KEY MESSAGES

• Africa is blessed with enormous natural resources—such as oil and gas, minerals, land, sunshine, wind, and biodiversity—but their value is poorly measured and they remain largely untapped. The continent has 65 percent of the world’s uncultivated arable land, the second longest and second largest rivers (the Nile and the Congo), the second largest tropical forest (the Congo basin), and an estimated 44.8 percent of the total global technical potential of renewable energy.

• Africa’s measured natural capital was estimated to be $6.2 trillion in 2018, with its mineral and fossil fuel resources respectively estimated at $290 billion and $1.05 trillion. The continent also earned $38.5 billion in ecotourism revenues in 2019. With an estimated 60 percent of its GDP coming from natural resources and essential ecosystem services, Africa still has huge potential to benefit further from its natural resources to finance its development goals.

• International multilateral agreements, such as the Paris Agreement and the Convention on Biological Diversity, provide new opportunities for African countries to tap into climate resources and carbon markets and those for genetic materials and biodiversity. Global trade in emission permits could amount to $1 trillion a year in 2050, with estimated cumulative sales proceeds of up to $1.5 trillion for Africa. Similarly, the Convention on Biological Diversity, agreed at COP15 in Montreal, to raise international financial flows of $20 billion by 2025 and $30 billion by 2030 from developed to developing countries.

• Harnessing Africa’s enormous natural capital to complement its climate finance needs and sustainable and green economic growth requires the following policies and actions by different stakeholders and at various levels:
  - African governments need to use appropriate natural resource policies and instruments to finance sustainable and green economic growth. These include fiscal instruments to increase resource revenues and linkages with industrialization; increase local content and value addition to natural resources and utilization along value chains; in-country value creation and retention; controlling illegal, unreported, and unregulated fishing and curbing the high rate of deforestation; investing in human capital across the value chain and build international negotiation capacity; and building transparent and accountable institutions to govern their resources and guard against illicit trade, illicit financial flows and corruption. It also important to ensure that returns are used to build inclusive
and sustainable development. Sovereign wealth funds can be useful, but also need good governance.

- African countries should also invest in data collection for better valuation and measurement of natural capital, including implementing and integrating natural capital and ecosystem services into the standard system of national accounts; implementing appropriate fiscal and market instruments for optimal utilization of both renewable and non-renewable natural resources that take climate change and green growth into account; investing in the capacity, technology, approaches and tools needed to benefit from best practices in exploration and licensing initiatives, and international agreements; and reforming institutions to improve transparency and implement best practices for the governance of natural resource.

- The global community should honor pledges and commitments in international agreements such as the agreement on a Loss and Damage Fund, the post-2020 Global Biodiversity Framework, and the Paris climate agreement. It should increase collaboration and coordination among stakeholders—including international and regional multilateral organizations, national governments, and the private sector—to invest in the sustainable management of Africa’s natural resources while ensuring equity in the distribution of rents despite competitive advantages between investors and investment destinations.

- Multilateral development banks, bilateral donors, and corporations have a role in promoting transparency in contractual negotiations and operations to ensure that African countries get good deals from natural resource investments. Efficient use of natural resources involves improving regional integration and for trade, sharing information, and learning from each other. Furthermore, although natural capital is becoming relevant in the environmental sustainability leg of the Environmental, Social, and Governance rating by credit risk and rating agencies, more needs to be done to adequately reflect the value of natural capital assets in the credit risk profiles of African countries. They should also support Regional Member Countries in enhancing their credit risk profiles by integrating the true value of natural capital to help them boost their creditworthiness and mobilize foreign capital and bond issuance as part of their climate finance in the international market.

**INTRODUCTION**

Africa has abundant renewable and non-renewable natural resources, including 30 percent of the world’s mineral resources and 65 percent of the world’s uncultivated arable land. It has a huge stock of fertile agricultural land and some of the world’s most productive forests both in timber and carbon retention. It is also blessed with ample solar, wind, and hydropower. However, the returns from these resources have persistently been below their potential. While the share of Africa’s agricultural and forest land in the world is considerable, the value of these resources, which reflects the use to which they put, is small or not measured appropriately. Also, Africa has below-average agricultural land productivity and has developed its solar energy only to a very limited extent. The trend over the past quarter century also shows a decline in the value of natural capital per capita—a strong indication that development has not been sustainable. Although the average natural capital sustainability is not encouraging, not all indicators show a lack of progress as some countries have recorded an increase in the value and efficiency of utilizing renewable and non-renewable resources.

Considering the significant challenge Africa faces due to climate change and the gap in climate finances, this chapter discusses how Africa—a continent well-endowed with enormous natural resources—can leverage its natural capital to finance a green transition. It starts by defining the concept of natural capital and discusses changes in natural capital stock over time, efficiency, and performance. It analyzes the
past performance of rents from natural capital to identify a wedge for improvement and resource conservation benefits. It also connects relevant international agreements with Africa’s natural resource base, considering the meager gains for African countries from flexible mechanisms since the Kyoto protocol in 1992. Next, it discusses the opportunities from new agreements, such as forest carbon sequestration in accordance with the Paris Agreement Article 6, and other nature-related opportunities, such as debt-for-nature swaps, the preservation of biodiversity hotspots related to the Convention on Biological Diversity, and the potential to negotiate natural resource-based compensation from the “loss and damage” fund.

The chapter also discusses challenges for leveraging Africa’s natural capital for sustainable development, probing why Africa has not been able to benefit fully from its enormous natural capital. Finally, it provides actionable recommendations for the global community, developing countries, African countries, bilateral and regional institutions, multilateral development banks (MDBs), and other development partners. The recommendations are articulated as a mix of short, medium, and long-term measures required to harness natural capital and to contribute to the estimated private climate finance gap of more than $200 billion annually by 2030 in Africa.

In its focus on how Africa’s natural capital can be used to leverage finance for a green transition, the chapter supplements the role of finance of chapter 2. But it is important to point out that Africa’s natural capital already is the bedrock for the livelihoods of a majority of the continent’s people. While the emphasis is on how its natural capital could be used to raise more funds for investments, it is essential to ensure that the resources are managed sustainably and that important ecosystem services are maintained. Africa’s natural capital is challenged by climate change, biodiversity loss, land degradation, exports of unprocessed raw materials, and overutilization and other forms of mismanagement. Future reports are needed to deal with these important challenges to sustain the role of Africa’s natural capital in contributing to the future well-being of Africa’s growing population.

AFRICA’S NATURAL WEALTH

Natural wealth is that part of nature that generates well-being for people. In economic terms, natural wealth is referred to as natural capital. The United Kingdom (UK) Natural Capital Committee defines natural capital as “that part of nature which directly or indirectly underpins values to people, including ecosystems, species, freshwater, soils, minerals, oil and gas, the air, and oceans, as well as natural processes and functions.” The Convention on Biological Diversity defines the term as the stock of natural assets, which include geology, soil, air, water, and all living things. Natural capital is part of a country’s wealth, which includes other forms of capital—physical, human, and social. The World Bank defines the value of a particular natural capital asset as the discounted sum of the value of the rents generated over its lifetime. For a renewable resource, the lifetime may be unlimited. A similar approach is taken in the United Nations Environment Programme “Inclusive Wealth” study to obtain estimates of natural capital. This chapter has adopted the World Bank’s narrow definition of measured natural capital derived from Africa’s most abundant natural resources, noting its limitations when carried out in practice. When using rents to value natural capital, it is important to recognize that these may undervalue the benefits of the resources, especially to the poor.

Evolution of Africa’s natural capital

Reliable, comprehensive, and harmonized data on natural capital are generally lacking due in part to the difficulty and complexity of precisely quantifying and valuing natural wealth on Earth. Concerted global efforts spearheaded by the United Nations and partner organizations are underway to integrate natural capital and ecosystem services in standard systems of National Accounts through new frameworks such as the System of Environmental Economic Accounting (SEEA) and the SEEA Ecosystem Accounting (SEEA EA). But challenges remain. Without reliable data, the analysis here uses the most recent and comprehensive estimates of natural capital produced by the World Bank, covering 1995–2018. The report classifies natural capital into renewable and non-renewable asset classes. While renewable assets...
include forest timber, forest non-timber, mangroves, fisheries, protected areas, cropland, and pastureland, non-renewable assets are separated into oil, natural gas, coal, and minerals. It should be noted, however, that these categories do not cover a range of non-marketed benefits of ecosystems.

The value of measured global natural capital increased by about 50 percent between 1995 and 2018, although there are significant variations across world regions. The increase in total natural capital is primarily driven by the appreciation of the value of non-renewable natural capital, which increased by 80 percent, while the value of renewable natural capital increased by 28 percent. This change can be decomposed into increases in volume, increase in unit value and the lifetime of the asset. Globally, the biggest share of the increase (58 percent) was due to an increase in volume, while the increase in unit value was only 14 percent on average, with that for cropland declining, and the lifetime effect was negative (there was a decline in the life of renewable assets). Africa’s natural capital was estimated at $6.2 trillion in 2018. The actual value of Africa’s natural capital could be much higher if reliable data on recent minerals and other extractive resource discoveries were available.

Asia is by far the wealthiest region, with the estimated value of its natural capital at $25 trillion, followed by the Americas, which cover North America and Latin America and the Caribbean ($14.4 trillion) and Europe ($9.5 trillion). The largest increase in the value of natural capital between 1995 and 2018 was in Asia, at 71.5 percent, followed by the Americas (36.5 percent), Africa (31.9 percent), and Europe (23.6 percent). Except in the Asia region, the total value of natural capital is dominated by renewable natural assets (figure 3.1). Note that due to challenges of measurement and valuation, the estimated values of natural capital do not consider several resources, which could mean the true value of natural wealth in Africa — both renewables and non-renewables — is largely underestimated. Examples include resources such as ecosystem services in the form of land-based sequestered carbon stocks, solar, wind, and several other types of natural resources not accounted for in the data sets for this analysis.

