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Biodiversity economy and natural capital accounting in Africa

Note by the secretariat

A. Africa: a continent rich in biological diversity

1. Biological diversity is defined as the number, variety and variability of living organisms in a given assemblage.[1] The "assemblage" refers to what are commonly known as ecosystems, which include terrestrial, marine and other aquatic ecosystems. It is important to note that biodiversity includes ecosystems that are managed, such as plantations, farms, croplands, aquaculture sites, rangelands, or urban parks and urban ecosystems, as well as unmanaged ecosystems, such as wildlands, nature reserves or national parks.[2]

2. Biodiversity is the foundation of the ecosystems that influence human well-being through the services they provide. Such services include the supply of food, fresh water, wood and fuel; climate regulation; water purification; disease regulation; recreational services; spiritual services; the supporting of nutrient cycling and soil formation; and the provision of aesthetic value.[3] Many people benefit from the exploitation of biodiversity, and as a result, biodiversity and ecosystem services underpin the global economy.

3. Africa, which covers some 20.2 per cent of the Earth's total landmass, has a variety of ecosystems, including deserts and drylands with unique flora and fauna; savannah grasslands with the world's greatest diversity of ungulates; tropical forests; mangrove forests in south Mauritania, the Saloum Delta in Senegal, the Sudan and Central African countries; tropical dry and humid forests; islands and coastal ecosystems; wetlands around freshwater bodies such as rivers, lakes and estuaries; urban and semi-urban systems and agroecosystems; and marine ecosystems. Africa has 119 terrestrial and 93 freshwater or wetland ecological regions.

4. The continent is endowed with immense and varied biological diversity (biodiversity) assets and ecosystems, many of which are of global importance. It is home to 8 of the 34 biodiversity "hotspots" in the world and to 1,220 important bird habitats. Africa hosts one quarter of the world's mammal species. The African continent shelters the greatest diversity of large mammals in the world and approximately one fifth of the world's bird species, and has high levels of amphibian diversity and endemism. Several global centres of species richness and endemism for freshwater fish, molluscs and crustaceans are also located in Africa. At least one sixth of the world's plant species are endemic to Africa, with many food crops originating on the continent, including species of wheat, barley, millet

* AMCEN/17/1.

[1] https://www.cbd.int/financial/values/g-economicvalue-iucn.pdf.

[2] Ecosystems and Human Well-being: Biodiversity Synthesis (2005).

[3] Ibid.

and sorghum; teff (*Eragrostis tef*); coffee (*Coffea arabica*); rooibos tea (*Aspalathus linearis*); cowpea (*Vigna unguiculata*); and oil palm (*Elaeis guineensis*).

5. In addition, the continent has a wealth of indigenous and local knowledge about biodiversity and ecosystems which has enabled sustainable co-existence between its people and nature for centuries. That knowledge, if properly harnessed, has the potential to contribute to both the conservation of biological diversity and the sustainable management and utilization of species.

6. Land, Africa's most valuable natural asset, underpins the health and productivity of the continent's renewable natural assets and biological diversity, in addition to providing space for human settlements and infrastructure development. Importantly, 60 per cent of the world's unconverted arable land is in Africa, indicating great potential for food production for both domestic consumption and export.

7. A biodiversity economy can be said to be an economy that takes into account the value and contribution of biological resources in sustainable development through enterprises and livelihoods that are based on the biological products or services generated.

B. The biodiversity economy in Agenda 2063: The Africa We Want

8. Spurred on by the Agenda 2063 strategic framework of the African Union (Agenda 2063: The Africa We Want), Africa aims to establish a prosperous region characterized by sustainable inclusive growth, peace and good governance. The region's growth is expected to be led by increased agricultural productivity, industrialization, investment in infrastructure development and renewable energy, biodiversity conservation, sustainable and fair and equitable use of its genetic resources, clean air and water, and better adaptive capacity to climate change.

9. According a regional assessment report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) in 2018,[4] 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.

