Measuring the **Green Wealth** of Nations

Natural Capital and Economic Productivity in Africa

Green
policies

Revalued
GDP metrics

Institutionalized compilation
and policy analyses

With input from
National statistical institutes
Other national sources
Regional data
Global data, including remote sensing

Standard
accounts
+
SEEA
CF/EA
+
Additional
values

Capacity
building

Sustainable
finance

Methodology
development

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Foreword

"... In a world wherein the focus is on greening of the economies, the continued use of GDP, without taking into consideration the huge values of environmental services provided by Africa's vast forests, hugely underestimates the green wealth of Africa.

There is no reason why Africa should be green and poor. Africa should be green and wealthy by proper valuation of its vast contributions to global environmental services that are critical for tackling climate change and preserving biodiversity.

Africa, therefore, cannot be nature rich and cash poor.
When the value of Africa's vast forest and environmental services are properly valued and included in the calculation of its gross domestic product (GDP), the size of its rebased GDP should reflect the net value of these services. In the event that the value of these services is positive, GDP could be far higher than currently estimated. In the same vein, negative values of environmental services will degrade GDP by the magnitude of the loss in environmental services. Thus, Africa's debt to environmentally re-indexed GDP (green wealth) will be much lower depending on whether the value of ecosystem services is higher—and vice versa.

Proper valuation of Africa's wealth therefore offers several benefits. It will help identify more accurately the real wealth of African economies, which is crucial for effective investment and beneficiation efforts. Unveiling the true potential of the continent's wealth can be a game changer by showcasing African countries as viable investment destinations and so provide greater access to financial flows, in part because credit ratings will incorporate the true value of Africa's overall assets, which in turn could improve its risk profile. Enhanced asset values means that African countries can have larger headroom to take on more financing for investment in greening their economies as well as building other forms of productive capital, further expanding their economies and creating opportunities for shared growth.

It is therefore vital that the green wealth of Africa is properly valued and included in recomputing Africa's debt sustainability. By way of comparison, the total value of global green bonds is $2.2 trillion—Africa gets less than 1 percent. Proper valuation of the vast green wealth of Africa and its inclusion in rebasing Africa's GDP could increase Africa's access to the green bond market to raise resources for investment in green technologies and climate-resilient green infrastructure. Thus, proper valuation of Africa's green assets presents an opportunity to change the investment and development landscape of the continent, with implications for global prosperity."

Dr. Akinwumi A. ADESINA,
President of the African Development Group
At the 37th African Union Summit,
Addis Ababa, 16 February 2024

Acknowledgements

Abbreviations

2025 SNA	Global update of the 2008 System of National Accounts
ADF	African Development Fund
AEO	African Economic Outlook
AfDB	African Development Bank Group
AFRISTAT	The Economic and Statistical Observatory of Sub-Saharan Africa
AGB	Above Ground Biomass
ANNI	Adjusted Net National Income
ANS	Adjusted Net Savings
ARIES	Artificial Intelligence for Environment and Sustainability
BGB	Below Ground Biomass
CO_2e	Carbon dioxide equivalent
COMESA	Common Market for Eastern and Southern Africa
CWON	Changing Wealth of Nations
ECCE	Country Economics Department, AfDB
ECMR	Macroeconomic Policy, Forecasting and Research Department, AfDB
ECNR	African Natural Resources Management and Investment Centre, AfDB
ECST	Statistics Department, AfDB
ESG	Environmental, Social, and Governance (framework or indicator)
G-20	Group of Twenty largest economies
GDP	Gross Domestic Product
GNI	Gross National Income
GPS	Global Program on Sustainability (World Bank flagship program on NCA)
HDI	Human Development Index
IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
IUCN	International Union for Conservation of Nature
IWI	Inclusive Wealth Index
$MtCO_2$	Million tonnes of carbon dioxide equivalent
NC4-ADF	Natural Capital for African Development Finance
NCA	Natural Capital Accounting
NCA CoP	Natural Capital Accounting Community of Practice
NCAVES	Natural Capital Accounting and Valuation of Ecosystem Services
NDP	Net Domestic Product
NIS	National Institutes of Statistics
OECD	Organisation for Economic Co-operation and Development
RMC	Regional Member Country
SDG	Sustainable Development Goal
SEEA CF	System of Environmental-Economic Accounting: Central Framework
SEEA EA	System of Environmental-Economic Accounting: Ecosystem Accounts
SNA	System of National Accounts
TEEB	The Economics of Ecosystems and Biodiversity
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNSC	United Nations Statistical Commission
UNSD	United Nations Statistics Division
VCM	Voluntary Carbon Market
WAVES	Wealth Accounting and Valuation of Ecosystem Services (World Bank program)
WWF	World Wide Fund for Nature

Highlights

Rationale for Africa to account for its natural capital and "greening" its GDP

A consensus is growing among the global political leadership and science community that time has come to move beyond gross domestic product (GDP)

The global consensus for metrics "beyond GDP" is epitomized by recent summits and declarations from world leaders. At their summit in Canada in 2018, G7 Heads of State recognized the limitations of economic output alone as a measure of economic success and "acknowledged the importance of monitoring other societal and economic indicators that measure prosperity and well-being." In the same vein, the United Nations (UN) Secretary-General clearly suggests in Our Common Agenda the need to improve national measures of progress "beyond GDP". This led to the commissioning of the report on "Valuing What Counts" as a step towards the Summit of the Future held in September 2024.

The Summit of the Future presented an opportunity for African leaders to advocate for a comprehensive and mandatory valuation of the continent's natural assets and the ecosystem services that these resources provide. The Summit of the Future agreed on the Pact for the Future, which will shape global interaction, focusing on, among other broad areas, sustainable development and financing for development. The Pact for the Future also seeks to reinvigorate the momentum and progress on the "Beyond GDP" framework and urges members to partner in "developing a framework on measures of progress on sustainable development to complement or go beyond GDP."