The distribution of natural wealth varies significantly across regions within Africa. North Africa is the richest in natural capital, accounting for 27.1 percent of the continent’s value in 2018, which increased from 19.6 percent in 1995 (figure 3.2). This is largely due to the increase in the value of non-renewable resources such as oil and gas. The second richest is West Africa, with 25.5 percent of the continent’s natural capital. But compared with 1995, this region’s share declined by

*FIGURE 3.1 The value of natural capital by regions*

*Constant 2018 $ billions*

Source: AfDB staff calculations using data from World Bank (2021).
percentage points, largely due to a large fall in the share of renewable resources from 28 percent in 1995 to 15 percent in 2018. With 20 percent of the continent’s natural capital, Southern Africa is the third richest region, followed by East Africa (16 percent) and Central Africa (11 percent). Renewable assets dominate the total natural capital of East Africa and Central Africa, accounting, respectively, for about 90 percent and 78 percent of each region’s total in 2018.

Africa’s predominant types of natural capital are renewables, primarily land, forest, cropland, pasture, and protected areas. Consider a snapshot of the estimated shares of the value of Africa’s natural capital by broad and narrow classifications in 1995 and 2018 (figure 3.3). Renewable
natural capital—such as timber, non-timber forest, cropland, pasture, and protected land, mangroves—accounted for about 73 percent of the continent’s total natural capital in 2018, an 11 percentage point decline from 1995. Shares of the individual components in 2018 were cropland (26 percent), timber (19 percent), pasture (12 percent), non-timber forest (9 percent), and protected areas (7 percent). The share of non-renewables—such as fossil fuel energy (oil, natural gas, and coal) and minerals (metals and non-metals)—increased from just 19 percent in 1995 to 27 percent in 2018. That increase could be driven by the increase in the share of oil, which accounted for 16 percent of the total value of natural capital of the continent in 2018 compared with 11 percent in 1995. The share of natural gas and minerals also increased. Fossil fuel wealth benefited from unit price increases, and mineral wealth from increases in stocks.

The evolution of the value of natural capital per capita is a better indicator of the sustainability of growth and provides a different picture of a country’s wealth accruing to its citizens. While the strong sustainability concept demands that the stock of natural capital not decline physically, the weak sustainability concept as applied by the World Bank requires that the per capita value of all capital not decline.9 The World Bank review shows that this was achieved in all regions, except Africa. But the increase in Africa was the lowest at 18.5 percent for the period, but highest in East Asia at 139 percent. This could be the result of much greater accumulation of physical capital in Asia relative to its population growth, or of better valuation and pricing of natural assets.

In addition to tracking weak sustainability, it is argued that the sustainability of growth needs the value of natural capital to not decline over time. Now consider the estimated values of renewable and non-renewable natural capital in 1995 and 2018 on a per capita basis (figure 3.5). Although as noted above weak sustainability has been achieved in all regions over the last near quarter century,9 in per capita terms, Africa is the only region that has not experienced sustainable growth over this period. The estimated total per capita natural capital declined by 21 percent to $4,739 in 2018 compared with $6,001 in 1995.

Natural capital on a per capita basis in Africa fell from $4,374 in 1995 to $2,877 in 2018 (figure 3.4). One factor behind the decline in the per capita value is rapid population growth, increasing from 737 million in 1995 to 1.31 billion in 2018, an increase of nearly 78 percent—much more considerable than in other world regions, such as 33.3 percent in Asia, 25.6 percent in Americas, and 2.3 percent in Europe. Other factors include
illegal activities, lack of tenure, and poor natural capital governance and management, which led to the depletion of resources, discussed in detail below. Markets for natural resources are also a significant factor. In Sub-Saharan Africa, all land assets showed a decline in per capita terms. Except cropland, which grew in total wealth, other resources did not grow fast enough to overcome the growth in population. While most non-renewable resources are tradable commodities in well-developed global markets, albeit volatile, such as oil, gas, and minerals, most non-renewables are not tradable, since markets could be missing or underdeveloped. A time series plot of the per capita value of natural capital for Africa depicts the decline in the value of renewable natural capital as approximately linear, whereas that of non-renewables show cyclical trends, reflecting volatility in market conditions among other factors (figure 3.5).

Some countries have abundant natural capital, and others do not. Figure 3.6 shows the level and change in the value of natural capital for African countries between 1995 and 2018 and by type. The Democratic Republic of Congo is the wealthiest country in Africa in renewable resources, with an estimated value of $282.9 billion in 2018, followed by Nigeria ($260.1 billion), South Africa ($213.8 billion) and Ethiopia ($195.8 billion). While most African countries experienced an increase in the aggregate value of natural capital between 1995 and 2018, six countries saw a decline. The most notable was in Nigeria, with a 67 percent decline in the value of its renewable resources between 1995 and 2018 (primarily due to deforestation). Other African countries experiencing a decline include Burundi, Namibia, Mauritius, Tanzania, and Somalia. The increase in aggregate renewable capital is largely the result of an increase in the area of cropland and pastureland. The rest of the countries had an increase in both forms of natural capital.

Nigeria remains the wealthiest nation in the value of non-renewable resources—thanks to its large reserves of fossil fuel (oil and gas), with an estimated total value of $582.4 billion in 2018, followed by Algeria ($485.4 billion), Libya ($372.3 billion), Angola ($205.8 billion), and South Africa ($186.1 billion). However, while some resource-rich countries experienced an increase in the value of their non-renewable resources, others registered a decline. Overall, of 53 African countries with data, the value of non-renewable natural capital declined for 14, potentially indicating the depletion of some minerals—diamonds and gold, for example, as in Botswana.

In per capita terms, however, the evolution of natural capital is much less encouraging. Between 1995 and 2018, 36 of the 53 countries had a decline in per capita renewable natural capital (figure 3.7). And 25 countries had a decline in per capita value of renewable natural capital for Africa depicts an approximately linear decline, whereas that of non-renewables shows cyclical trends, reflecting volatility in market conditions among other factors.
FIGURE 3.6 Changes in the value of natural capital for African countries, 1995–2018

Source: AfDB staff calculations using data from World Bank (2021).
FIGURE 3.7 Changes in per capita value of natural capital for African countries, 1995–2018

Source: AfDB Staff calculations using data from World Bank (2021).
With most African countries overreliant on primary commodities and unprocessed raw materials exports, low and volatile global commodity prices have eroded their export revenues. A decline in the value of that capital both in physical quantity and unit value will result in poverty, exacerbate inequality, and increase vulnerability to climate risks. With most African countries overreliant on primary commodities and unprocessed raw materials exports, low and volatile global commodity prices have eroded their export revenues. Prices of agricultural commodities such as coffee and cocoa had been declining since the 1970s, whereas prices of crude oil and natural gas and minerals exhibit volatility (figure 3.8). In addition to boosting efficient use and better measurement of natural capital, sustainable growth necessitates increasing the revenue per unit through various policies. This includes adding value to the raw minerals and commodities including market form of franchising, discussed further below.

**FIGURE 3.8** Real prices of selected commodities, 1960–2020

Source: AfDB staff calculations using World Bank Commodity Price Data (The Pink Sheet).
Africa’s unmeasured natural wealth

Africa has enormous potential in unmeasured and largely untapped natural wealth, such as water, land, minerals, oil, gas, sunshine, wind, biodiversity, and the ecosystem services they provide. But the accounting of natural capital covered by the World Bank and the UN does not cover the implicit value of natural resources essential to well-being, such as water, air, and sunshine. Freshwater and air are regarded as unlimited inputs and thus may assume a zero value. When they are inputs into producing a good or service, however, such as drinking water or electricity, their value can be obtained by using the residual value method. This can be estimated as the difference between the annual revenues earned from the sale of renewable electricity and the annual cost of its production, including wages and return on produced capital.\(^{11}\) With the global conversation around long-term, low-carbon, green transformation, and the energy transition taking hold now more than ever, the values of sunshine, wind, and water for hydropower should be considered renewable energy sources and valued as such.

Africa is by far the world’s richest region for low-cost renewable energy potential, approaching half (44.8 percent) of the total global technical potential of renewable energy.\(^{12}\) Given its abundant solar and wind resources, the continent has the world’s best potential to produce cheap hydrogen, though it is yet to benefit from this potential. So far, clean hydrogen projects and investments have grown quickly, almost all outside Africa, despite its competitive advantage in several areas. The story on untapped potential also holds for hydropower. Of its total exploitable hydropower capacity, Africa harnessed only 11 percent, compared with 53 percent in Europe, 39 percent in North America, 26 percent in South America, and 20 percent in Asia.\(^{13}\) Central, East, Southern, and parts of West Africa have many permanent water bodies—rivers, streams, and river basins—providing nature-based opportunities for hydropower development. For instance, the installed capacity of the Grand Inga Hydropower project in Democratic Republic of Congo is estimated at more than 42,000 MW.\(^{14}\)

Landscape is also a form of natural capital not fully measured and valued as part of the continent’s natural wealth, generating services such as tourism. Although it is already making some contributions, the potential is hugely underdeveloped: Africa’s share of global tourism is only 5 percent.\(^{15}\) Tourism on the continent could be enhanced through investments in natural capital-driven subsectors. The 2019 Tourism and Travel Competitiveness Report shows that the regional score for Africa for natural resources was 2.9 of 7, declining to 2.6 in 2022. The report also shows that during the same period, North Africa (clustered with the Middle East) recorded scores of 2.2 and 2.0 in 2019 and 2022. Despite the decline, Africa has an enormous opportunity to take advantage of its abundant natural resources for tourism. It should build its competitiveness through increased connectivity and investments to enhance the value and attraction of tourism, including investments to stop the declining performance of natural and cultural resources. As highlighted by the 2019 report, core challenges include an unfriendly business environment, poor health and hygiene, and weak human resources. The region has well-developed enablers to support tourism based on natural capital, such as digital connectivity and operationalization of the African Continental Free Trade Area (AfCFTA) clauses that enable the free movement of people across the continent.

There could be other opportunities for updating the measures of sustainability of green growth, by further expanding the 12 indicator categories of the Green Growth Index. The 2019 GGI report stated that the four dimensions of green growth—that is, efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion—are closely interlinked. Efficient and sustainable resource use entails more productive use of natural capital and more cumulative economic value with fewer resources to also capture unmeasured natural wealth and their relative contribution to climate or green finance. This may provide a basis for a joint methodology to track natural capital-based financing and their relative contribution to climate finance in the future.