10. Aspiration 1 of Agenda 2063 envisions "A prosperous Africa, based on inclusive growth and sustainable development", underpinned by, among other things, sustainable management of natural resources, including biological diversity, for the economic and social development of the continent. Achieving that would mean that by 2063 Africa's biodiversity, including its forests, rivers and lakes, genetic resources, land, and degraded fish stocks and coastal and marine ecosystems, would be fully conserved and used sustainably. Forest and vegetation cover would be restored to 1963 levels; land degradation and desertification would have been stopped and then reversed. All agricultural land would be managed in a manner that was environmentally and socially sustainable, and African countries would have reduced and conserved by at least 90 per cent biodiversity loss and the loss of all natural habitats.[5]

11. Both Agenda 2063 and Agenda 2030 for Sustainable Development, as defined by the Sustainable Development Goals (SDGs), contain common elements for a development trajectory that will provide Africa with a healthy living environment while ensuring good health and quality of life for its people. The two Agendas are also critical to harnessing the region's natural capital for the benefit of all its citizens and providing an enduring source of livelihoods. To realize that vision, Africa's State and non-State institutions must build flexible and adaptive governance structures and continuously apply innovative solutions to the management of the continent's natural, social, economic and cultural endowments.

12. At its fifteenth session, held in Cairo from 2 to 6 March 2015, the African Ministerial Conference on the Environment (AMCEN) adopted the Cairo Declaration on Managing Africa's Natural Capital for Sustainable Development and Poverty Eradication. At the second session of the United Nations Environment Assembly of the United Nations Environment Programme, held in Nairobi from 23 to 27 May 2016, African countries were instrumental in advancing resolution 2/13 on Natural capital for sustainable development and poverty eradication as an approach that countries should embrace in their endeavours to conserve and sustainably manage their natural resources. The

[4] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, The IPBES Regional Assessment Report on Biodiversity and Ecosystem Services for Africa. (Bonn, Germany, 2018). Available at https://www.ipbes.net/system/tdf/spm_africa_2018_digital.pdf?file=1&type=node&id=28397.

[5] African Union Commission, Agenda 2063: The Africa We Want. (Addis Ababa, 2015).

approach is built on the premise that Africa's economy is to a significant extent driven by or based on natural resources and biological diversity.

13. However, for a variety of reasons Africa does not at present fully realize the returns from its natural capital. Those reasons include a focus on trade in raw materials, as a result of which the lack of value addition costs the continent opportunities for employment and wealth creation which are realized in other continents. There is also inadequate appreciation of the potential value and contribution of natural capital to economic growth and human well-being, as a result of the fact that it is not taken into account in the calculation of national gross domestic product.

14. To further advance the natural capital discourse, the sixteenth session of AMCEN, held in Libreville from 12 to 16 June 2017, adopted the Libreville Declaration on Investing in Innovative Environmental Solutions for sustainable wealth creation as a source not only of environmental benefits, but also of social, economic and financial dividends.

15. The 2018 IPBES regional assessment report on biodiversity and ecosystem services for Africa contains five key messages, all of which are relevant to the discourse on the biodiversity economy. The first of those messages focuses on the ways in which the continent's natural assets are unique:

(a) 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;

(b) 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;

(c) 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 under-appreciated in decision-making processes;

(d) 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;

(e) Certain ecosystems found in Africa are of great ecological, biological and cultural importance at regional and global levels;

(f) 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;

(g) 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.

16. It is thus clear that the biodiversity economy should underpin Africa's 50-year vision as set out in Agenda 2063: The Africa We Want. By developing Africa's biodiversity economy, the region will in effect be implementing the necessary actions towards achieving the first aspiration of Agenda 2063.

C. Opportunities for a biodiversity economy

17. The importance of natural resources to human well-being cannot be over-emphasized. Biodiversity and ecosystem services underpin economic growth, sustainable development and human well-being in Africa. The majority of the 62–70 per cent of Africa's population who live in rural areas depend directly on biodiversity and ecosystem services for their food and livelihood. However, the true value of nature's contribution to human well-being is still under-appreciated in decision-making processes.

18. Appreciating nature's contribution to gross domestic product is important in making the case for the biodiversity economy. It follows, therefore, that the valuation of ecosystem and ecosystem services and the mainstreaming of natural capital into national accounts is of the utmost importance. Through the Gaborone Declaration for Sustainability in Africa initiative,[6] African countries are gradually making progress towards appreciating nature's contribution to their gross domestic product through natural capital accounting.