Africa has compelling reasons to lead global efforts for a comprehensive and mandatory valuation of the continent's natural assets and the ecosystem services they provide

Africa is richly endowed with abundant natural capital, relative to other regions. For instance, the continent is home to the Congo Basin Rain Forest, the world's second-largest rainforest (dubbed the second "lung" of the world) after the Amazon, accounting for 25 percent of global biodiversity. Africa also contributes substantially to the global annual production of key minerals: 80 percent of platinum, 77 percent of cobalt, 51 percent of manganese, 46 percent of diamonds, 39 percent of chromium, and 22 percent of gold. All these natural resources are pivotal for the economies of many African countries, often constituting a major source of export earnings and government revenues.

The reliance of African economies on natural resources is seen through the continued dominance of raw materials in Africa's exports, which largely consist of unprocessed or semi-processed products. And in many instances, the heavy reliance on natural resources has led to unsustainable extraction, both directly and indirectly, through externalities from other economic activities—production and consumption—leading to a decline or degradation of natural capital stock and its value. By continuing to export primary products, whose real prices have been declining, African countries are missing opportunities to add value to their natural resources, making them in fact poorer.

The resulting degradation of natural resources in Africa is already affecting the continent's long-term economic sustainability, environmental health, and social wellbeing. The expansion of agricultural lands, poor agricultural practices, unsustainable logging, and urbanization have all contributed to widespread deforestation and forest degradation; while pollution from agricultural runoff and mining discharges, unsustainable fishing practices and habitat destruction have also contributed to the degradation of both land and aquatic ecosystems. The negative externalities from these activities adversely affect the quality of economies and social wellbeing, and need to be reflected in economic indicators that capture a country's *overall* state of wealth.

Natural capital accounting (NCA) is a first step towards a more comprehensive assessment of a nation's wealth through incorporating natural assets

Proper valuation of and accounting for Africa's rich natural capital can raise the wealth profile, especially of countries rich in natural capital and ecosystem services and hence their creditworthiness, which can in turn unlock substantial financial resources for development. NCA can also be used to reduce a country's risk profile to gain competitive interest rates on debt from international financial markets. Africa can thus

leverage the value of its vast natural capital to catalyze additional funding that targets investments in green infrastructure and other climate-resilient productive assets and the preservation of its natural assets.

However, the failure to capture natural resources and their services, such as carbon sequestration, means that the GDP numbers of African countries endowed with such resources are undervalued. This has negative implications for African countries' credit ratings, which depend on—among other factors, the size of their GDP. Cognizant of this reality, President William Ruto of Kenya, at the 2024 Annual Meetings of the African Development Bank Group (AfDB) in Nairobi, urged the AFDB to take measures that would ensure accurate valuation of African economies, stressing that the undervaluation has disadvantaged African countries in international financial markets.

Countries can update their GDP by accounting for returns and negative externalities from natural capital and ecosystem services, resulting in a revalued, or "greener" GDP measure that better reflects the true value of their economies. Such a measure would form a better basis for policy decisions than the traditional measures reported based on the existing System of National Account (SNA). The System of Environmental-Economic Accounting (SEEA) provides a framework for accommodating contributions from natural capital and ecosystem services in the SNA.

Current conventional GDP and alternative welfare measures present many limitations that call for NCA

The existing SNA is primarily concerned with economic performance and does not capture other dimensions of wellbeing. In particular, the SNA does not directly account for social, environmental, and non-economic factors that affect wellbeing and quality of life, such as social cohesion, political stability, happiness, or environmental (including water) quality. Thus, traditional GDP and other conventional indicators of economic activity and wellbeing present a less comprehensive view of the economy, which could lead decision makers to favor policies with short-term benefits over those focused on long-term economic sustainability.

Concern has also been raised over the use of GDP to assess national development. For instance, UN (2022) states that, while GDP measures the production of goods and services, it does not capture how these goods and services are produced and distributed across society. This raises serious questions about the extent to which GDP can be applied to understand other dimensions of development, such as equality and a just distribution of resources. The international development community increasingly realizes that GDP alone is inadequate to capture sustainable, equitable, and inclusive economic development.

Alternative measures constructed to capture various aspects of sustainability and human wellbeing also have limitations. These measures include the Human Development Index produced by the United Nations Development Programme, the Inclusive Wealth Index of the United Nations Environment Programme, and the World Bank's *Changing Wealth of Nations.* In many ways, these indicators share the weakness of GDP in that they fail to provide a comprehensive scenario of a country's performance and development over time. For instance, the Human Development Index has been criticized for its simplicity and failure to adequately capture the full complexity of human development or the qualitative aspects of development, such as political freedom, security, and environmental sustainability.

It is therefore critical to integrate NCA into the current version of the SNA

Efforts to enhance GDP metrics by integrating flows from natural capital assets and ecosystem services are ongoing, focusing on augmenting the SNA with satellite accounts and sustainability indicators. The 2008 SNA emphasized the integration of economic, environmental, and social aspects in the national accounts, aiming to reflect issues related to sustainability and the environment more comprehensively. This approach is further enhanced through the SEEA, which integrates economic, environmental, and social data into a single coherent framework that allows for holistic policy design and implementation.

Thus, the SEEA Central Framework (SEEA CF) addresses the limitations of conventional SNA by integrating environmental and economic data—crucial for understanding the interaction between ecosystems and economic activities. It covers aspects such as water, energy, and biodiversity to offer a comprehensive view of environmental–economic interrelations. It supports in-depth analyses, helps develop relevant

indicators and trends, and provides insights into natural resource utilization and the environmental impacts of economic activities. The framework focuses primarily on physical flows, environmental assets, and economic activities related to the environment.

The SEEA Ecosystem Accounting (SEEA EA) was developed given SEEA CF limitations, including gaps in how the SEEA CF covers environmental issues, which may differ across countries, or in its ability to properly measure the benefits of some natural resources such as ecosystem services. The SEEA EA extends the SEEA CF by broadening the environmental-economic accounting horizon to encompass ecosystem services and conditions. It delves into specific resource realms, covers all ecosystem types, and links ecological data with economic and human activities. The SEEA EA aligns with standard economic accounting by using exchange values for monetary assessments, aiding in comparisons with traditional economic data.

Despite making great strides in environmental-economic accounting, the SEEA EA and its various thematic extensions have weaknesses. For instance, its measurement scope does not cover all ecosystem interactions yet, nor does it fully acknowledge the intrinsic value of ecosystems or the full spectrum of humans' cultural and spiritual connections with nature. The economic valuation of ecosystems may not reflect their broader social benefits, and compiling the associated monetary accounts faces challenges given the significant data and methodological requirements. The focus is therefore on developing highly relevant accounts for decision making with advanced data and estimation techniques.