Efficiency in natural capital use

There is vast potential to increase the productivity of renewable natural capital while sustaining natural resources. With the right human capital
and industrial policies, physical assets and ecosystems could provide a higher value of output without compromising environmental quality. But across world regions, the gap is widening between the actual and potential value of goods and services from natural resources—such as carbon sequestration, crop, grazing, and forestry outputs. And Africa has the widest gap between the actual efficiency in natural resource use and the potential efficiency.¹⁶

There is also great variation in actual efficiency across African countries and sectors, with some scoring higher in efficiency and others performing poorly, such as agricultural land resources. For instance, agricultural productivity is the lowest in Africa. The value added per hectare of agricultural land for Africa is only 37 percent of the world average (figure 3.9). Regions in Asia (mainly developing countries) have productivity between five and eight times greater. Moreover, a large amount of land in many parts of Africa can be used for agriculture without causing deforestation. In Congo, only 2 percent of the land is used for agriculture, with rudimentary techniques.¹⁷ Similar observations apply to many other countries.

The application of circular economy principles—which involves recycling and recovering materials when possible—has the potential to increase the productivity of natural capital. The extraction of resources and production accounts for about 50 percent of global greenhouse gas (GHG) emissions and more than 90 percent of impacts on water stress and biodiversity loss owing to land use.¹⁸ Between 30 percent and 50 percent of copper, gold, iron ore, and zinc production are concentrated in areas where water stress is already high.¹⁹ Promoting mineral stewardship to responsibly guide the environmental, social, and governance aspects of green minerals, together with increasing material reuse and recycling in the mineral and water sectors, can provide significant win-win opportunities for the investment in and productivity of nature-based solutions and the overall sustainability of both renewable and non-renewable natural capital.

The efficiency of sequestering carbon in terrestrial ecosystems can be further increased. Globally, GHG storage capacity was 429 billion metric tons of carbon dioxide equivalent (MTCO₂e) stored in terrestrial vegetation for 2017 for all lands.²⁰ By choosing land use and land management to increase GHG storage without compromising the use for productive purposes, this amount can be increased by 86 billion MTCO₂e, or by around 20 percent. Much of this gain is in a few countries, some of them in Africa.²¹ The ones with the biggest gap between the actual and potential sequestration are Burundi, Gambia, and Uganda.

**FIGURE 3.9** Value added per hectare of agricultural land 2021

$3,000

2,500

2,000

1,500

1,000

500

0

Sub-Saharan Africa

Middle East and North Africa

North America

Latin America and the Caribbean

Europe and Central Asia

World

East Asia and Pacific

South Asia

Source: AfDB staff calculations using data from World Bank (2021).
Using non-renewable resources for low-carbon transition

Africa possesses significant mineral resources that are key to the global transition to a net-zero carbon future. According to the United States Geological Survey (USGS) data on global mineral reserves, Africa is abundantly endowed with cobalt (52.4 percent), bauxite (24.7 percent), graphite (21.2 percent), manganese (46 percent), and vanadium (16 percent). And more than half of African countries have at least one of the metals critical for the energy transition, placing the continent in a strategic position to influence the global net-zero transition. For instance, with its enormous endowment in strategic minerals that are components of lithium-ion batteries, Democratic Republic of Congo is at the heart of the battery value chain. It accounts for 70 percent of the world's cobalt production and at least 51 percent of global reserves.22

Despite its vast resource endowment, Africa participates only in the small value components of the total global value chain and has not invested adequately in green minerals. It is estimated to account for only about 10 percent of the total global value of such minerals, primarily exporting raw materials with little or no local value addition. Also insufficient is investment in green minerals and emerging energy storage using electrolysis to produce green hydrogen. Deepening Africa’s critical minerals value chain calls for investments in infrastructure, new explorations, skills, and digitalization, among others.23 That makes it important for African countries to break the vicious cycle of excessive dependence on exporting natural resources by creating more value on the continent, strengthening productive capabilities, and expanding exports and intra-African trade through the African Continental Free Trade Area (AfCFTA).

Africa can also promote green growth as part of the transition to a low-carbon future through the increased exploitation of its natural gas. The energy transition to net-zero carbon emissions will not be immediate. A pragmatic transition process should be carefully managed to reduce emissions while allowing communities to use their natural resources sustainably. Due to its lower carbon emissions, natural gas is widely considered a transition fuel. Today, more than half the people in Africa have no access to electricity. To eliminate energy poverty in Africa by 2030, the continent needs to expand the electricity generation capacity using reliable and clean sources by more than 6 percent a year to support industrialization and improve the quality of life for the people.24 Natural gas can be a key instrument in fighting energy poverty, but for this to happen, African countries need to develop robust energy transition plans to attract private capital investment in the sector.

Africa’s estimated 600 trillion cubic feet (tcf) of natural gas reserves, estimated at $210 billion in 2018, can fast-track the continent’s energy access. Due to natural gas accessibility, gas-to-power generation can help phase out more polluting fuels and integrate green energy, supporting the energy transition.25 Increased use of natural gas would also contribute to phasing out Africa’s reliance on biomass for cooking, thus stemming deforestation and bringing about health and economic benefits. Countries with new discoveries of natural gas, including Egypt, Mauritania, Mozambique, Senegal, and Tanzania, are making strides to commercialize gas resources. Both the demand for and the production of gas have grown consistently over the last decade, a trend expected to continue as global decarbonization efforts intensify.

However, much natural gas is still flared (leaked) by all global oil producers. African oil producers do not show up as the largest in gas flaring by volume (except for Nigeria, which ranks seventh),26 and the amount of flared gas per barrel of oil produced has been falling for the rest of Africa since 1995. Even so, flaring per barrel in Africa is nearly double the world average (figure 3.10). Recovering this gas would increase the use of gas as a transition fuel and reduce GHG emissions. It would also make a major contribution to development in the countries that undertake the recovery, which are often short of energy (as with Nigeria).

Natural capital accounting to track sustainable green growth

Data on natural capital has a key role in helping governments ensure that this form of wealth is fully accounted for in its contribution to national well-being. Rents from natural resources need to be measured accurately to ensure transparency.
Gas flaring per barrel in Africa is nearly double the world average.

and accountability and evaluate actions to improve resource use and efficiency. For renewable resources, a lack of data on the contribution of ecosystems that form the basis of such natural capital for income generation—and an area where data are a huge challenge—can result in their degradation. Oftentimes, key components of ecosystem services provided by natural capital, such as pollination, disaster risk management, protection of land against extreme events, assessment of the blue economy, wildlife, and parks, are lost because they were not recorded, and care was not taken to conserve them. In the UN System of Environmental–Economic Accounting (SEEA) now being upgraded, guidelines are provided on extending wealth accounting to include natural capital. This will help record changes in the value of assets as well as the value of the services provided now and expected to be provided in the future under existing or alternative management regimes. Only on this basis can policies to increase the sustainable use of such natural capital be implemented and tracked.

There are enough data to track the sustainability of economies in Africa. This review has made use of information on changes in total wealth per capita as an indicator of weak sustainability—and natural capital per capita as an indicator of sustainable growth. The World Bank’s analysis of trends also includes data on the physical and unit value components of natural capital that help further track progress (or lack of it) along a sustainable path.

The use of environmental accounts that include natural capital has already been carried out for several African countries, with some success. Environmental accounts bring together economic and environmental information in a common framework to measure the contribution of the environment to the economy and the impact of the economy on the environment. They enable governments to set priorities, monitor economic policies more precisely, enact more effective environmental regulations and resource management strategies, and design more efficient market instruments for environmental policies. A review of work in this area includes examples from the regional environmental accounting program in Southern Africa. They address issues such as the economic importance of non-market forest goods and services in South Africa; and the socio-economic impact of current water allocation and pricing policies in Botswana, Namibia, and South Africa.

One use of capital accounting is to track the extent to which the liquidation of natural capital has been used to increase other forms of capital (in Namibia and Botswana). Studies have also

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**FIGURE 3.10 Annual gas flaring, 2012–21**

![Gas flaring chart](https://eogdata.mines.edu/products/vnf/global_gas_flare.html)

Source: AfDB staff calculations using data from Earth Observatory Group (Zhizhin et al. 2021; Elvige et al. 2016; Elvige 2013).
been conducted on the value of specific forms of natural capital, such as wild animals and fisheries, to be able to better evaluate measures to conserve and/or enhance these stocks. These kinds of studies are, however, often hampered by a lack of data, something being addressed in the work reported in this chapter, but there is still a lot to be done. For non-renewable resources, a key issue has been the availability of information to estimate the stock of mineral resources and total wealth. Except for Botswana, there is a lack of comprehensive data or statistics on wealth accounting in Africa. The data assembled by the World Bank and UN at the country level is a major exercise in attempting to collect such data, but it is only a beginning and needs to be developed further for details, accuracy, and reliability. Even so, the full or even partial implementation of the UN SEEA System by all countries would be an important first step toward preserving, protecting, and enhancing their national wealth, thus building the foundation for the prosperity of all generations.

**Approaches to boost the value of natural capital**

Africa’s abundant renewable and non-renewable resources and essential ecosystem services account for approximately 62 percent of its GDP and have the potential to drive much-needed economic growth. The continent has the world’s largest arable landmass, the second largest and longest rivers (the Nile and the Congo), and the second largest tropical forest. In addition, Africa contributes significantly to the world’s capture fish production, and is also home to about 30 percent of global mineral reserves. For oil and natural gas reserves, Africa had estimated proven reserves of 125.3 billion barrels of oil in 2021 and natural gas accounting for around 7 percent of the world’s total reserves. Despite this abundance, the continent’s natural capital is not effectively harnessed for sustainable economic development.

**Opportunities in non-renewable resources**

The extractive sector contributes much to public and private finance in many African countries, with some heavily reliant on these resources for public revenue. Africa’s extractive resources will contribute more than $30 billion annually to government revenue by 2040. The continent’s value of non-renewable natural capital was estimated at $2.4 trillion in 2018, with mineral and fossil fuel wealth estimated at $215 billion and $1.06 trillion, respectively. The North African countries, including Egypt, Morocco, and Tunisia, contributed approximately 26 percent and 15 percent to the continent’s mineral and fossil fuel wealth, respectively. Southern Africa and West Africa contributed the highest to the continent’s mineral wealth (32 percent) and fossil fuels (51 percent), respectively. East Africa contributed the least of the two natural resources.