19. Other initiatives include The Economics of Ecosystems and Biodiversity (TEEB) initiative,[7] which advances knowledge of environmental-economic accounting, in particular ecosystem

[6] http://www.gaboronedeclaration.com/.

[7] http://www.teebweb.org/.

accounting, by testing through the System of Environmental-Economic Accounting Experimental Ecosystem Accounting. The System seeks to improve the measurement of ecosystems and their services (both in physical and monetary terms) at the subnational and national levels; mainstreaming biodiversity and ecosystems at the subnational and national levels; policy planning and implementation; and to contribute to the development of internationally agreed methodology.[8]

20. Those initiatives, coupled with policy instruments and decisions of the African Ministerial Conference on the Environment and the United Nations Environment Assembly, provide entry points for African countries to think more innovatively about the ways in which they could benefit from their indigenous natural resources and traditional knowledge to transform their sustainable development pathways.

21. The new African Continental Free Trade Area, established in Kigali in 2018, brings increased trade opportunities between African countries, including trade in biodiversity assets.

22. The mechanism that provides the opportunity for Africa to develop its biodiversity economy both continent-wide and globally is the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity, an international agreement which entered into force on 12 October 2014 and which aims to share the benefits arising from the utilization of genetic resources in a fair and equitable manner. Most African countries have ratified the Protocol, with many going a step further and developing national policies and legislation to incorporate the Protocol into their national legislation. Several African countries are already at an advanced stage in implementing policy and legal frameworks which include prior informed consent and mutually agreed terms of agreement between communities as resource holders or custodians and users (such as those involved in bioprospecting, for example).

23. The Nagoya Protocol creates greater legal certainty and transparency for both providers and users of genetic resources by establishing more predictable conditions for access to genetic resources, helping to ensure benefit-sharing when genetic resources leave the country which has provided them. The Protocol creates incentives to conserve and sustainably use genetic resources, thus enhancing the contribution of biodiversity to development and human well-being.[9] It addresses traditional knowledge associated with genetic resources through the inclusion of provisions on access, benefit-sharing and compliance, and deals with genetic resources in situations in which indigenous and local communities have an established right to grant access to them. Contracting parties are to take measures to ensure prior informed consent by those communities, and fair and equitable benefit-sharing, keeping in mind community laws and procedures, and customary use and exchange.[10]

24. Economic opportunities offered by the biodiversity economy may be (a) direct opportunities, in which revenues and incomes are derived directly from biodiversity, such as through biodiversity-generated products and services, (b) indirect opportunities, in which actions to conserve and halt the loss of biodiversity generate other benefits, or (c) non-use opportunities. A study by Failler et al. (2012) found that the direct use, indirect use and non-use values generated by a marine protected area in West Africa were US$11.2 million, US$39.5 million and US$0.5 million respectively per annum.[11]

25. Examples of direct opportunities for the biodiversity economy include the following:

(a) Wildlife-driven ecotourism, which is the largest single driver for tourism growth in Africa. Related ecotourism attractions include game drives and bird watching, nature trails, coral reefs and sea diving. According to the World Tourism Organization, some 80 per cent of trips to Africa each year are for watching wildlife. Tourism currently drives 8.5 per cent of Africa's economy and supports 24 million jobs. In 2017, international tourist arrivals in Africa were estimated to have increased by 9 per cent, with a total of 63 million tourists and tourism receipts in excess of US$37 billion. It is estimated that by 2030 visitors to the continent could more than double to 134 million. A study conducted in 2019 on the financial impact of nature-based tourism found that Africa's 8,400 protected areas were generating US$48 billion in direct in-country expenditure.[12] In 2018, Rwanda earned US$19.2 million from the sale of 15,132 mountain gorilla permits, costing at least US$1,500 per tourist to see the mountain gorillas in Volcanoes National Park. Such high-value tourism is achievable with proper planning, policy framework and marketing. Five per cent of the revenues are ploughed

[8] https://seea.un.org/content/seea-experimental-ecosystem-accounting-revision.

[9] https://www.cbd.int/abs/about/default.shtml/.

[10] https://www.cbd.int/traditional/Protocol.shtml.

[11] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, op. cit. (2018).

