SPM.9). Mainstreaming biodiversity and ecosystem services into policies and actions at different levels is vital to,

Figure SPM 9 Summary of how effective global and regional agenda-setting combined with relevant decision-making tools can achieve desired future outcomes for Africa.

Achieving a desirable and equitable future for Africa is based on an existing set of regional and global goals and targets. By using scenarios as a tool to think about how futures could play out, an enabling policy environment can be co-created to maximize synergies and coherence between actions and minimize trade-offs. This figure starts with a set of existing targets and objectives (Agenda 2063 of the African Union, the Sustainable Development Goals, the Aichi Biodiversity Targets and other globally agreed goals) that the majority of African nations have agreed to and that are necessary to achieve in order for the continent to reach a desirable future; some of these are cross-cutting because they aim to achieve institutional reform (e.g., Aichi Biodiversity Targets 2, 3, 18, 19 and 20 and Sustainable Development Goals 16 and 17) (See Table SPM.2). Recognition of the cross-cutting institutional targets is critical as they focus on what needs to be done within and between institutions if a more desirable future is to be achieved. They not only map onto one cluster of targets e.g., around water or energy, but are necessary to achieve them all. To aid thinking about how to reach this agenda, there are a set of scenario archetypes that help us to conceptualize potential futures that could arise under different conditions and the trade-offs between each of these (See Box SPM.1). None of these scenarios offer the desired future that we want; some of them get us closer to a desirable future than others, but the future is uncertain and a complex articulation of aspects of all these potential scenarios. In this light, scenarios are useful tools to help us think about the type of enabling environment necessary for achieving certain goals (Table SPM.4). Looking at the targets through the lens of the scenario archetypes enables decision-makers to make more informed decisions about what policy instruments could be employed (See Table SPM.4) explicitly highlighting trade-offs and directing attention to specific synergies and coherence. The figure summarizes how agenda-setting should be accompanied by effective decision-making that recognizes future uncertainties in order to employ relevant policy instruments to achieve a desirable future.



and also consistent with, traditional polycentric governance approaches on the continent, which bring together stakeholders (public, private and local communities) with different perspectives, bridge sectors, and operate at multiple levels and scales, over different time frames.

Polycentric approaches offer an alternative to top-down approaches that are less sensitive to local constraints, and to bottom-up approaches that are sometimes inadequate for dealing with issues at higher decision-making levels. When supported by appropriate legal, regulatory, economic and financial instruments, these approaches can harness consensus and co-learning through dialogue and knowledge co-production, while enacting principles of equity, transparency, accountability and participation. Although resource-intensive in the short-term because they demand significant time for dialogue and consultation, polycentric approaches offer agility in responding to change, reduce conflict, balance conservation and development objectives, and yield positive results in the medium to long term. A polycentric governance system is thus critical for enabling Africa's diverse natural assets to deliver equitable benefits to people. Practiced for many years in Africa for managing diverse interests in resources, polycentric governance is grounded in the processes of accountability through stakeholder engagement, and addresses trade-offs. It further entails working across scales, sectors, values, and knowledge systems, integrating indigenous and local knowledge and their institutions, as well as adaptive management. It further involves building a sense of social

responsibility and pursues what might be termed "no regrets" options, particularly in relation to the drivers of changes described in section B above {6.2, 6.2.1, 6.3, 6.4.5}.

E2 Governance options that harness synergies and deliver multiple benefits, facilitated by an enabling environment, can help to balance access to, and allocation of, ecosystem services in Africa (*established but incomplete*). Policy coherence may also contribute towards poverty reduction and help to build the resilience of integrated social-ecological systems. Establishing and using existing entry points in spatial planning, land use management and integrated development planning, and mechanisms that draw on a mixture of policy instruments, can help to leverage synergy, helping to improve the implementation of policy at regional and national levels. Africa's radical transformation towards sustainability in line with the 2030 Agenda for Sustainable Development and Agenda 2063 will depend on investment targeting multi-stakeholder, multilevel adaptive governance. By promoting policy coherence with adequate resources and capacity and encouraging adaptive governance approaches that bring together different perspectives, a more socially just approach to accessing ecosystem services and biodiversity can ensue, helping to make sure that the costs and benefits are more appropriately distributed {6.3.3, 6.6}.





APPENDICES

APPENDIX 1

Communication of the degree of confidence

Figure SPM A 1 The four-box model for the qualitative communication of confidence.

Confidence increases towards the top-right corner as suggested by the increasing strength of shading. Source: IPBES (2016).²⁰



In this assessment, the degree of confidence in each main finding is based on the quantity and quality of evidence and the level of agreement regarding that evidence (Figure SPM.A1). The evidence includes data, theory, models and expert judgement. Further details of the approach are documented in the note by the secretariat on the information on work related to the guide on the production of assessments (IPBES/6/INF/17).