In resource-rich African countries, oil and mining, on average, account for more than a quarter of gross domestic product (GDP) and more than three-quarters of export earnings. The value of minerals as non-renewable natural capital increased sharply between 2005 and 2012 before declining but remaining above the 1995 value (figure 3.11). In contrast, the value of fossil fuels rose from 1998 through 2014 before declining (figure 3.12). Comparing the maximum recorded value of natural wealth from minerals in 2012 with the latest estimated value in 2018, there was a 44.5 percent difference ($173 billion, in constant $ 2018). The corresponding difference in the value of fossil fuels was $675 billion, equivalent to about 37 percent of the continent’s GDP in 2018.

For natural resource wealth to drive economic development, African countries must ensure they receive a fair share of resource rents and effectively manage revenues. Tax policies should be designed to internalize environmental opportunity costs associated with exploiting non-renewable resources. The fiscal instruments used most are royalties, income taxes, and corporate taxes. Income taxes may be neutral, corporate taxes are generally progressive, while royalties (an ad valorem tax) are regressive and may lead to a higher cut-off grade of minerals (table 3.1).

When the extraction of a natural resource generates a negative externality, such as environmental damage, or when the costs of mining are private information, governments can deploy royalties (ad valorem taxes) to steer extraction paths toward the optimal. Revenues generated from corporate taxes are typically low across the
The value of minerals as non-renewable natural capital increased sharply between 2005 and 2012 before declining but remaining above the 1995 value.

Continent due to asymmetric information on production costs, which are often overstated despite the high economic returns from oil and mineral extraction. In 2020, the top four oil producing countries in Sub-Saharan Africa had the following rent to GDP ratios: Nigeria 4.4 percent, Angola 24 percent, Congo 31.9 percent, and Equatorial Guinea 15.6 percent. Mineral rent to GDP ratios were, on average, even lower, ranging from 7.2 percent in Mali to 0.1 percent in Botswana and Central African Republic. The average pre- and post-tax internal economic rate of return on petroleum extraction in Chad, Ghana, and Nigeria were between 41 percent and 34 percent, far above the common hurdle rate of 12–14 percent that companies aim to surpass for investment approval.

Moreover, the negotiated royalty taxes are often low in many African countries. In the Democratic Republic of Congo, the rates range from 2.5 percent to 10 percent, depending on the mineral. The royalty rate for gold in Ghana ranges from 3 percent to 5 percent, depending on the price of...
African governments should deploy different fiscal instruments to obtain a fair share of revenues from non-renewable resources.

When there are excess profits due to high prices of a natural resource, governments should be able to intervene and capture some of the rents.

Despite the potential benefits of windfall taxes, their design can be complex, requiring technical and administrative capacity which is lacking in many resource-rich countries in Africa. Until African countries develop the capacity in the long term, some experts have recommended that flat rate regimes, which are easier to administer, are adopted rather than the tiered system. The progressive R-factor–based production sharing employed by Ghana and other countries is desirable, while rate-of-return-based fiscal instruments in Angola and elsewhere are considered too complex for some countries to adopt. The R-factor mechanism is a standard procedure to calculate royalties based on the ratio of cumulative revenue to cumulative expenditure.

However, obtaining a “fair share” of the revenue from non-renewable resources does not guarantee economic development. Corruption in countries bedeviled with weak institutions has...
Botswana developed a reputation for prudent fiscal management of its mineral wealth, and other African countries can learn from it.

been noted as the source of Africa’s resource curse, with resource-rich countries in Africa and elsewhere in the developing world experiencing low economic growth and high poverty. For instance, annual illicit financial flows are mostly tied to Africa’s natural resources. So, in addition to ensuring that revenue taxation accounts for the cost of depleting non-renewable natural resources, including environmental damages, revenues generated should be reinvested in productive capital to deepen economic diversification and build strong and transparent institutions for natural resource governance.

Resource-rich nations on the continent should take proper account of how rents obtained from non-renewable resources are used. Adjusted Net Savings (ANS) or Genuine Savings is often recommended as a guiding indicator. It is calculated as the difference between gross savings and consumption of fixed capital (depreciation) and adjusting for changes in natural resource and environmental degradation such as the cost of air pollution damage to human health. A positive value of ANS implies that the nation’s wealth is increasing while a negative value denotes depletion of the nation’s capital stock and future material well-being. Recent estimates show that Guinea, Mozambique, Sierra Leone, and South Sudan registered a negative average ANS over 2015–19, while Nigeria had zero ANS, and Ghana, Sudan, and Zambia registered positive values.

Botswana developed a reputation for prudent fiscal management of its mineral wealth, and other African countries can learn from it. As part of its efforts for sustainable development and economic stability, it implemented a Sustainable Budget Index (SBI), which is the ratio of recurrent (non-investment) spending to non-mineral revenues. If the index equals 1, recurrent spending is financed partly by mineral revenues. A value less than one implies sustainability since non-recurrent revenue (mineral revenue) is being saved or spent on public investment in education.

As the world transitions toward a low carbon and green economy, Africa’s fossil fuel reserves may risk becoming unusable or uneconomical.
This could result in a substantial loss of value and potential revenue. Stranding such assets due to the expected sharp decline in the demand for fossil fuels over the next three decades will reduce the viability of fossil fuel-rich countries’ economies. The extent of the effect will depend on how the risks associated with the transition are managed. It has been estimated that, depending on the global climate policy pathways, global fossil fuel wealth could decline by 13 to 18 percent over 2018–50. Since low-income fossil fuel-rich economies are likely to face the brunt of the impact, African countries may have to convert their underground energy wealth to alternative assets such as human and produced capital and seek assistance to transition effectively.

**Opportunities in renewable resources**

Renewable resources replenish themselves over time and can generate benefits in perpetuity if the extraction rate does not exceed the reproduction rate. If the resources are extracted sustainably, their flow generates revenue streams (livelihoods, profits, and foreign exchange earnings) and is not capital depleting. So, it is important in supporting the livelihoods of several communities and Africa’s economic development. There are two main reasons why such resources may generate less revenue than their potential: if the resources are not extracted at a level that generates the maximum economic rents, and if the resource-rich nation does not receive a fair share of the resource rents, especially when foreign capital is invested in the extraction of the resources. In nearly all African countries, renewable resources have excessive extractive capacity (over-capitalization) and are overexploited, with foreign direct investment contributing significantly to the problem. The overextraction is typically due to open access or common pool resource management practices.

**Capture fisheries**

Africa’s annual capture fish production is estimated at 10 million tons—about 7 million tons from marine fisheries and 3 million tons from inland fisheries. Fish provides much-needed protein, minerals, and micronutrients for more than 400 million people on the continent. In Gambia, Ghana, and Sierra Leone, more than 60 percent of animal protein comes from fish, and in Senegal, about 47 percent. Domestic fish protein consumption comes mainly (about 90 percent) from the landings of artisanal fleets. Approximately 13 million people are engaged in fishing, fish processing, and trading on the continent, with roughly 46 percent of them women. Despite the potential of capture fisheries to generate these substantial benefits in perpetuity, it has been reported that 60 percent of wild fish stocks in Africa are fully exploited, while 30 percent are overexploited. The three categories of fishing fleets are local small-scale fleets, which provide 90 percent of employment in the sector, industrial fleets with local and foreign ownership, and distant water fleets, are organized through access agreements with the coastal nation to fish within its exclusive economic zones.

Africa’s fish stocks are, however, shrinking. The estimated value of fish stock fell from $59 billion in 2003 to $20 billion in 2008, during which Africa lost more than $38 billion worth of its fishery’s capital (figure 3.14). This is attributable to the low capture fish stocks due to biological overfishing. Key factors contributing to overfishing in Africa are overcapacity; illegal, unreported, and unregulated (IUU) fishing activities; poor resource governance; insufficient knowledge and misperception of biophysical dynamics; and climate conditions such as salinity, coastal upwellings, and sea level rise. Assessing the economic impacts of IUU activities is difficult. In West Africa, for example, despite the declining fish population, fishing capacity has increased by 50 percent since the 1970s, and the annual cost of IUU fishing activities is as high as $2.3 billion. A recent study estimates a loss of between 2 and 3 million tons of fish per year (about 20 percent of total reported production) for all African countries, with a gross value of $3–5 billion. It estimates revenue losses for the industry at $2 billion and tax losses for governments at a further $1.5 billion.

A composite index recently developed to characterize the state of IUU fishing practices in global coastal African countries showed that Africa’s coastal countries made just a marginal improvement from 2.39 to 2.32 between 2019 and 2021 on a score ranging from 1 to 5, where one is the best and five is the worst. There are, however,
The estimated value of fish stock fell from $59 billion in 2003 to $20 billion in 2008, during which Africa lost more than $38 billion worth of its fishery’s capital variations across countries (figure 3.15). Mozambique made the best progress, while Eritrea regressed. Over the past decade, several bilateral and multilateral development partners have supported African states and their regional fisheries organizations in building capacity to combat IUU fishing. For instance, in 2014, the African Development Bank stressed the importance of increasing its commitment to protecting coastal waters from IUU fishing. Between 2016 and 2018, the Bank also supported several Central and West African countries in adopting and implementing the Port State Measures Agreement and has supported the Fisheries Transparency Initiative since its inception in 2017.

In addition to IUU fishing, access agreements tend to favor distant water fleets. By allowing foreign fishing fleets to access their waters, African countries could generate revenue that can be used to fund important social and economic programs. Fisheries access agreements typically apply to the contractual framework that allows industrial fishing vessels belonging to distant water fishing nations to fish in the waters of resource-rich third countries. In reality, most African nations are short-changed. Access agreements make foreign fleets prioritize short-term economic gains over long-term sustainability, hurting coastal communities’ livelihoods. Distant water fleets also engage in IUU practices due to political corruption in resource-rich countries and their lack of capacity and financial resources for monitoring, control, and surveillance.

For fisheries access agreements to benefit African countries by generating more revenue and employment while also promoting sustainable fisheries management practices and protecting marine biodiversity, they should be structured in a way that the African countries receive a fair share of the economic benefits. They should include provisions for technology transfer and capacity building to enable African countries to develop their own fisheries sector and create jobs, which can consist of training in modern fishing techniques, equipment, and infrastructure development. They should prioritize sustainable fishing practices to ensure the long-term viability of fish stocks. They should include measures to monitor and enforce compliance with fishing regulations, including satellite tracking of fishing vessels, onboard observers, and penalties for non-compliance. And they should foster regional cooperation among African countries to address common challenges and develop a coordinated approach to fisheries management. This can include sharing data and best practices, joint research, and joint enforcement efforts.