[12] Bertzky et al., European Commission, Joint Research Centre, Science for the AU-EU Partnership: building knowledge for sustainable development. (Luxembourg, 2017).

back into benefit projects in local communities around the park. Community-based ecotourism, in particular, ensures that any revenues generated flow more directly into the communities which are the custodians of biodiversity in those areas;

(b) In 2010, Africa accounted for 7,597,427 million tons, or 9 per cent, of the global caught supply of fisheries, representing a 6.8-fold regional increase from 1,109,387 tons in 1950, when fish catches and aquaculture globally totalled some 158 million tons, valued at US$ 217.5 billion. Africa's contribution to world fisheries production has grown from 5.9 per cent in 1950 to 8.1 per cent in 2011. That increase has been a result of the extension of national exclusive economic zones to 200 miles; higher fishing capacity and technological progress; the creation of national industrial fleets; a high rate of motorization of artisanal canoes (61 per cent in Africa) and fishing agreements signed between African countries and others, in particular the European Union. Global inland fisheries production was estimated at some 11.2 million tons in 2010, of which Africa contributed about 2.5 million tons. Uganda and the United Republic of Tanzania are the leading fishing countries in the African Great Lakes region, while Nigeria and Egypt, with their river fisheries, remain the main producers in Africa.[13] African fish exports continue to generate low revenues, owing to a lack of value addition. Africa has potential for intraregional trade in fisheries: it is notable, for example, that Nigeria is the world's fourth largest importer in volume terms (5.4 per cent of global imports) after China, Japan and the United States of America;

(c) Bioprospecting and the sustainable utilization of biodiversity species, including in pharmaceuticals, herbal medicines, food flavourings and fragrances, is an industry worth trillions of dollars, although it remains underexploited. The potential size of the bioprospecting industry market in South Africa, based on resource permit application data, is estimated to be at least South African rand (R) 2,150 million per year, of which only 20 per cent had been reached by 2018. The total revenue produced from value-added products sold in the domestic retail market, and which contained bioresources as an ingredient, was approximately R1,470 million in 2011.[14] Such locally produced value-added products can be segmented into five product categories: personal hygiene products (R585 million, representing 40 per cent of products), cosmetics (R555 million, representing 38 per cent of products), complementary medicines (R170 million, representing 11 per cent of products), food flavourings (R110 million, representing 8 per cent of products) and oils (R50 million, representing 3 per cent of products). While a majority of local communities rely on herbal medicines as their first line of treatment, there are no statistics on the overall value of this biodiversity-reliant industry. The World Health Organization estimates that every year 1,500 tons of traditional medicines are sold in medicine markets in Durban, South Africa, alone. It is estimated that the traditional medicine industry is worth up to R2,300,000 per year;[15]

(d) Timber and non-timber products from the forestry sector, including gums, resins and honey. While the importance of forests as biodiversity, habitats and as a source of foreign earnings for African countries is well known, the lack of value addition hampers realization of their true value and robs the continent of some of the employment which it deserves. The lack of a developed timber processing industry also means that African countries rely on imported processed timber, thus, in many cases, becoming net importers rather than exporters of timber. Similarly, Africa's high potential for trade in non-timber forest products is underexploited. For example, the Sudan is the world leader in the export of gum arabic, supplying over 60 per cent of the world market. In 2016, Sudanese exports of crude gum arabic reached a record level of nearly 73,000 tons.[16] However, Europe and the United States of America export gum arabic with high and defined levels of functionality, often traded under proprietary brands, which sell for substantially higher prices. In the period from 2014 to 2016, average export unit values were relatively high for the United Kingdom of Great Britain and Northern Ireland ($5.07 per kilogram), Germany ($4.43 per kilogram) and the United States of America ($4.36 per kilogram), moderate for France ($3.46 per kilogram), and relatively low for Italy ($2.27 per kilogram) and the Sudan ($1.95 per kilogram);

(e) Wildlife ranching by local communities and private sector investors has proven to be a profitable venture in several countries in East Africa and Southern Africa, such as Kenya and South Africa. Wildlife is ranched for tourism purposes and for game meat (under licence). The proceeds

[13] GLOBEFISH: Information and Analysis on World Fish Trade, Food and Agriculture Organization of the United Nations.

[14] South African Department of Environmental Affairs bio-products retail database.