The 2025 System of National Accounts (2025 SNA), currently being developed under the auspices of the United Nations Statistical Commission, represents a step-change in national accounts compilation as it provides a framework for capturing and understanding the interactions between economic activities and the environment. A notable extension to the 2008 SNA by the 2025 SNA is the enhanced recognition and valuation of economic assets and activities, which helps to improve the usefulness of the national accounts for addressing issues relating to sustainable development. For instance, under the 2025 SNA, renewable energy resources are recognised as economic assets while the degradation of natural resources is recorded as cost of production.

Additionally, the proposed change in recording natural resource depletion as a production cost is expected to notably impact net domestic product in resource-rich countries.

Examples of policy uses of natural capital accounting

With the support of the international community, several countries in Africa have launched an NCA initiative to inform government policies

Several African countries have launched an NCA initiative, leveraging on the support from the international community. For instance, Ethiopia, a country largely dependent on agriculture , has benefited from World Bank support. Its agricultural sector has continued to record growth rates above 10 percent a year, relying heavily on natural resources, principally land and water. The sector contributes 42 percent of the country's GDP and an estimated 90 percent of the country's exports. However, demographic and climate shocks are contributing to land degradation, costing an estimated 2–6.75 percent of agricultural GDP and affecting about 20 percent of the total population.

The initial steps of the initiative included establishing a steering committee for NCA and building an Investment Prioritization Tool, led by the Ministry of Planning and Development of Ethiopia and the cross-Ministerial Technical Working Group for NCA, with support from the World Bank. Other milestones included five trainings on NCA, SEEA, the use of the Investment Prioritization Tool, data and institutional assessment, and a pathway for institutionalizing NCA and for developing a preliminary land cover classification and a draft land account system.

Once fully implemented, Ethiopia's NCA initiative is envisaged to inform climate-friendly policies. These include the Ethiopia Strategic Investment Framework for Sustainable Land Management, the 10-year Development Plan, the sustainable land management framework, the climate action through landscape management program, and payment for ecosystem services policies and programs.

In Zambia, a country with extensive forest cover, which is vital for economic and ecological wellbeing, international support has been provided for developing comprehensive forest and land accounts to address the gaps in natural resource data. Forests in Zambia

are estimated to provide over 1 million jobs and are a supplemental source of livelihood for rural communities, which depend on natural resources. Yet, these ecosystem services remain largely unaccounted for, undervaluing forests' contribution to the national economy and, consequently, leading to suboptimal investment in forest conservation. Zambia's GDP adjusted for the size of the value of these negative externalities could therefore be much lower than the conventional GDP estimate suggests. The corollary is that optimal investment in the conservation of Zambia's forests and in the extraction and value addition to its minerals would significantly increase the value and contribution of natural capital to the economy, providing much-needed headroom for the country to address its current debt challenges while allowing it to regain "fiscal fitness" and to mobilize additional resources to finance its development agenda.

NCA has informed Zambia's national policy on climate change and Vision 2030. Other policy impacts include informing the Apiary National Strategy (involving honey and wax) under the Ministry of Lands and Natural Resources and including a line item for Forest and Tourism Accounts in the 2021 National Budget. These accounts were also used to develop many of the indicators for the Voluntary National Reporting on SDGs, which were presented at the High-Level Political Forum in New York in July 2023.

NCA has also proven useful in Uganda in managing the country's diverse ecosystems, including forests, wetlands, and savannas. Uganda is one of few countries in Africa that has published a full set of ecosystem accounts. Through the Uganda Bureau of Statistics, it launched the National Plan for Advancing Environmental Economic Accounting in October 2019. The plan is guiding the development of a set of natural capital accounts and the integration of wealth accounting into the nation's macroeconomic data. Two of these natural capital accounts, for land and water, were launched in November 2019, and wood asset and forest resources accounts were launched in November 2020.

These efforts have shaped the formulation of development policy in Uganda. For instance, the Wealth Accounting and Valuation of Ecosystem Services (WAVES) supported by the World bank and Global Program on Sustainability (GPS) have contributed to Uganda's National Development Plan III finalized in 2020, and

the planning for post-COVID-19 recovery. The ecosystem accounts have also produced key changes, such as a ban on cutting *Prunus africana,* also known as African cherry, and a quota on its bark exports. In Uganda, *Prunus africana* is recognized for its economic and medicinal value and its demand has surged, locally and internationally, leading to overharvesting and heavy depletion of its wild population.

The three country examples above on the use of NCA show the potential for leveraging natural capital to inform green policies and the broader development agenda in Africa. Thus, closing data gaps in natural capital and using the information can greatly improve Africa's understanding of the real value of its natural wealth.

The current wealth of natural capital in Africa

Africa's natural capital was estimated at $6.2 trillion in 2018, a potential understatement given the failure to account for recent mineral and other extractive resource discoveries, as well as ecosystem services

The endowment of inclusive wealth shows notable variations at national level, and the nature of the assets is also diverse among countries. Inclusive wealth in Africa is concentrated in only a few countries, while many have low levels of endowments. Changes in large economies' wealth have been dominated by growth in human and renewable natural capital, with human capital accounting for a much larger share. South Africa has recorded the highest increase in inclusive wealth, at more than $4.5 trillion in 1992–2019, largely driven by substantial increases in human capital. In Egypt, Kenya, and Tunisia, too, growth in inclusive capital has been almost entirely due to growth in human capital.

Other countries, such as the Democratic Republic of Congo, Gabon, and South Africa, also recorded substantial growth in renewable natural capital. Common among all African economies is the limited expansion of produced capital, which reflects low value addition and beneficiation to the continent's natural assets. Many African countries are thus highly dependent on natural capital relative to other regions of the world, with fossil fuels, minerals, and agricultural products common features of many Africa countries.