**Mangroves**

In tropical and subtropical regions, coastal mangroves provide several economic and ecosystem benefits including carbon sequestration, flood protection, biodiversity conservation, and timber...
and non-timber goods. The total mangrove wealth of Sub-Saharan Africa increased from $3.7 billion to $7.6 billion between 1995 and 2018. For African countries with consistent data from 1995 and 2018, Ghana registered the highest gain in mangrove value of $975 million within the period (1995 to 2018) (figure 3.16. This is followed by Senegal ($609 million) and Nigeria ($386 million), while Egypt registered the lowest gain of $28.7 million. These values are based on the size or extent of mangroves, its flood risk protection capacity, and the value of produced capital that could be damaged in the absence of mangroves. Although the

Although the total mangrove area or extent decreased by about 2 percent over the period between 1995 and 2018 and less than 1 percent after 2010, its flood protection value increased by 150 percent within the period, generating a net increase in mangrove wealth.

Mangroves are under threat of habitat loss and degradation from coastal development, pollution, and overexploitation as well as climate change and sea-level rise. The sea-level rise coupled with land-use changes and coastal development can impede the flow of freshwater and sediments, threatening mangroves. Strategies to protect them
FIGURE 3.16 Changes in the value of mangrove wealth for African countries, 1995–2018

Source: AfDB staff calculations using data from World Bank (2021).
include establishing protected areas from fishing, logging, and any destructive practices, promoting sustainable forest management practices, promoting community-based management of the resource and providing alternative and supplementary livelihood options for local communities.

**Forests**

Africa’s forest cover is estimated at 637 million hectares or 23 percent of the continent’s land area, and wooded landscapes and trees outside forests are estimated at 13 percent of land area or 350 million hectares. Central Africa and Southern Africa are more endowed regions in forests than other parts of the continent. At the continental level, while forest products (timber and non-timber) contribute about 6 percent annually to GDP, the natural capital value of Africa’s timber was about $725.5 billion in 2018, up from $582.2 billion in 1995. In addition to the forest timber wealth, the continent’s forest ecosystem wealth increased from $338.5 billion to $374.1 billion between 1995 and 2018. As of 2018, Africa’s total forest capital value (timber and ecosystem services) was about $1.1 trillion. The Democratic Republic of Congo has the highest forest timber and forest ecosystem capital, valued at $126.8 billion and $51.1 billion, respectively. The gain in forest timber value—despite Africa’s recording the highest forest loss in the world, estimated at 7.9 million hectares between 2001 and 2018—is likely due to rising timber prices. The forest loss is equivalent to about $9.0 billion in natural capital (timber value), using 2018 estimates. Between 2001 and 2021, the Democratic Republic of Congo recorded the highest forest cover loss, more than 5.9 million hectares due to illegal logging (figure 3.17).

**FIGURE 3.17 Forest cover loss in Africa between 2001 and 2021**

Africa’s forest cover is estimated at 637 million hectares or 23 percent of the continent’s land area, and wooded landscapes and trees outside forests are estimated at 13 percent of land area or 350 million hectares.

Source: AfDB staff calculations using data from World Bank (2021).
Protecting Africa’s forests requires a multifaceted approach involving government policies, community engagement, and public education and awareness. Governments should promote and enforce policies and regulations, protecting reserve areas and preventing illegal logging, increasing enforcement and setting penalties for illegal logging. Sustainable forestry practices, such as selective logging practices and reforestation should be promoted to reduce deforestation. And promoting sustainable agricultural practices can reduce the need for farmers to clear new land for farming. Deforestation can also be slowed by raising public awareness through education campaigns, outreach programs, and media campaigns about the negative impacts of deforestation and engaging local communities in managing protected forests.

One way to regulate excessive extraction and promote environmental compliance is through performance guarantee bonds, which give long-term cutting rights and the responsibility for sustainable forest management rest to a lessee through competitive bidding. The schemes can be designed to enforce compliance with technology or performance standards. An alternative is to have a deposit refund (tax subsidy) mechanism where an individual pays the up-front bond but receives a bond repayment as a subsidy if actions are taken that result in an improvement above a

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**Box 3.1 Debt-for-nature swaps**

Forest, biodiversity, and ecosystem services are derived from natural assets, and have the potential to finance climate change and green growth and support debt sustainability through innovative financing mechanisms like debt-for-nature swaps. A debt-for-nature swap (DNS) is a type of financial transaction in which a portion of a developing country’s sovereign debt is forgiven in exchange for the country’s commitment to conserve its natural resources. This type of arrangement is designed to encourage sustainable development and conservation efforts, while also helping countries to reduce their debt burden.

With Africa’s rising debt stock coupled with the intense pressure to service its debts, DNSs presents an opportunity for marginal relief. Currently less than $3 billion is spent on biodiversity conservation in Africa, while it is estimated that the continent needs about $1.2 billion yearly to protect wildlife alone. It is noteworthy that from 1989 to 2015, Africa was able to secure just about $135 million in DNSs through bilateral and multilateral arrangements. Africa’s total external debt in 2021 was estimated at $1.09 trillion, which is about 39.5 percent of the continent’s GDP. It is estimated that debt service payment in 16 African countries with data will be $22.3 billion in 2023, $25 billion in 2024, and $26.8 billion in 2025. Although funds allocated to DNSs so far are very small, there are some benefits to the arrangement. If the environmental allocations are deployed to capitalize conservation funds, it could grow over time and lead to better environmental protection. And countries receiving such funds could have some budget flexibility owing to maturity extensions and reductions in interest on sovereign debts. The flexibility will enable the countries to borrow more for socioeconomic development.

While DNSs can be a powerful tool for promoting sustainable development and conservation in Africa, they are not without challenges. For example, there may be difficulties in ensuring that the conservation efforts are effective and that the benefits are distributed equitably among local communities. Additionally, there may be concerns about the potential impact of debt forgiveness on a country’s credit rating and ability to access future financing.

**Notes:**

reference level. Performance bonds can effectively change the incentive structure and behavior of loggers, making them an enforcer with stronger sanctions than just withdrawing concession. They can also reduce the burden and cost of monitoring. The benefit-cost ratio of protecting the African forests 3:1.66

Beyond generating revenue, Africa’s forests and woods provide ecosystem services such as watersheds and stream-flow protection, controlling erosion, enhancing soil fertility, regulating the climate, and protecting biodiversity.67 Tropical forests host at least two-thirds of the world’s flora and fauna diversity and store 25 percent of the terrestrial carbon above and below ground.68 So, sustaining this natural capital is critical. The natural capital value of Africa’s forest ecosystems was estimated at $374 billion in 2018, with Cameroon, Democratic Republic of Congo, South Africa, Tanzania, and Zambia accounting for 40 percent.

**Ecotourism**

Ecotourism is growing in Africa, and many countries are promoting it as a means of sustainable development. The continent’s unique natural assets—its iconic wildlife, mountains, waterfalls, rapids, majestic forests, unique bird populations, pristine beaches, and coral reefs—are a tremendous value that can be exploited to develop the tourism sector and contribute to job creation and livelihoods.

Its many biodiverse wildlife reserves and national parks offer nature enthusiasts an ideal destination. With a range of landscapes, from the expansive savannas of East Africa and Southern Africa to the lush rainforests of Central Africa and the deserts of North Africa, the continent is home to impressive scenery. Visitors observe exotic species, such as the Big Five (lions, elephants, leopards, rhinoceroses, and buffalo), in their natural habitat through game drives, hiking, and bird-watching safaris, as well as whale watching on the coasts and underwater observation and recreational fishing in the Red Sea and the Mediterranean. East and Southern Africa are the main destinations for nature-based tourism. For example, a fifth of employment in Namibia is linked to nature-based tourism. In Tanzania, mostly nature-based tourism is the largest foreign exchange earner, competing with gold. Ecotourism has the potential to encourage economic growth and generate employment in rural areas and nature conservation communities. It can promote cultural exchanges between visitors and their host communities, leading to a greater appreciation of cultural differences. Revenue earned from ecotourism could be reinvested to enhance provisional ecosystem services derived from ornamental resources and wildlife tourism.

**Opportunities in international agreements**

The limited benefits for Africa from past international agreements are in part attributable to countries’ limited capacity to negotiate better positions, to take stock of its resources, or to identify and communicate gaps for assistance. African countries also fail to negotiate for optimal benefits from their natural resources with private investors, partly due to the inability to carry out surveys to ascertain the value of resource reserves. In some cases, countries have imposed local content requirements without accompanying investments in local capacity to contribute to value addition. The Marrakesh Accords in 2001 were partly a response to the realization that while Africa needs international support, many countries cannot identify and communicate their capacity needs, hence the need for special treatment. Other institutions have also come on board to support capacity building among African countries to improve the continent’s capacity to participate effectively in international agreements. As a result, many African countries are now calling for enhanced capacity that would support improved negotiations in international agreements.70

There is a great need for capacity development to implement the Convention on Biological Diversity. This was a key point on the agenda at the 15th Conference of Parties in Montreal in December 2022 and led to the decision to implement a long-term strategic framework for capacity-building and development. African governments have much to benefit from engaging in the implementation of this strategic framework.71 Other initiatives include the Green Climate Fund (GCF), which, through the Readiness and Preparatory Support Programme, has been providing funding
Prices on emission reductions in compliance markets are much higher than in voluntary markets—a compelling reason for African countries to focus on compliance carbon markets under the Paris Agreement (figure 3.18). The wedge between compliance and voluntary markets is widening. In 2017 it was just $3.41 per metric ton of emissions, but in 2021 it was $52 per metric ton. So, there is much to gain for African governments to invest in proper MRV procedures under the Paris Rulebook and develop mechanisms to benefit from trade under the Paris Agreement’s Article 6.