[15] World Health Organization. Legal Status of Traditional Medicine and Complementary/Alternative Medicine: A Worldwide Review. (Geneva, 2001).

[16] Commodities at a Glance: Special Issue on Gum Arabic. United Nations Conference on Trade and Development. (Geneva, 2018). Available at https://unctad.org/en/PublicationsLibrary/suc2017d4_en.pdf.

from the value chains associated with wildlife ranching ventures have seen communities benefit from improved educational and health facilities, and better basic infrastructure, such as feeder roads. However, wildlife ranching is not fully embraced in many countries, especially those in West Africa, where bushmeat could be supplied from such ranches to improve wildlife sustainability while bringing revenues from tourism and the supply chain to communities.

26. Examples of indirect benefits include the following: (a) Africa's opportunity to use its large population of young people to drive its growth. To that end, an informed and vibrant youth population can make sustainable lifestyle choices and help to develop the continent's infrastructure, accelerate industrialization, increase energy and food production, and promote sustainable natural resource governance; (b) advancing the economics of land degradation,[17] which has demonstrated that the cost of taking action to address soil erosion is far less than the cost of inaction.

27. It is estimated that 280 million tons of cereal crops lost per year could be prevented if soil erosion were managed, thus reducing the demand for expansion of land for agricultural production. Furthermore, Africa could generate an additional US$71.8 billion per year if all countries on the continent took action against soil erosion; (c) Pollinators are a source of multiple benefits to people; beyond their input into food, they also contribute directly to medicines, biofuels (such as canola and palm oil), fibres (such as cotton and linen,) construction materials (such as timbers), musical instruments, arts and crafts, recreational activities and they are sources of inspiration for art, music, literature, religion, traditions, technology and education. It is estimated that in 2015, some 5–8 per cent of global crop production, with an annual market value of between US$235 billion and US$577 billion worldwide, was directly attributable to animal pollination. Many of the world's most important cash crops benefit from animal pollination in terms of yield or quality and are leading export products in developing countries (for example, coffee and cocoa) and developed countries (for example, almonds), providing employment and income for millions of people; (d) An estimated US$20 billion per year is spent worldwide on pesticides, yet parasites and predators existing in natural ecosystems provide an estimated 5–10 times that level of pest control. Without the existence of natural enemies, crop losses attributable to pests in agriculture and forestry would be catastrophic and the cost of chemical pest controls would escalate significantly.

28. 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 in order to mitigate the impact of the challenges that the continent is facing. 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.[18]

29. The Africa Ecological Futures[19] work by the African Development Bank, United Nations Environment Programme and World Wide Fund for Nature provides an opportunity for African countries to think ahead in terms of harmonizing development and the prevention of biodiversity loss, in particular when large development projects are being undertaken. However, scenario modelling capacity remains low in Africa. 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 the continent, 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.[20]

D. The challenge

30. With its population expected to double to approximately 2.5 billion by 2050, Africa is at a crossroads between the goals of biodiversity conservation and social and economic development. For example, population growth means that more food needs to be produced. That could mean expansion of agricultural land into hitherto virgin lands, or agricultural intensification to produce more food on the same land area. Either option has implications for biodiversity and needs to be carefully studied, using trade-off analyses to determine the optimal option or combination of options.

[17] United Nations Environment Programme, Economics of Land Degradation in Africa, (2015).

[18] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, op. cit. (2018).

[19] See the 2015 report at https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/xwwf_african_futures_report_english-lo-rez.pdf. The African Development Bank, UNEP, World Wide Fund for Nature and International Union for Conservation of Nature are currently working on an updated version of Africa's Ecological Futures report.

[20] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, op. cit. (2018).

31. Two-thirds of the population of sub-Saharan Africa reside in rural areas, the majority of whom can be considered to be smallholder farmers. Furthermore, it is estimated that some 375 million young Africans will enter the job market in the coming 15 years. Of that number, some 200 million will be living in rural areas, mostly engaging in smallholder farming, in which they will simultaneously serve as stewards of increasingly scarce natural resources and on the frontline of dealing with the impact of climate change. Job creation for young people is an urgent and high-priority challenge for African countries. It calls for innovative thinking beyond traditional sectors. Through biodiversity economy models, for example, it will be possible to maximize the productivity of young people as a dividend for Africa's sustainable development.