The value of Africa's natural capital has been declining in absolute terms over the last three decades, while that of human capital has been increasing

The total inclusive wealth of African countries was $500 billion in 2019, comprising 54 percent human capital, up from $419 billion in 1992, for a 27 percent increase. In 1992–2019, renewable natural capital declined by 24 percent from $229 billion to $175 billion, while the value of nonrenewable natural assets decreased by 37 percent from $72 billion to $45 billion. African renewable and nonrenewable natural capital therefore decreased by an annual average of 0.8 percent and 1.3 percent, respectively, during the period.

While all the other regions recorded substantial per capita growth in at least some land assets, in Africa the reverse was true. Even if some of the land assets—forest timber, forest ecosystem services, protected areas, cropland or pastureland—may have grown in absolute value, the increase was insufficient to compensate for the average growth in Africa's population. For instance, the value of crop land per capita contracted by more than half while forest timber and forest ecosystem services per capita declined by around 40 percent. The main causes of this sharp drop are loss of forest assets and value of croplands through negative externalities of agriculture and other economic activities such as mining.

Research findings suggest that an increase in the value of natural capital lowers borrowing costs. In particular, growth in renewable resources decreases borrowing costs for B-rated countries. This is especially relevant for many African countries that possess huge reserves of renewable assets but face high borrowing costs, exacerbated by the effects of the multiple shocks that have weakened their currencies against the US dollar. Thus, concerns raised about the methodology used by major credit rating agencies in assessing sovereign risk of African countries are valid. The methodology ignores the importance of Africa's total wealth endowment and instead focuses on conventional measures of economic performance, such as GDP growth, which has a narrow coverage. It is therefore important that the international community provides for mandatory valuation of natural capital and for incorporation of this value in national income measures, to help bolster countries' risk profile and improve their credit ratings.

Accounting for the value of carbon sequestrated by African forests could help in boosting forest preservation investments, but will require addressing the challenges in estimating stocks and flows of the associated ecosystem services

The latest available global data on CO_2 sequestration shows that, in 2018, Africa accounted for approximately 26 percent of all carbon sequestration in forests worldwide. This is a substantial contribution, especially given the continent's low share—estimated at about 4 percent—of global fossil fuel emissions. Yet, this "global public service" remains largely unaccounted for, as the ecosystem services, including carbon sequestration, provided by natural resources such as forests are not captured by standard measures of economic activity such as GDP. For instance, the estimated value of climate service of the Congo Basin forest is over $30 billion, net of deforestation, while official development assistance for forests in Africa remains low, at an average of $0.17 billion. Consequently, there is underinvestment in efforts to preserve the vast forests, contributing to the observed high rates of deforestation and forest degradation and/or suboptimal harvesting of forestry products.

The increasing wedge between the very low prices of Voluntary Carbon Market (VCM) offsets and the far higher prices in compliance markets such as the European Union Emissions Trading System (EU ETS) has raised concerns in Africa. This is why the AfDB launched the Africa Carbon Markets Initiative at COP 27 in Sharm el-Sheikh in December 2022. According to the initiative, the potential for African carbon credits is estimated at about 2,400 $MtCO_2$ in 2030, with a value of up to $50 billion.

Still, estimating stocks and flows of carbon retention presents several challenges. These include quantifying carbon stocks, what to consider, and what to exclude. In the forest sector for instance, there is ongoing debate of the type, nature, and density of forests to include, and quantifying carbon sequestrated by forests. The data compiled using the Artificial Intelligence for Environment and Sustainability (ARIES) model to produce carbon stock maps for each year in 2001–2020 show that the Democratic Republic of Congo—home to the larger part of the Congo Basin forest—accounts for more than 20 billion tonnes of carbon in above ground biomass, or 41 percent of Africa's total. (ARIES is an integrated, open-source modelling

platform specifically designed to facilitate ecosystem accounts.) Other countries—Cameroon, Central African Republic, Gabon, Republic of Congo, and Angola—together account for about 73 percent of the carbon stock in Africa.

The value of carbon capture would be higher under rules-based markets such as the EU ETS than under VCM arrangements. Using the EU ETS price could yield a net carbon capture value of about $20 billion in the Democratic Republic of Congo alone, and around $8 billion in the Central African Republic—more than three times its GDP in 2022. The Congo Basin forest, with an estimated gross carbon removal of 1.1 gigatons, would have an annual sequestration value as high as $77 billion under the EU ETS price, versus $5.5 billion based on the VCM price. Other countries with a relatively high proportion of net carbon flux to GDP are Guinea-Bissau at 35 percent, Republic of Congo at 31 percent, Democratic Republic of Congo at 30 percent, and Gabon at 22 percent.

Despite some methodological weaknesses, preliminary estimates for the value of carbon sequestration highlight the potential change in African countries' GDP if natural capital were to be fully accounted for. Based on preliminary estimates and assumptions, Africa's nominal GDP in 2022 could have increased by $66.1 billion when adjusted for carbon sequestration, representing a potential expansion of about 2.2 percent (see table 3.1 in chapter 3). The Congo Basin countries—Cameroon, Central African Republic, Democratic Republic of Congo, Republic of Congo, Equatorial Guinea, and Gabon—accounted for 63.7 percent of the estimated increase in sequestration-adjusted GDP.

This demonstration effect is expected to trigger renewed global commitment towards NCA and provide the required impetus for African countries to sustain their efforts at developing action plans for revaluating their GDP estimates. These moves will not only ensure that African countries recognize the economic value of their natural resources—and so incorporate these values into national economic planning —but will also attract international funding for and investment in the mandatory valuation of ecosystem services.

The anticipated potential increase in African countries' GDP from carbon sequestration provides an opportunity for African leaders to lead the continent's advocacy for implementing mandatory requirements for nations to adopt policies for greening their GDP. They should consider introducing and enforcing a mandatory update of methodologies for measuring the wealth of countries to include their green wealth. This approach will ensure that Africa leverages its natural capital to expand the size of its economy, and improve its risk profile to mobilize more resources from international capital markets for financing its structural transformation. The proper valuation of natural capital and associated ecosystem services needs to attract investment in NCA beneficiation and conservation. The estimates in this policy paper represent the AfDB's initial effort to highlight the importance of proper valuation and beneficiation.