The potential cost reductions through trade in carbon credits instead of each country implementing its NDCs on its own are about $250 billion annually in 2030 and $1 trillion annually in 2050. Thus, creating “internationally transferred mitigation outcomes” (ITMOs) could be a huge gain for African countries. Southern Africa region has the lowest expected marginal cost for abatement, and South Africa has the highest marginal abatement cost, so the potential to trade in ITMOs is not evenly distributed across African regions and countries (figure 3.19, panel a). But Africa as a whole could be a net seller of emission credits (figure 3.19, panel b). Sales could amount to 881 MtCO₂e per year by 2030 and a cumulative 18,124 MtCO₂e by 2050, estimated at a total value of $1.5 trillion. Countries in North Africa and South Africa would buy emission credits. But a more realistic outcome would be for these countries to negotiate international agreements to support their mitigation efforts, as with the International Just Energy Transition Partnership with South Africa at COP 26 in Glasgow that mobilized an initial $8.5 billion to support the decarbonization of the South African economy. The negative financial volumes, estimated to be $411 billion cumulatively by 2050, should thus be interpreted as the international financial support needed for mitigation in these countries (figure 3.19, panel c). Africa could be a major actor in the early period, particularly for sales, but this would ebb over time. The early potential is primarily in land use, land use change, and forestry, while various forms of technical sequestration, such as carbon capture and storage, are expected to increase in the future (figure 3.19, panel d).

The Great Green Wall Initiative also provides funding opportunities for carbon sequestration through tree plantation. This initiative, started more than a decade ago by GEF and the World Bank primarily as a tree planting project, is now supported by international conventions (UNCCF, UNCCD, CBD) and initiatives (Bonn Challenge and AFR100 for landscape restoration). The initial vision has been updated to now focus on “integrated approaches to natural resource management for transforming livelihoods and landscapes.” In January 2021, during the One Planet Summit, President Emmanuel Macron of France and other world leaders announced the launch of the Great Green Wall Accelerator, which has since raised more than $19 billion. The objectives are to restore 100 million hectares of currently degraded land, sequester 250 million tons of carbon, and create 10 million green jobs by 2030. The initiative benefits 11 countries in the Sahel (figure 3.20).
Opportunities from the European Union Carbon Border Adjustment Mechanism (CBAM)

A closely related issue to trade in carbon emission permits is trade in goods produced emitting CO₂. The European Union has committed to a low-carbon transition by cutting emissions by 55 percent by 2030 and to net-zero by 2050. To make this happen, the European Union has, among other measures, an emissions trading system (EU-ETS) that makes it increasingly expensive for European industries to emit CO₂. But cleaner European goods could be replaced by imported goods from highly emitting economies. To restrict this, the European Commission in June 2021 proposed that the carbon content of imports be taxed through a Carbon Border Adjustment Mechanism (CBAM). This was confirmed in a high-level agreement by the European Council of States in March 2022, and the European Parliament amended the proposal before adopting it in June 2022. The CBAM will be limited to aluminum, cement, electricity, fertilizers, iron and steel, hydrogen, plastics, and organic chemicals. Importers need to present third-party verifiable emission factors. Otherwise, a default emission factor will be applied, equivalent to the emission intensity of the dirtiest 10 percent of producers in the EU. The price of the embedded carbon will be the same as for carbon emission permits bought at the EU-ETS.

The European Parliament’s Amendment 40 states that “the Union should finance least
The Great Green Wall Initiative provides funding opportunities for carbon sequestration through tree plantation in 11 countries in the Sahel.

The COP27 Loss and Damage Fund
COP 27 in Sharm El-Sheikh, Egypt in 2022 agreed on the creation of a Loss and Damage Fund for vulnerable countries. The Fund aims to provide financial assistance to developing countries that are most affected by the losses and damages of climate change, such as rising sea levels, higher temperatures, and extreme weather events. It will complement mitigation efforts to avert impacts from climate change and adaptation measures to minimize the adverse effects of climate change. Vulnerable countries face significant economic and social costs associated with climate change, such as crop failures, loss of biodiversity, and displacement of communities (figure 3.21). The expectation is that principles of solidarity and common-but-differentiated responsibility will guide the Fund’s operation. The way the Fund distributes funds should be guided by vulnerability criteria, and projects should be locally driven. To ensure that the Fund supports the most vulnerable countries and communities, it needs to be managed transparently and accountably.

The Convention on Biological Diversity
Another international agreement closely related to the African natural resource base is the Convention on Biological Diversity (CBD). The most prominent funding mechanism for CBD that African countries can benefit from is managed by the Global Environment Facility. For example, GEF-6 programming for the biodiversity focal area was about $1 billion over a period of four years, 2014–18. Findings from the GEF-6 and GEF-7 programming cycles indicate that programs addressing the drivers of environmental degradation using an integrated framework result in more impact per unit of investment than comparable GEF investments and create the conditions for transitions towards lasting systems transformation.

Recently, the GEF-8 Integrated Programming was set in motion to invest in projects designed...
BOX 3.2 Can Africa become the new green hydrogen El Dorado?

Can Africa become an El Dorado in the new green economy? The global transition to lower-carbon energy sources places renewables and green hydrogen as alternatives to fossil fuels. Green hydrogen consumption is expected to grow significantly over the next decades as transport (such as aviation and shipping) and heavy industry (such as steel, aluminum, cement, and chemicals) decarbonize. Box figure 3.2.1 shows the expected cumulative power-to-X capacity of green projects in Africa and the Middle East per year.

Considering the renewable energy potential of many African countries, green hydrogen presents a great opportunity for the continent to transform its energy and economic sectors. And as a source of green hydrogen, Africa has the potential to emerge as a cost-effective worldwide supplier. Africa has a large land mass of sunlight for green power production. Egypt, Mauritania, Morocco, Namibia, Niger, and South Africa are planning large-scale hydrogen projects, and the momentum is building (box figure 3.2.2). Collaboration between the European Union and interested African parties would facilitate progress toward country and company-specific plans aligned with 2050 net-zero emissions targets.

BOX FIGURE 3.2.1 Cumulative power-to-X capacity

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Note: The chart presents the annual expected cumulative capacity of green hydrogen projects in Africa and the Middle East. The Unknown category refers to projects with no disclosed commissioning date. The African projects with a disclosed capacity represent 37 percent of the Unknown cumulative capacity.
Source: IHS Markit 2022.

BOX FIGURE 3.2.2 African green hydrogen projects and renewable power plants

Source: IHS Markit 2022.

Note:
1. An El Dorado is a place where advanced science can be applied and contribute to improving the environment.
Vulnerable countries face significant economic and social costs associated with climate change, such as crop failures, loss of biodiversity, and displacement of communities. Strategic partnerships, with specialized organizations, such as inter-agency collaboration under a proposed GEF-8 Greening Transportation Infrastructure Development Integrated Program, are required to leverage the expected resources to support integrated planning for nature-positive and climate-resilient systems.

The CBD’s 15th COP in Montreal in December 2022 adopted the Post-2020 Global Biodiversity Framework (GBF), with an ambition to mobilize at least $200 billion per year by 2030. To increase international biodiversity financial flows to developing countries and economies in transition will require at least $20 billion per year by 2025 and at least $30 billion per year by 2030. For Africa to realize benefit from such arrangements, there may be a need to establish an Africa Biodiversity Fund to attract private capital.

**Voluntary carbon markets**

While carbon trade under the Paris Agreement’s Article 6 is linked to countries’ NDC compliance, other actors—such as large corporations—are also pledging to compensate for their CO₂ emissions—opted for the Post-2020 Global Biodiversity Framework (GBF), with an ambition to mobilize financial resources for implementation. In addition to the current $150 billion, an extra $800 billion from private investment (about 0.7 percent of global GDP), plus at least $60 billion from public finance is required, per year, to implement the GBF, to scale up ecosystem restoration, reduce the extinction risk of species, and protect 30 percent of land, freshwater and marine areas by 2030. For Africa to benefit from such arrangements, it may be to establish an Africa Biodiversity Fund to attract private capital. To service this demand, many project developers that offer a range of greenhouse gas emission offsets have emerged, many of them nature-based solutions (NbS) related to forestry and land use, agriculture and soil sequestration, and blue carbon. While African voluntary carbon markets are growing slightly faster than global markets, their combined market share is only about 15 percent of the global voluntary carbon market in 2021. This could change. According to the African Carbon Markets Initiative (ACMI), the potential for African carbon credits is estimated at about 2,400 MtCO₂ in 2030, with a value of up to $50 billion. The ACMI was launched at COP27 with the ambition to produce 300 million carbon credits by 2024. **FIGURE 3.21 Losses and damages associated with climate change**

Source: UNFCCC (https://www.climateforesight.eu/seeds/loss-and-damage/).
Managed by the African Development Bank, the Adaptation Benefits Mechanism is an innovative mechanism for mobilizing new and additional public and private sector finance for enhanced climate change adaptation action.

As with MRV for compliance markets, it is important to ensure the integrity of certification of voluntary carbon markets. Certification standards have been criticized for being too generous in their calculations of the additional sequestration from carbon project implementation. There are also concerns about leakages and the impermanence of sequestration. All these concerns can be addressed if state-of-the-art methods are used for certification.

Managed by the African Development Bank, the Adaptation Benefits Mechanism (ABM) is an innovative mechanism for mobilizing new and additional public and private sector finance for enhanced climate change adaptation action. It is a results-based, nonmarket finance mechanism that channels resources to projects enabling communities, economies, and ecosystems to adapt and build resilience to the negative impacts of climate change. Climate finance needs for adaptation are estimated between $249 and $407 billion in 2020–30. But adaptation finance flows to the continent are well below what is desired, with an average of $19 billion in total climate finance in 2017–18, and only a small portion allocated to adaptation. So, leveraging untapped private sector resources is crucial to filling the adaptation financing. To this end, the ABM has been piloted by the African Development Bank since 2019–23 (box 3.3).

The ABM creates an incentive for private sector investments in adaptation projects by facilitating payments upon delivery of certified adaptation benefits, thereby generating a new and additional source of revenue for adaptation. ABM de-risks and incentivizes investments by certifying the social, economic, and environmental benefits of adaptation activities. The value of adaptation action captured in these certificates, including the incremental costs of generating the benefits, is promoted to potential investors and lenders. A major AMB contribution is that it verifies certificates of the benefits of specific adaptation activities based on sound methodologies. Since this is done in consultation with stakeholders and with the approval of the host government, it can increase the credibility of the adaptation activities and their attractiveness to potential investors and lenders.