32. Smallholder farmers therefore play a critical role in addressing the challenges which currently prevent them from scaling up their participation in markets, including insecure rights to land and natural resources, lack of access to quality farm inputs and financial services, inadequate support from research and extension services, and high transaction costs caused by poor rural infrastructure. The challenges are even greater for women farmers, who constitute the majority of farmers in Africa. As a group, smallholder farmers are among the poorest and most marginalized in the world, and their direct dependence on natural resources for their livelihoods causes a cyclic loop between poverty and biodiversity loss.

33. Africa faces great challenges in sustaining rapid economic growth, while at the same time safeguarding the life-support system provided by its rich natural capital which underpins the realization of its long-term vision. It is, therefore, imperative that such growth should take into account the relatively weak environmental governance in the region and the paucity of accurate and up-to-date environmental and socioeconomic data for evidence-based decision-making. Scenario modelling is required to analyse the ways in which development, in particular large infrastructure projects, can be undertaken while safeguarding the ecological foundation on which life itself depends.

34. Inadequate data and documentation on Africa's biodiversity remains a major challenge for the continent. While African countries have committed to take measures to ensure technology transfer, adaptation and support for innovation (see, for example, Agenda 2063) most of the data and technologies related to biodiversity and ecosystem services, including indigenous and local knowledge, are poorly documented. The efficiency and improvement potential of indigenous and local knowledge and their related technologies have not been well assessed. Furthermore, many modern technologies are expensive and there is limited capacity to adapt them, yet for Africa to benefit from the biodiversity economy, technology must play a key role, in particular in research and development and in value addition in biodiversity-generated products.

35. It is thus clear that concerted efforts are required across the continent to promote the innovation and adoption of technologies related to biodiversity and ecosystem services, including the adaptation of existing environmentally sound technologies to local conditions, in parallel with indigenous technological innovation. The role of information and communications technology should be emphasized to promote the biodiversity economy. The mechanisms to do so may include South-South cooperation to facilitate access to clean and efficient technology; enhancing the capacity of research institutions for data generation, storage and analysis, such as through regional and subregional centres of excellence; and the participation of the private sector in the development and adoption of technology in both urban and rural areas.

36. Furthermore, the region must deal with an array of other regional environmental challenges, including the illegal trade in wildlife, low levels of access to clean forms of energy, biodiversity loss, inadequate waste management practices, and climate change and variability. Africa's natural capital is challenged by competing uses, illegal off-take, weak resource management practices, climate change and pollution. Challenges of that magnitude require forward-looking, flexible, inclusive and integrated approaches in policy formulation and implementation, based on solid principles of sustainable resource management.

E. Developing the biodiversity economy

1. Providing an enabling environment

37. The biodiversity economy will thrive when policy and legal frameworks provide for certainty, predictability and protection of investments. An enabling environment that is conducive to doing business in biodiversity-related value chains will foster the development of the economy, attract direct foreign investment and channel financing to deserving enterprises, supporting the development of skills and research and development. African countries need to review their sectoral policies with a view to better aligning them to provide coordinated support for the biodiversity economy.

2. Regional approach and cooperation

38. The current state of knowledge on biodiversity and ecosystem services points clearly to the need for regional cooperation[21] to ensure that human well-being derived from biodiversity and ecosystem services is sustained in the long term while at the same time preventing loss of biodiversity.[22] Under a regional cooperation scenario, 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, lead to less habitat transformation.

39. 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.[23]

40. For regional cooperation to work, Africa needs to develop joint policy and legal frameworks to provide common approaches to the biodiversity economy. Such frameworks should address issues related to access and benefit-sharing within and between countries, including the use of indigenous and local knowledge associated with the conservation and sustainable use of biodiversity assets.

41. Harmonized laws and procedures will further enhance the continent's competitiveness and maximize returns when trading with countries outside Africa. That is particularly important now, as Africa opens up intraregional trade under the African Continental Free Trade Area, as it will enable countries to leverage regional strength to access and develop sustainable global markets without compromising local biodiversity or ecosystem integrity.