Natural Capital Accounting in Africa: Commitments and interventions

Political commitments to NCA in Africa have been ongoing for at least two decades, seeing several interventions implemented

The political commitment to the SEEA in Africa began with the 2012 Gaborone Declaration for Sustainability in Africa. This was a commitment by 10 African countries—Botswana, Gabon, Ghana, Kenya, Liberia, Mozambique, Namibia, Rwanda, South Africa, and Tanzania—to "integrate the value of nature **into their national policies and programs**, recognizing that nature is needed for economic growth and sustainability." In March 2015, the Gaborone Declaration was endorsed as the implementation vehicle for the African Ministerial Conference on the Environment's Regional Flagship Program on Africa's partnership for the Green Economy. The Nairobi Declaration on Climate Change and Call to Action made at the inaugural Africa Climate Summit in September 2023 is another continental-level commitment to "green GDP."

Several interventions have been implemented to support the rollout of the SEEA, such as WAVES, launched in 2010, and the Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES) program, in 2017. Other initiatives include the Mapping and Assessment of Ecosystems and their Services and the Integrated System for Natural Capital and Ecosystem Services Accounting in EU territory. Other platforms to promote NCA in Africa include the Natural Capital Accounting Community of Practice in Africa (Africa NCA CoP), established on 1 July 2020.

The AfDB, alongside the Green Growth Knowledge Partnership, the World Wide Fund for Nature, and Economics for Nature launched the Natural Capital for African Development Finance (NC4-ADF) initiative in 2020. The initiative sought to lay the foundation for mainstreaming natural capital in African development finance, covering AfDB operations as well as those of peer multilateral development banks. The objectives of NC4-ADF are to mainstream natural capital in the operations of the AfDB and in the processes of AfDB's regional member countries, to maintain Africa's natural capital, and to promote its sustainable use for the benefit of current and future generations.

Despite commitments and interventions, Africa is still lagging other regions in implementing the SEEA

The 2023 global assessment of SEEA implementation reveals that Africa has the lowest share of countries implementing the SEEA relative to other regions. Only 38 percent (16 countries out of 42 responding) of African countries were implementing the SEEA, compared with 93 percent in Europe and North America, 60 percent in Western Asia, and 57 percent in Central, Eastern, Southern, and South-Eastern Asia. Out of 16 countries implementing the SEEA, 8 are still in stage I of implementation (compilation of accounts), 3 in stage II (dissemination of accounts), and 5 in stage III (regular compilation and dissemination). Still, scope remains for increasing momentum as more African countries have indicated plans to implement the SEEA.

Several African nations have already established institutional frameworks enabling them to create environmental accounts. These include South Africa (the only African country that is a member of NCAVES), Botswana, Egypt, Ethiopia, Madagascar, Morocco, Rwanda, Uganda, and Zambia—all members of the World Bank's WAVES, WAVES Plus, or GPS programs.

In addition, there are disparities between African countries on the degree of implementation of the SNA. While 38 out of 54 (70 percent) African countries are using the 2008 SNA, 13 (24 percent) compile their national accounts based on the outdated 1993 SNA. Other countries, such as Libya and South Sudan, still use an even older, and abandoned system based on the 1968 SNA. Limitations in fully updating SNA implementation to the latest available version make efforts to introduce the SEEA more difficult, and the resulting metrics less useful,

credible, and comparable across countries. Further, implementing the 2025 SNA will require countries to make the necessary efforts and investments in building capacity to integrate the two accounts from the previous SNAs, and the SEEA to have integrated national accounts with the natural capital dimension.

Most African countries do not meet the five-year periodicity recommended in the 2008 SNA to update the GDP base year so as to reflect dynamic changes in their economies' structure

An AfDB survey in June 2023 showed that only four countries are compliant with the internationally recommended five years for rebasing and updating their GDP: Kenya, Rwanda, South Africa, and Uganda. Thirty-eight countries use a base year 5–15 years old while 11 countries use a base year that is more than 15 years old. Efforts towards GDP rebasing in Africa are often hampered by lack of technical capacity and the high cost of undertaking the requisite surveys.

The reliability of current GDP estimates in Africa is thus hampered by the challenges of methodology adopted and base year used. This has significant implications for national, continental, and global development agendas, such as: (i) underestimation of GDP numbers as revealed by the AfDB survey that showed that GDP rebasing increases GDP numbers on average by 15 percent (ii) sectoral misrepresentation in published figures, which creates incorrect assessments and forecasts of economic performance, misguided investment decisions, a wrong policy focus, and suboptimal resource allocation; and (iii) weakened international perception and credibility, as failure to regularly rebase raises concerns about the overall quality and reliability of a country's statistical system, which in turn could affect global economic rankings.

An agenda for green national accounts and policies in Africa

A concerted action agenda is warranted to fully include the values of natural capital and ecosystem services in the metrics used for policy analysis and strategic decisions

Many lessons can be learned from previous NCA interventions. For instance, continued high-level support for developing and using NCA has proven essential for securing NCA's mandate and for opening up the most strategic entry points for NCA integration. Country

programs have been most successful when they have combined evidence-based analysis to support decisions with longer-term development of NCA. Further, establishing a national steering committee of NCA producers, users, and quality assurers, supported by technical working groups, can help smooth the path to developing, using, and embedding NCA in national policy frameworks.

The proposed concerted action agenda for NCA calls for a multipronged approach. Gauging the high-level commitment and ambitions in each country is the starting point for any policy intervention. The next step is to assess the current level of adoption and identify gaps in institutional, legal, and policy frameworks, in capacities, and in data availability. There is also a need to support the establishment or strengthening of dedicated NCA units in national statistical offices, and in relevant ministries such as ministries of finance, environment, and climate change and green economy.

Further, it is essential to encourage integration of NCA findings into national development plans, sectoral policies, and strategies to ensure sustainable use of natural resources and economic planning that considers the value of ecosystems. Successful policy integration requires involvement of more stakeholders and main users of the policies, such as the ministries just mentioned, and not just statistics bureaus, for instance. Dedicated analytical teams could also collaborate with policymakers and public bureaucrats to formulate new—or revise existing—policies, while mechanisms should be established for monitoring and evaluation of major interventions, particularly their impacts on ecosystem services.