Governance of natural resources in Africa
Despite substantial natural resource endowments, many African countries have been unable to fully harness their potential for economic growth.
One of the challenges to good governance in natural resources in Africa is that the ruling political elites, and other domestic actors with influence, have control over who has access to resource rents. Transformation and sustainable development, using natural resources that allow sustainable revenue flows and promote development while safeguarding the environment will spur sustained, inclusive, and green growth, thus strengthening economic resilience and regional integration. The flow and amount of natural resource rents are affected by the bargaining between host countries and multinational companies. But many African governments are not well equipped to negotiate with large foreign private investors because of weak bargaining and institutional capacity. So,

**BOX 3.3 Recent green initiatives of the African Development Bank**

The African Development Bank (AfDB) established the Africa Financial Alliance on Climate Change (AFAC) in 2018 as a platform to engage Africa’s financial sector to de-risk and direct capital flows toward low-carbon and climate-resilient investments. AFAC is a network of African financial institutions whose mission is to mobilize and direct private capital flows toward Africa’s continent-wide low-carbon and climate-resilient development. It is designed to promote climate action through knowledge sharing, climate risk-mitigating financial instruments, climate risk disclosure, and mobilizing climate finance. This mission is envisioned by ensuring that current and future financial risks and opportunities are integrated into investment decision making.

Current global efforts to address climate vulnerability and debt distress in developing countries and the lessons from COVID-19 have reinforced the case for a strengthened AFAC to crowd in the resources to transition Africa to a sustainable future. The finance sector stakeholder consultations at COP27 in November 2022 provided a unique opportunity to advocate for enhanced support for the African financial sector to enable it to play its full part in the transition to green growth and to have its voice heard in the global discourse on climate risk management and climate finance.

The African Green Bank Initiative (AG3F) launched at the COP27 supports the Bank’s objective of increasing the climate finance available for the continent from the 3 percent to 10 percent and turn the $2.8 trillion in NDC implementation needs by 2030 into investments opportunities. The initiative is built on the model of local specialized financing vehicles deploying blended financing using small portion of public resources for large private capital mobilization. It is supported by strategic partners such as the Climate Investment Funds, one of the major global climate finance mechanism, Canada Climate Action Africa, the Green Bank Network, and the European asset management firm Amundi. Amundi backs the initiative through technical assistance activities. It will also mobilize its investment vehicles dedicated to sustainable development in emerging markets and developing economies to support green facilities’ capitalization and thus participate in developing green investments across the continent.

A pilot phase to provide technical assistance to governments and financial institutions to design and set up Africa’s first Green Finance Facilities is planned, with initial discussions held with Banque Nationale d’Investissement de Côte d’Ivoire and Caisse des Dépôts et Consignations du Bénin. For its pilot phase, the AG3F aims to mobilize $10 million for the technical assistance and $90 million to support capitalization.

In 2020, the AfDB and the Green Growth Knowledge Partnership joined forces with the World Wide Fund for Nature and the Economics for Nature team to launch the Natural Capital for African Development Finance initiative to lay the foundation for mainstreaming natural capital in African development finance. Throughout the last few years, we have worked through key activities, including generating evidence for integrating natural capital into AfDB’s development finance operations, prioritizing the role of natural capital in Africa’s post-COVID-19 recovery, and convening peer signatory MDBs to develop a common vision for mainstreaming nature-based solutions in support of the MDB Joint Nature Statement released at COP26 in 2021.
In many African countries, the governance of natural resources is impaired by the conflicting mandate of various government institutions and departments. Some of these institutions are involved in multiple and often conflicting functions such as policymaking, regulation, licensing, and commercial aspects that need to be separated. This separation would create special authorities captured by a small section of the ruling class and their associates, fueling corruption and conflict. Increased natural resource rents can also provide governments with opportunities and incentives to pay off political supporters to stay in power. Since being in power means having access to resource rents, politicians are willing to spend more today to stay in power tomorrow. By paying off their constituency—or investing in “security”—instead of delivering reforms, natural resource rents may weaken the accountability of governments to their citizens. Countries that have avoided the resource curse managed to do so because of successive governments with a long-term vision that puts the national interest at the heart of natural resource extraction.

**Manifestations of the resource curse**

Extractable resources are not only blessings—they can also be a curse depending on their governance. Many resource-rich nations experience slow growth, are caught in a resource dependency trap, and struggle to diversify their economies. Resource extraction can create enclave economies and fail to link the resource sector with the rest of the economy. This leads to poor economic performance, debt crises, and high poverty, which can foster authoritarian regimes.

The political aspects of poor management of natural resource rents are associated with weak governance and state intervention. Rents are captured by a small section of the ruling class and their associates, fueling corruption and conflict. Increased natural resource rents can also provide governments with opportunities and incentives to pay off political supporters to stay in power. Since being in power means having access to resource rents, politicians are willing to spend more today to stay in power tomorrow. By paying off their constituency—or investing in “security”—instead of delivering reforms, natural resource rents may weaken the accountability of governments to their citizens. Countries that have avoided the resource curse managed to do so because of successive governments with a long-term vision that puts the national interest at the heart of natural resource extraction.

**Taxonomy of leakages**

Africa has lost more than $1 trillion in illicit flows over the last 50 years, and it will likely still lose about $89 billion annually. The money lost through various leakages is more than the total of foreign direct investments and overseas development assistance in Africa. Mining, oil, and gas remain particularly prone to leakages: of $1.2 trillion accrued from selling oil, gas, and minerals, only 22 percent of the proceeds end up in national treasuries.

Africa also loses significant revenue from its natural resources from tax avoidance. The Tax Justice Network estimated that Africa lost $17.1 billion in 2021 due to tax evasion alone. This amount represented the equivalent of a third of public health budgets in the midst of the COVID-19 pandemic. Similarly, an IMF study shows that tax avoidance by multinational extractive companies costs African countries up to $750 million a year.

**Increasing the contribution of natural capital to green growth transitions**

In many African countries, the governance of natural resources is impaired by the conflicting mandate of various government institutions and departments. Some of these institutions are involved in multiple and often conflicting functions such as policymaking, regulation, licensing, and commercial aspects that need to be separated. This separation would create special authorities
For African countries to make the most of local content policies in natural resources, the policies should be integrated with national industrial and economic policies to facilitate linkages with other sectors of the economy.

Natural capital and sovereign credit risk factors

In addition to the high perceived risks in African markets, the dependence on natural resource wealth in Africa makes it an easy case for the integration of natural capital in credit risk profiles to earn higher scores by rating agencies. African countries should earn a better rating on account of the rich natural capital on the continent. Today, the rich natural capital of the African countries is not reflected in their creditworthiness by rating agencies and thus do not influence their borrowing costs. Instead, credit rating methodologies consistently overemphasize political risk, at about 50 percent of the composite rating.\textsuperscript{101} And while the qualitative factors are judged purely based on the ideology of the credit analysts, their perception of the political institutions in Africa is generally negative.\textsuperscript{102}

Credit ratings assigned by the world’s three dominant credit rating agencies—Moody’s, Standard & Poor’s, and Fitch—determine the government’s access to international capital markets.\textsuperscript{103} Decades ago, sovereign credit risk factors had included the rule of law, control of corruption, government effectiveness, regulatory quality, voice, and accountability, political stability, transparency, and ease of doing business.\textsuperscript{104} However, recently, Environmental, Social, and Governance (ESG) factors have become a part of the risk mitigation process, and credit rating agencies have adapted their methodologies to explicitly include ESG factors, which predominantly reflect long-term issues, in their rating. Indicators reflecting environmental issues have become very relevant in sovereign credit ratings. So, there is scope for the current rating approach to reflect natural capital in sovereign credit rating methodologies.

Many factors related to a country’s long-term sustainability—such as mineral wealth, natural gas, and forest capital—should be mainstreamed in sovereign credit assessments. Integrating natural capital in sovereign credit ratings is still at its nascent stage, with a focus on qualitative assessments, and can be further enhanced with a more quantitative assessment.

Local content, value addition, capacity needs and regional integration

To capture more value and maximize benefits from natural resources, many African countries have local content regulations. Their popularity is based on the premise that once these regulations are in place, countries will be able to foster linkages, create direct and indirect local jobs and capture more revenues across the natural resource value chain. But existing local content policies have not been realistic enough about local capacity. As a result, many countries struggle to engage with foreign investors and fail to adopt frontier technologies from multinational companies.

For African countries to make the most of local content policies in natural resources, the policies should be integrated with national industrial and economic policies to facilitate linkages with other sectors of the economy. African countries must embrace green industrial policies to encourage structural transformations toward opportunities from natural resource booms, energy transitions, and global decarbonization efforts. For example, the projected rise in demand for critical minerals (cobalt, copper, lithium, nickel, graphite, and manganese) and green hydrogen and associated value chains could be integrated into the design of medium to long-term development and industrial policy planning. A Pan-African vision will be needed to coordinate such efforts. Realistic policies would allow strategic partnerships with state-owned enterprises and foreign investors, foster innovation, and create a conducive environment for African-owned firms to emerge and thrive.
Countries should also explore franchising agreements with foreign firms to complement local content policies and requirements, especially where capacity (both technical and financial) is lacking, as in many local firms and state-owned enterprises. The potential for franchising is huge, but many countries have overlooked it. So, negotiations under the AfCFTA should include opportunities offered by franchising to boost continental trade. To maximize the benefits of franchising, countries must identify specific capacity gaps and opt for franchising models that suit their contexts.

Regional integration will help countries to trade and learn from each other to build sustainable battery and electric vehicle value chains. The geographical spread of minerals needed in the battery value chain limits what individual governments can do without regional cooperation. Cobalt-rich Democratic Republic of Congo does not have all the resources needed to add value and develop an effective battery value chain. It will require a range of minerals from other African countries, including copper from Zambia (which also produces cobalt), graphite from Mozambique or Tanzania), lithium from Zimbabwe, and manganese from Madagascar or South Africa. The recent memorandum of understanding among the United States of America, the Democratic Republic of Congo, and Zambia on support for the development of an open and transparent electric vehicle supply chain exemplifies such collaborations and needs to be expanded.