The summary terms to describe the evidence are:

- **Well established:** comprehensive meta-analysis or other synthesis or multiple independent studies that agree.
- **Established but incomplete:** general agreement although only a limited number of studies exist; no comprehensive synthesis and/or the studies that exist address the question imprecisely.
- **Unresolved:** multiple independent studies exist but conclusions do not agree.
- **Inconclusive:** limited evidence, recognizing major knowledge gaps.

20. IPBES. (2016). *Summary for policymakers of the IPBES Assessment Report on Pollinators, Pollination and Food Production*. S. G. Potts, V. L. Imperatriz-Fonseca, H. T. Ngo, J. C. Biesmeijer, T. D. Breeze, L. V. Dicks, L. A. Garibaldi, R. Hill, J. Settele, A. J. Vanbergen, M. A. Aizen, S. A. Cunningham, C. Eardley, B. M. Freitas, N. Gallai, P. G. Kevan, A. Kovács-Hostyánszki, P. K. Kwapong, J. Li, X. Li, D. J. Martins, G. Nates-Parra, J. S. Pettis, R. Rader, & B. F. Viana (Eds.). Bonn, Germany: Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Retrieved from www.ipbes.net/sites/default/files/downloads/pdf/spm_deliverable_3a_pollination_20170222.pdf.

APPENDIX 2

Nature's contributions to people

This appendix describes the evolving concept of nature's contributions to people and its relevance to this IPBES regional assessment.²¹

Nature's contributions to people are all the contributions, both positive and negative, of living nature (i.e., diversity of organisms, ecosystems and their associated ecological and evolutionary processes) to the quality of life of people. Beneficial contributions from nature include such things as food provision, water purification, flood control and artistic inspiration, whereas detrimental contributions include disease transmission and predation that damages people or their assets. Many of nature's contributions to people may be perceived as benefits or detriments depending on the cultural, temporal or spatial context.

The concept of nature's contributions to people is intended to broaden the scope of the widely-used ecosystem services framework by more extensively considering views held by other knowledge systems on human-nature interactions. It is not intended to replace the concept of ecosystem services. The concept of nature's contributions to people is intended to engage a wide range of social sciences and humanities through a more integrated cultural perspective on ecosystem services.

Ecosystem services has always included a cultural component. For example, the Millennium Assessment²² defined four broad groups of ecosystem services:

- Supporting services (now part of "nature" in the IPBES Conceptual Framework)
- Provisioning services

➤ Regulating services

➤ Cultural services

At the same time, there has been a long-standing debate in the ecosystem services science community, and in policy circles, about how to deal with culture. The social science community emphasizes that culture is the lens through which ecosystem services are perceived and valued. In addition, the groups of ecosystem services have tended to be discrete, while nature's contributions to people allow for a more fluid connection across the groups. For example, food production, traditionally considered to be a provisioning service, can now be categorized both as a material and a non-material contribution by nature to people. In many but not all societies, people's identities and social cohesion are strongly linked to growing, gathering, preparing and eating food together. It is thus the cultural context that determines whether food is a material contribution by nature to people, or one that is both material and non-material.

The concept of nature's contributions to people was developed to address the need to recognize the cultural and spiritual impacts of biodiversity, in ways that are not restricted to a discrete cultural ecosystem services category, but instead encompass diverse world views of human-nature relations. Nature's contributions to people also make it possible to consider negative impacts or contributions, such as disease.

There are 18 categories of nature's contributions to people, many of which closely map onto classifications of ecosystem services, especially for provisioning and regulating services. These 18 categories of nature's contributions to people are illustrated in **Figure SPM.2**. The 18 categories fall into one or more of three broad groups of nature's contributions to people regulating, material and non-material.

21. Díaz, S., Pascual, U., Stenseke, M., Martin-Lopez, B., Watson, R. T., Molnár, Z., Hill, R., Chan, K. M. A., Baste, I. A., Brauman, K. A., Polasky, S., Church, A., Lonsdale, M., Larigauderie, A., Leadley, P. A., van Oudenhoven, A. P. E., van der Plaats, F., Schröter, M., Lavorel, S., Ameeruddi-Thomas, Y., Bukvareva, E., Davies, K., Demissew, S., Erpul, G., Failler, P., Guerra, C. A., Hewitt, C. L., Keune, H., Lindley, S., & Shirayama, Y. (2018). Assessing nature's contributions to people. *Science*, 359(6373), 270–272. Retrieved from <http://science.sciencemag.org/cgi/doi/10.1126/science.aap8826>.

22. Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Synthesis*. Washington, DC: Island Press. Retrieved from <https://www.millenniumassessment.org/documents/document.356.aspx.pdf>.

APPENDIX 3

Aspirations, goals and priority areas of Agenda 2063 of the African Union.