Regional coordination and support will also be needed for accelerated NCA implementation in Africa. Many African countries already rely on international support for implementing the SEEA. A 2023 global assessment by the United Nations Statistics Division reports that 25 African countries received technical assistance for implementing NCA-related activities. This number is expected to increase rapidly because 23 of 27 currently non-implementing countries are planning implementation, which will require regional coordination of international support to avoid duplication of efforts. A regional facility could also be considered to convene regional workshops, conferences, and study tours to promote experience and knowledge sharing and mutual peer learning among African countries.

The expansion of the Africa NCA CoP will also be critical. It can be leveraged to ensure sustained implementation of NCA across the continent. It is also an ideal vehicle to enable dialogue between stakeholders that need to be involved in implementation, such as government agencies, civil society, and businesses. This will require enhanced operational capacity of the Africa NCA CoP through funding, technical support, and leadership development, with the AfDB as the preferred host. The development of a knowledge management platform will also be necessary to facilitate the exchange of information and experiences, and the sharing of resources among Africa NCA CoP members, while training programs and technical assistance will ensure successful SEEA implementation.

There is still a great need for further NCA methodology development, to improve the valuation of African ecosystem services

Carbon retention and the multiple aspects of biodiversity are among the more important ecosystem services for policies—yet challenging to value for African countries. Of particular importance is the proper valuation of fossil fuel reserves (and the social cost of carbon if developed) and carbon sequestration opportunities, such as forests, peatlands, and agricultural systems that sequester carbon. Ecosystem services valuation for Africa can be jump-started with a combination of remote sensing and artificial intelligence, such as ARIES.

There are expectations that an enhanced NCA can improve credit ratings of African economies rich in natural resources. The AfDB has called for a two-pronged approach for African countries: the current credit rating approach should reflect natural capital in sovereign credit rating methodologies, and should support regional member countries in enhancing credit risk profiles by integrating the true value of their natural capital.

Robust methodologies for data collection, management, and analysis are thus needed to support NCA. These include establishing standardized protocols for data gathering for natural capital assets and flows to ensure comparability between countries, developing databases to store and manage the data, and utilizing information technology tools to analyze and disseminate findings. Addressing the current glaring gaps in data availability and quality is especially important for countries with limited resources,

particularly human capital. The proposed methodologies must, however, be adaptable to the diverse contexts of African countries, recognizing the varying scales—national, regional, local—and the complexity of natural capital assets.

The successful implementation of NCA programs across the continent will require financial and technical support. There is a need to develop a comprehensive strategy for financing NCA initiatives that can cover both the common costs (that can be considered a public good for the continent) and the specific costs related to implementation in African countries. Based on past experience, it will likely be quite costly both to push the boundaries of valuation of ecosystem services and to mainstream more ambitious accounting in African countries.

The first step in the financing strategy will be to cost implementation of NCA initiatives. After establishing the target funding, the financing strategy will entail identifying sources of international support and of domestic funding; innovative financing mechanisms; and a blend of African Development Fund (ADF), non-ADF, Bank Trust Funds, and cofinancing from domestic and donor sources. Given the potentially high cost of the initiatives, it will be essential to build partnerships with international organizations already involved in supporting NCA implementation, as well as with financial institutions and the private sector to secure sustainable funding and support for NCA. The financing strategy should also seek opportunities in related markets, such as carbon markets and biodiversity financing.

The AfDB is well positioned to play a pivotal role in mobilizing African countries to embrace measurement of natural capital and in integrating these values into GDP estimates for GDP

With its strong mandate, expertise, and convening power, the AfDB is particularly well placed to heed the call for proper valuation

of ecosystem services. The AfDB would be the natural institutional leader in Africa for developing improved economic indicators and designing sustainable, green policies. It could help mobilize resources for pilot projects in selected African countries that demonstrate the practical application and benefits of fully integrating natural capital assets into their national accounts. By leveraging its virtual learning platform, supported by the Virtual Academy on Natural Capital, the AfDB can help upgrade skills among public bureaucrats in related ministries and agencies across the continent through targeted capacity building.

As Africa's premier development financial institution, the AfDB is committed to working with its regional member countries and partners to overcome barriers to valuing Africa's natural capital. With a strong footprint across 41 country or liaison offices and six regional hubs, it is equipped to provide support through policy dialogue, analytical work, and knowledge sharing. The AfDB supports country-level initiatives to value nature, and this study demonstrates its commitment to leveraging evidence-based analytical work to inform the design of macroeconomic and green transition policies. Through initiatives like the NC4-ADF initiative and co-leadership of the steering committee of the Africa NCA CoP, the AfDB has further reinforced its strong leadership in, and commitment to, integrating natural capital considerations into development finance. Its efforts include supporting programs such as the Botswana Sustainable Environmental Diagnostic, the Natural Capital Accounting Program in Ethiopia, and the Environmental Sustainability Compliance Programme in South Africa. By spearheading these initiatives and fostering collaboration, the AfDB aims to catalyze the transformation of Africa's natural capital into financial capital—to drive sustainable development and economic growth, with the ultimate goal of achieving annual GDP growth rates of 7 percent and more.

Executive summary

This policy paper outlines the critical importance of valuing African natural capital within and beyond the current framework of the System of National Accounts (SNA) so as to forge green transition policies and engender a more encompassing measure of the continent's green wealth beyond conventional gross domestic product (GDP). Its analysis underscores the premise that a more accurate valuation of Africa's natural resources and ecosystem services, including global public goods that the continent provides to the world, could potentially increase Africa's GDP, and particularly the GDP of some African countries with a net value for these services, and thereby enhance fiscal headroom and debt sustainability, improve credit ratings, and attract investments, especially in green projects and other areas of climate adaptation and mitigation. For countries with negative net values of green wealth, the converse will be the case, providing an important signal for improved natural resource governance policy. Thus, the size of African economies could either increase or decrease, depending on the net value of their natural capital and ecosystem services. Given Africa's abundant natural capital, the valuation of these forms of capital is likely to be positive in net terms and hence the environmentally adjusted GDP will be higher.

But higher GDP alone will not solve Africa's structural problems, including endemic poverty. The continent's high poverty rate is partly due to policy failures to fully capture the economic value of its rich natural capital, which includes significant global shares of precious minerals and biodiversity. Most policies are not aligned with sustainable resource utilization and management, and have thus excluded large segments of Africa's population from enjoying the full benefits of the continent's total wealth.