Leveraging AfCFTA to build and support the regional value chain in green development minerals is paramount. As African countries prepare to use their natural resources, especially critical minerals, to attract foreign investment and build up a domestic battery and electric vehicle manufacturing value chain, capacity assessments will be important given the previous low levels of investments in research and development. The capacity to conduct resource assessments and geological surveys across the continent will be paramount to obtaining significant knowledge of available resources. There are great expectations about Africa’s richness of critical minerals, but very little is known about the exact amount of proven reserves of these minerals. Establishing proven reserves can also help countries to strengthen their credit ratings if good governance can be ensured. Capacity will also need to be built in areas such as fiscal and financial modeling and legal aspects to enable regulatory officials to engage well with foreign investors during contract negotiations. Mapping the battery value chain will be needed to guide areas of the value chain where capacity is available or lacking.

As African countries strive to develop their geological, fiscal, and legal capacities, capacity-building efforts will hinge on regional collaboration. Many countries face similar challenges, and it will be crucial to pull resources to co-develop solutions across countries and sub-regions. However, African countries must strive to create an enabling environment to attract foreign and private capital. In some cases, public spending will be required to show responsibility and ownership, hence private public partnerships (PPPs) may offer respite. Many African governments lack the resources to finance natural resources projects, and so will have to rethink and in some cases reform policies to make African state-owned enterprises an attractive destination for foreign and private investments. Policy uncertainty will likely lock out private capital, which will be a missed opportunity for the continent. In building capacity, African-owned firms and African champions must be incentivized to invest in various parts of the natural resource value chain. This will strengthen local content and foster linkages.

Environmental and social safeguards
Almost all countries in Africa have enacted legislation on Environmental Impact Assessment (EIA) for projects, and an increasing number of countries have developed regulations also on Strategic Environmental Assessment (SEA) for sector-wide plans and programs to ensure appropriate environmental and social safeguards. But the performance of these assessments has generally been below expectations. There is great potential to improve practice by improving public participation in the assessment process and by making the assessments publicly available so that they can also contribute to improved accountability. Foreign and African-based companies extracting natural resources must strive to secure social licenses to operate together with the Free Prior Informed Consent of communities likely to be affected by
Subjecting the natural resource licensing process to beneficial ownership standards will help many African countries to tackle illicit financial flows, prevent tax evasion and detect loopholes for corruption, especially in state-owned enterprises (SOEs), which face bigger risks. Beneficial ownership is also one of the requirements of the Fisheries Transparency Initiative standard to discourage African countries from setting up joint ventures or flagging international fishing vessels. With the projected rise in demand for critical minerals, it is envisaged that SOEs will play a bigger role in natural resource extraction. However, many of these companies remain inefficient, more indebted, and less profitable than their privately-owned counterparts. They suffer from political interference, are highly vulnerable to corruption and state capture, and are often poorly governed. Reforming SOEs is important to ensure that African countries secure good resource deals. Strategic areas for reforming African SOEs include corporate governance, transparency, regulation, and de-politicizing their management.

Dealing with illicit financial flows and corruption
The Extractive Industries Transparency Initiative (EITI) process has proven useful in many countries so far; African states must leverage the opportunities offered by EITI to maximize transparency and accountability and reduce corruption risks. In addition, best practices such as open contracting must be adopted. Blockchain technology is also increasingly seen as a tool to minimize corruption and transparency challenges in various natural resources value chain stages. From processing to the sale of natural resources, blockchain technologies can help to track transactions along the value chain. But implementing them in Africa will require a strong grasp of the technology, its strengths, and its weaknesses. It is thus a critical area for capacity building.

Beneficial ownership, championed by EITI, will help provide key information about companies (foreign and state-owned, plus their joint-venture partners and subsidiaries) involved in natural resource extraction. Subjecting the natural resource licensing process to beneficial ownership standards will help many African countries to tackle illicit financial flows, prevent tax evasion and detect loopholes for corruption, especially in state-owned enterprises (SOEs), which face bigger risks. Beneficial ownership is also one of the requirements of the Fisheries Transparency Initiative standard to discourage African countries from setting up joint ventures or flagging international fishing vessels.

CONCLUSION AND POLICY CONSIDERATIONS
Africa is a continent of abundant natural resources. If adequately and sustainably exploited, it can generate revenues and wealth to complement climate finance for adaptation and mitigation and to invest in its green growth efforts. Proper valuation, prudent management, and effective governance of Africa’s natural capital can contribute to increased climate adaptation financing and green growth.

Several policy levers can be deployed to increase returns from natural resources to finance sustainable green growth and climate-resilient economic transformation. For Africa to truly change, its path to natural capital-driven development will need something akin to shock treatment of hyperinflation in the 1980s. This would entail a combination of policy recommendations encompassing:

- Investments in data collection for improved valuation.

- Sovereign wealth funds
Sovereign wealth funds (SWFs) can act as a buffer during economic downturns. The main source to capitalize SWFs is revenue from natural resources. According to data from the International Forum of Sovereign Wealth Funds, there are more than 20 SWFs currently operating in Africa, and plans are under way in various countries to create more.

Existing natural resource-linked SWFs in Africa are expected to help countries manage their resource wealth well. However, if not well governed, a SWF can become a political tool for a few ruling elites and their cronies to benefit through corruption and patronage at the expense of citizens. To be an effective tool, transparency is key to preventing SWFs from elite capture and corruption. Robust oversight measures must be in place, including proper due diligence and regular reporting of key transactions, including deposits, withdrawals, and investments. Auditing and parliamentary oversight are especially crucial.

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- Investments in data collection for improved valuation.
• Implementation of natural capital accounting to keep track of the most important stocks of natural capital.
• Implementation of a range of fiscal instruments for both renewable and non-renewable resources.
• Investments in the capacity, technology, approaches, and tools to benefit from best practices in exploration and licensing initiatives and from international agreements.
• Deep institutional reforms to reduce illicit financial flows and corruption, improve transparency and implement best practices when it comes to governance of natural resources.
• Enhanced credit risk profiles integrating the actual value of natural capital to increase financial volatility for foreign capital mobilization and bond issuance as climate finance in the international market.

Major policy recommendations for the global community

• Honor pledges and commitments in international agreements such as the agreement on a Loss and Damage Fund, the post-2020 Global Biodiversity Framework, and the Paris Climate Agreement. Developed countries need to establish a global fund for nature that incorporates and incentivizes the preservation of nature and sustainable natural resource management. This includes funding the Global Biodiversity Framework and raising its ambition to meet the $200 billion per year financial requirement by 2030.
• Increase collaboration and coordination among stakeholders, including international and regional multilateral organizations, national governments, and the private sector, to invest in sustainable management of Africa’s natural resources. For improved governance of natural resources, there must be deliberate efforts to safeguard biodiversity and ensure that resource extraction is sustainable and equitable, inclusive of communities, indigenous people, and human rights, especially in ecologically sensitive areas where threats to biodiversity and habitat destruction are very high.
• Develop long-term policy options to establish markets for innovative financing mechanisms such as bio-credits—and increase investments in non-recourse (collateralized loan) sustainable bonds, carbon bonds, resource-backed loans, certified adaptation benefits, debt-for-nature swaps, and natural capital funds. It is crucial to consider the nature and origin of the entities financing debt-for-nature swaps, as some may have interests other than development or environmental conservation. These swaps can be done in both voluntary and intergovernmental sectors but should avoid depleting renewable natural resources and promote responsible extraction and use of non-renewable natural resources.
• Promoting a circular economy in nature-sensitive investments could responsibly guide the environmental, social, and governance aspects of natural capital, together with increasing material reuse and recycling in non-renewables (such as green minerals) and renewables (sustainable fishing and forestry management). This can provide significant win-win opportunities for investment in nature-based solutions and the overall protection of biodiversity.
• Multilateral development partners could support African countries by supporting the design of appropriate fiscal instruments and policies to add more value to natural resources to increase beneficiation, revenues, and utilization of natural capital and ecosystem services, invest in human capital, and build capacity in international negotiations. To increase international financing for climate adaptation, mitigation, and nature, MDBs should play a role in de-risking climate and nature-related investments, as in the Adaptation Benefits Mechanism.

Major policy recommendations for Regional Member Countries

• African countries need a strong and sustained commitment to carry out public policy reforms to ensure that natural resource wealth drives economic development. This will trigger actions to resolve myriad other management and governance issues, including internalizing environmental opportunity costs associated with the exploitation of natural resources and investment in natural capital. They should
develop Natural Capital Investment Plans that complement National Biodiversity Action Plans (NBAPs). They should mainstream natural capital in development planning and finance. They should integrate natural capital accounting in national systems of accounts. They should develop specific fiscal instruments to improve renegotiations of royalty rates and windfall taxes to generate more revenue from Africa’s natural resources. They should develop natural resource utilization policies and instruments that link with industrialization and sustainable development planning. They should reform state owned enterprises to promote beneficial ownership and work with global credit rating institutions to feature natural capital more prominently in fairer credit ratings so that they can have better access to international capital markets. And they should formulate strategies that will give them the impetus to process at least 50 percent of their primary commodities into consumable goods by 2030. Implementing these set of recommendations could fast-track development in Africa, acknowledging that no country develops exporting raw materials.

Africa’s natural capital accounts need to be transparent, and open to the public to build investor confidence in the role of natural capital in financing economic growth. This would be a first step toward generating appropriate macroeconomic management and sustainability indicators as part of the regular system of national accounts. This could also help generate geological and geospatial data by investing part of their natural resource rents to support regional exploration, carry out required environmental assessments, and strengthen their negotiation power with investors.

- Re-basing countries’ GDP in light of the positive externalities associated with the carbon sequestration value of forest ecosystems could further expand their economic base, and will align it with the inclusive growth agenda. The benefits of carbon sequestration to overall GDP and as value for the purpose of Credit Rating is an area where Risk Rating Agencies and African scholars could explore more using growing opportunities of big data and innovative models that will incorporate the pricing of these positive externalities as global public goods.

- Africa’s endowments of green development needed in the battery value chain will require regional approaches, cooperation, and capacity building to ensure effective value addition. In addition, producing lithium-ion batteries from its substantial mineral resources will be necessary to decarbonize the supply chains while creating employment. However, such investments need conducive and stable policies and institutions to foster regional collaborations.