Source: AU (2015).²³

GOALS		PRIORITY AREAS	
ASPIRATION 1. A prosperous Africa based on inclusive growth and sustainable development			
1	A high standard of living, quality of life and well-being for all citizens	1.1	Incomes, jobs and decent work
		1.2	Poverty, inequality and hunger
		1.3	Social security and protection, including persons with disabilities
		1.4	Modern, affordable and liveable habitats and quality basic services
2	Well educated citizens and skills revolution underpinned by science, technology and innovation	2.1	Education and STI driven skills revolution
3	Healthy and well-nourished citizens	3.1	Health and nutrition
4	Transformed economies	4.1	Sustainable and inclusive economic growth
		4.2	STI driven manufacturing, industrialization and value addition
		4.3	Economic diversification and resilience
		4.4	Tourism/Hospitality
5	Modern agriculture for increased productivity and production	5.1	Agricultural productivity and production
6	Blue/ocean economy for accelerated economic growth	6.1	Marine resources and energy
		6.2	Port operations and marine transport
7	Environmentally sustainable and climate resilient economies and communities	7.1	Sustainable natural resource management
		7.2	Biodiversity conservation, genetic resources and ecosystems
		7.3	Sustainable consumption and production patterns
		7.4	Water security
		7.5	Climate resilience and natural disasters preparedness and prevention
		7.6	Renewable energy

23. AU. (2015). *Agenda 2063: The Africa we want*. Addis Ababa, Ethiopia: African Union Commission. Retrieved from <http://archive.au.int/assets/images/agenda2063.pdf>

GOALS		PRIORITY AREAS	
ASPIRATION 2. An integrated continent, politically united, based on the ideals of Pan-Africanism and the vision of Africa's Renaissance			
8	A United Africa (Federal or Confederate	8.1	Frameworks and institutions for a United Africa
9	Continental financial and monetary institutions established and functional	9.1	Financial and monetary institutions
10	World class infrastructure criss-crosses Africa	10.1	Communications and Infrastructure connectivity
ASPIRATION 3. An Africa of good governance, democracy, respect for human rights, justice and the rule of law			
11	Democratic values, practices, universal principles of human rights, justice and rule of law entrenched	11.1	Democracy and good governance
		11.2	Human rights, justice and rule of law
12	Capable institutions and transformative leadership in place	12.1	Institutions and leadership
		12.2	Participatory development and local governance
ASPIRATION 4. A peaceful and secure Africa			
13	Peace, security and stability is preserved	13.1	Maintenance and preservation of peace and security
14	A stable and peaceful Africa	14.1	Institutional structure for AU instruments on peace and security
		14.2	Defence, security and peace
15	A fully functional and operational APSA	15.1	Fully operational and functional APSA all pillars
ASPIRATION 5. Africa with a strong cultural identity, common heritage, values and ethics			
16	African cultural renaissance is pre-eminent	16.1	Values and ideals of Pan Africanism
		16.2	Cultural values and African Renaissance
		16.3	Cultural heritage, creative arts and businesses
ASPIRATION 6. An Africa whose development is people-driven, relying on the potential offered by African people, especially its women and youth, and caring for children			
17	Full gender equality in all spheres of life	17.1	Women and girls empowerment
		17.2	Violence and discrimination against women and girls
18	Engaged and empowered youth and children	16.3	Youth empowerment and children's rights
ASPIRATION 7. An Africa as a strong, united and influential global player and partner			
19	Africa as a major partner in global affairs and peaceful co-existence	19.1	Africa's place in global affairs
		19.2	Partnerships
20	Africa takes full responsibility for financing her development	20.1	African capital markets
		20.2	Fiscal systems and public sector revenue
		20.3	Development assistance

APPENDIX 4

The Aichi Biodiversity Targets

Source: Secretariat of the CBD (n.d.).²⁴

STRATEGIC GOAL A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	
	Target 1 By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.
	Target 2 By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.
	Target 3 By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.
	Target 4 By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.
STRATEGIC GOAL B: Reduce the direct pressures on biodiversity and promote sustainable use	
	Target 5 By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.
	Target 6 By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.
	Target 7 By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.
	Target 8 By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
	Target 9 By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.
	Target 10 By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

24. Secretariat of the CBD. (n.d.). *Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets: Living in harmony with nature*. Retrieved from <https://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf>

STRATEGIC GOAL C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

**Target 11**

By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

**Target 12**

By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

**Target 13**

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

STRATEGIC GOAL D: Enhance the benefits to all from biodiversity and ecosystem services

**Target 14**

By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

**Target 15**

By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

**Target 16**

By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

STRATEGIC GOAL E: Enhance implementation through participatory planning, knowledge management and capacity building

**Target 17**

By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

**Target 18**

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

**Target 19**

By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

**Target 20**

By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)

is the intergovernmental body which assesses the state of biodiversity and ecosystem services, in response to requests from Governments, the private sector and civil society.

The mission of IPBES is to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.

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