The SNA standard, first released in 1953 under the auspices of the United Nations Statistical Commission (UNSC), was not developed to be a welfare measure, but as a systematic metric to gauge marketed economic activities. The limitations of the traditional GDP measure have led to a series of initiatives to capture values that it misses. These initiatives include the Human Development Index produced by the United Nations Development Programme (UNDP), the Inclusive Wealth Index of the United Nations Environment Programme (UNEP), the World Bank's Changing Wealth of Nations (CWON), and The Economics of Ecosystems and Biodiversity (TEEB). The "Beyond GDP" discourse has also been addressed by the UN Secretary-General and is a key feature at the UN "Summit of the Future" in September 2024.

The UNSC has over the last few decades taken great strides to include the value of natural resources and ecosystem services in the SNA. Initially, the environment was dealt with in satellite accounts, then major resources were included in the System of Environmental-Economic Accounting's Central Framework. This work has now advanced to also include accounting of ecosystem services such as the value of carbon sequestration. Many of these advances are part of the 2025 System of National Accounts that is about to be launched. Yet in Africa, several countries are behind—while the majority use the 2008 SNA, some are far behind, and still use the 1993 SNA framework for estimating their GDP.

Natural capital accounting (NCA) already has a history of political commitments and international interventions in Africa. The 2012 Gaborone Declaration for Sustainability in Africa, which called for the integration of the value of nature into national policies and programs, recognized that nature is key for economic growth and sustainability. Implementation of NCA has also been supported by programs such as the Wealth Accounting and Valuation of Ecosystem Services (WAVES) program and its successor the Global Program on Sustainability, both funded and implemented by the World Bank. This has created relevant experiences in many countries and has nurtured a vibrant Africa Natural Capital Accounting Community of Practice (Africa NCA CoP). This has been supported by the World Bank. The end of the World Bank's leadership in supporting the NCA CoP in 2024 presents an opportunity for the African Development Bank (AfDB), with its convening power in the continent, to leverage its experience in hosting similar activities and increase its commitment to this program. Under the leadership of the AfDB, the NCA CoP could advance the work on measuring the green wealth of nations and ensure the uptake of green policies in African countries.

The political commitment initiated in Gaborone was reiterated in September 2023, in Section 59 of the African Leaders' Nairobi Declaration on Climate Change and Call to Action: "We call for revaluation of the Gross Domestic Product of Africa through the proper valuation of its abundant natural capital and ecosystem

services including but not limited to its vast forests that sequester carbon to unlock new sources of wealth for Africa. This will entail the use of natural resource accounting and development of national accounting standards."[1]

There are by now many examples of policy uses of NCA in Africa. This paper shows how NCA has been used to inform policies in countries like Ethiopia, Uganda, and Zambia, emphasizing the significant contributions of natural resources to their economies and the importance of incorporating these values into national planning for sustainable development. These examples, however, also show that NCA is not a silver bullet, but it provides highly useful information that could help countries to better manage their resources and make the most of them for stronger growth and enhanced sustainable development.

Flow measures, such as GDP, must have a foundation in properly measured and inclusive stock measures (assets). Such wealth accounts have been developed both by UNEP (Inclusive Wealth) and the World Bank's CWON. These initiatives have underscored Africa's heavy reliance on its natural capital relative to other continents. Though while the value of human capital has been increasing over the last 30 years, from $41 billion to $215 billion, that of natural capital has been declining in absolute terms.[2] In 2019, the total inclusive wealth of African countries was $500 billion, comprising 54 percent human capital. The renewable capital declined in value from $229 billion in 1992 to $175 billion in 2019, a fall of 24 percent, while nonrenewable capital went down from $72 billion in 1992 to $45 billion in 2019.[3] In per capita terms, the reduction in natural capital is even higher. Africa is the only region where the value of all land assets declined in per capita terms in 1995–2018. For instance, the value of cropland per capita in Africa (except North Africa) contracted by more than 50 percent while that of forest timber and forest ecosystem services declined by around 40 percent.[4]

The decline in natural capital is concerning, because of the empirical evidence suggesting that increased natural capital decreases borrowing costs. In particular, growth in renewable resources decreases borrowing costs for B-rated countries.[5] This evidence is relevant for many African countries that face high borrowing costs in international capital markets, partly due to unfair high-risk perception and undervaluation of their economies. According to a study from the International Monetary Fund, the average yield on African sovereign Eurobonds in 2021 was above 5 percent, compared with around 1 percent for outstanding sovereign debt in advanced economies.[6] Wealth accounting can be instrumental in improving the quality of the environmental part of environmental, social, and governance (ESG) scores, and this could bolster credit terms in international capital markets where ESG risks have become important in assessing a country's risk profile. For instance, research has shown that country-level ESG risk and average sovereign credit ratings exhibit a strong positive correlation.[7] Given the growing importance of ESG scores, fulfilling the potential of Africa's natural capital will require that wealth accounting is carried out transparently, and preferably annually, without too much of a time lag before publication of findings.[8]

Sequestration and retention of carbon are two important global public ecosystem services that Africa provides to the world. Almost 70 percent of the African carbon storage is concentrated in four of the six countries in the Congo Basin: Central African Republic, Democratic Republic of Congo, Republic of Congo, and Gabon. The Congo Basin forest covers a landmass of 298 million hectares and straddles six countries: the above four plus Cameroon and Equatorial Guinea. This is also where most of the annual carbon sequestration occurs.

Despite the development of carbon markets and the possibility of trading in carbon credits in international markets under Article 6 of the Paris Agreement, net carbon sequestration in Africa has decreased dramatically over the last few decades. African countries are, however, mostly active in voluntary carbon markets where prices of carbon credits are far lower than in compliance markets, and this "wedge" between voluntary and compliance markets is widening. In 2017, it was just $3.41 per metric ton of carbon emissions, but in 2021 it was $52.[9] Therefore, if carbon sequestration in Africa was traded in compliance markets with prices as high as in the European Union Emissions Trading System (EU ETS), the continent could generate about $77 billion a year for the Congo Basin, with the Democratic Republic of Congo alone accounting for more than a quarter of this amount ($20 billion). In relation to current GDP, the Central African Republic would see the greatest benefit, as the value of carbon sequestration (valued at EU ETS prices) would be 340 percent higher than its 2022 nominal GDP. In absolute terms, the Democratic Republic of Congo would have the largest increase, of $19 billion, in GDP adjusted for carbon sequestration relative to traditional GDP, while the lowest would be Gabon's $4.6 billion.