3. Natural capital valuation and accounting

42. Africa needs to set up a valuation of its ecosystems and ecosystem services to build a strong foundation for developing comprehensive natural capital accounts. Doing so should be a progressive effort by all African countries, starting with individual ecosystems or sets of ecosystems, and dependent on national contexts and priorities. Using a common approach will enable data comparability between countries, which in turn will support intraregional and interregional trade.

43. Methods for recognizing the value of natural capital need to be more widely adopted and integrated into national reporting to reduce reliance on gross domestic product as a measure of growth. An understanding of the value of ecological infrastructure would result in society being more prepared to pay the real cost of conserving it. That will require regional standards of natural capital accounting systems that enable countries to compare and exchange goods and services, and invest in conservation measures to prevent biodiversity loss and achieve global and regional goals and targets. National statistics bureaux and planning ministries should cooperate to embrace natural capital accounting as an integral tool for policy design and implementation in delivering inclusive green growth, premised on the stewardship of natural wealth to ensure sustained economic growth and sustain livelihoods for long-term prosperity.

4. Technology development and transfer

44. Technology is critical to the success of a biodiversity economy. That includes technology based on indigenous and local knowledge and the ways in which it can be harnessed and scaled up to sustainably utilize biological resources. Investment is required to acquire modern, cutting-edge technologies that are environmentally sound and adapting some, as necessary, to fit into the African context through technology support (where the technology is privately owned) and technology transfer (for publicly owned technologies). Support for research and academic institutions to partner with the

[21] 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 an overall increase in human well-being.

[22] See, for example, Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, op. cit. (2018) and African Development Bank and World Wide Fund for Nature, African Ecological Futures. (Abidjan and Nairobi, 2015). Available at https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/xwwf_african_futures_report_english-lo-rez.pdf.

[23] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, op. cit. (2018).

private sector, in addition to public-private partnerships and South-South cooperation, will further enhance technology research and development.

45. Value addition is crucial to the success of the biodiversity economy in maximising the value chain to increase livelihood opportunities and ensuring maximum returns on investment. Technologically driven value addition, including digital technology, from bioprospecting to processing, manufacturing and marketing has a key role to play in achieving this success.

5. Entrepreneurship and innovative financing

46. Developing the biodiversity economy requires developing and promoting entrepreneurship based around a range of biodiversity-related products and services, including bioprospecting, product innovation and development, intellectual property rights, and business incubation and market research. Entrepreneurship development should include promoting enterprises owned by women and young people and scaling up traditional and indigenous biodiversity-based livelihoods.

47. Furthermore, developing the biodiversity economy requires financing. Innovative financing mechanisms, such as the Seed Capital Assistance Facility, which aims to mitigate the risks involved in setting up and investing in biodiversity-related enterprises, should be developed in partnership with banking and financial institutions, pension funds and insurance companies; including through public-private partnerships.

48. Similarly, innovative financing of conservation measures by public, private and community efforts should be developed, such as an intergenerational biodiversity fund based on revenues from biodiversity-related trade. Financing of conservation measures can be achieved by developing natural capital accounts from the various ecosystems and ecosystem services and demonstrating the importance of and contribution made by biodiversity and ecosystem services to national economies. In that way decision makers, as well as stakeholders, will be presented with facts based on financial analysis to underline why investing in biodiversity conservation is important in the long term.

6. Data to support the biodiversity economy

49. Biodiversity data and documentation are vital to understanding the assets that countries possess. Africa currently lacks adequate records on its biodiversity. Where records exist, most of the data may not be easily accessible, has no systematic way of being updated, or may be stored in databases outside the continent. Setting up centres of excellence in biodiversity information systems at the country, regional and continental levels is important. Africa also needs to establish systematic ways to collect, store, analyse and share data. Efforts need to be increased to repatriate African biodiversity data held in foreign databases.

7. Capacity development

50. Effective implementation of the biodiversity economy needs to be supported by up-to-date knowledge and skills. Capacity-building of African researchers, academics and practitioners in new and emerging issues in biodiversity and biosafety is needed. Capacity-building advisory services and technical support should also be extended to the African Group of Negotiators on biodiversity and to the focal points for the Convention on Biological Diversity and the two protocols thereto (the Cartagena and Nagoya protocols) so that they are optimally prepared to articulate African perspectives and priorities during international processes at conferences of the parties and meetings of the parties.