Estimates of the value of sequestered carbon developed in this paper present several challenges requiring cautious interpretation, particularly because of the inherent limitations and potential inaccuracies of the chosen approaches. One major weakness is the complexity and variability inherent in natural systems, which makes precise quantification of sequestration difficult. There is therefore the difficulty of objectively quantifying carbon stocks and flows, which involves complex interactions within natural systems and between these systems and human activities. An even greater challenge is the fact that there is not a comprehensive compliance carbon market for Africa that would generate reasonable prices for African carbon offsets at this scale. Despite these weaknesses, the computed estimates for the value of carbon sequestration showcase the potential change in GDP of African countries if natural capital were fully accounted for, based on tested and universally accepted methodologies.

Still, estimates on carbon sequestration and the derived sequestration-adjusted GDP highlight the importance of proper valuation and beneficiation of Africa's natural capital for the continent's development efforts. The AfDB is well positioned to support the agenda of the African Union through the work of the C-15, a committee of 15 African countries[10] constituted to lead the continent's regional and global advocacy for proper valuation of Africa's natural capital and its incorporation in GDP, as well as the adoption and implementation of policies for greening African countries' GDP. A concerted effort is now needed to integrate NCA into Africa's economic and policy frameworks, leading to a rebasing of GDP to include the full value of natural resources and ecosystem services. Improved and increased valuation of Africa's resources and ecosystem services, and the inclusion of these values in key policy and credit considerations, are prerequisites to achieve

sustainable development and green growth in Africa.

The AfDB could leverage on its extensive experience, convening power, and ability to mobilize the resources to operationalize the framework for valuing natural capital and incorporating such values in GDP across the continent. It is therefore important that the AfDB continue to advocate for the adoption of the System of Environmental-Economic Accounting, which provides a standardized framework for integrating environmental data in economic accounts. In addition, national statistical offices require capacity development to enable them to collect data on natural capital assets and analyze it accurately. This approach will ensure that Africa leverages its natural capital to expand the size of its economy, and increase its risk profile to mobilize resources in international capital markets to finance structural transformation.[11] Proper valuation of natural capital and associated ecosystem services will further attract investment in NCA beneficiation and conservation.

This policy paper thus proposes an agenda for fully implementing green national accounts and policies in African countries, outlining an ambitious and comprehensive action plan to mainstream NCA and green policies. The agenda emphasizes (i) the importance of high-level support to ensure a mandate for sustained NCA; (ii) the vital role of strong stakeholder engagement in implementing NCA policies; (iii) that the focus remain on policy relevance and consistency and on the integration of values and policy analyses into decisionmaking processes; and (iv) the importance of continuing to advocate for mandatory inclusion of these key values in GDP. Finally, because the paper sets the foundation for a comprehensive program for the revaluation of GDP in African countries, high-level financial commitment and institutional ownership are needed to ensure full and sustained implementation of the policies and strategies.

1

Rationale for Africa to account for its natural capital and "greening" its GDP

The analytical needs of a resource-rich continent

A consensus is growing among the political leadership and science community that the time has come to move beyond gross domestic product (GDP). At their summit in Canada in 2018,[12] G7 Heads of State recognized that "economic output alone is insufficient for measuring success" and acknowledged "the importance of monitoring other societal and economic indicators that measure prosperity and well-being." The United Nations (UN) Secretary-General also clearly suggested in Our Common Agenda the need to improve national measures of progress beyond GDP, declaring: "I urge Member States and others to already begin implementation of the recent System of Environmental-Economic Accounting (SEEA) Ecosystem Accounting and the system for population and social conditions, and to consider existing complements or alternatives to GDP, such as the Human Development Index, and the inclusive wealth index."[13]

Our Common Agenda provides compelling reasons for the need to supplement the use of GDP, and led to the commissioning of the report "Valuing What Counts" as a step towards the "Summit of the Future," to be held in September 2024.[14] There are numerous suggestions to address the limitations of GDP, under the banner of "Beyond GDP."[15] These have also been motivated by the 2030 Agenda for Sustainable Development, which seeks to address not only economic growth, but also environmental sustainability and aspects of human well-being. According to the UN (2022), there are two paths towards improved metrics "Beyond GDP." The first is to improve existing statistical frameworks, for example through implementing the SEEA. The second is to learn from the successes and criticisms of GDP and identify alternative—existing or new—indicators to supplement the current metrics. The conclusion is that "wellbeing and sustainability are complex multidimensional phenomena that cannot be addressed by a single summary indicator, such as GDP."[16] The UN system therefore proposes a combination of 10 to 20 indicators.[17]

The Summit of the Future thus presents an opportunity for African leaders to advocate for a comprehensive and mandatory valuation of the continent's natural resources and the services that these resources provide. Among the expected key outcomes of the Summit is the Pact for the Future, which will shape future global interaction, focusing on, among other broad areas, sustainable development and financing for development. The Pact will also seek to reinvigorate the momentum and progress on the Beyond GDP framework. In particular, the Pact is expected to call upon members to partner in "developing a framework on measures of progress on sustainable development to complement or go beyond GDP."[18]

A clearer and bolder high-level political commitment for Africa was made in September 2023, in the African Leaders' Nairobi Declaration on Climate Change and Call to Action. Section 59 states: "We call for revaluation of the Gross Domestic Product of Africa through the proper valuation of its abundant natural capital and ecosystem services including but not limited to its vast forests that sequester carbon to unlock new sources of wealth for Africa. This will entail the use of natural resource accounting and development of national accounting standards."[19]

There are fundamental reasons for Africa to lead this process. It is rich in natural capital relative to other regions. For instance, the continent is home to the Congo Basin Rain Forest,[20] the world's second-largest rainforest—the second "lung" of the world—after the Amazon, and accounts for 25 percent of global biodiversity. Africa also contributes greatly to global annual production of key minerals: 80 percent of platinum, 77 percent of cobalt, 51 percent of manganese, 46 percent of diamonds, 39 percent of chromium, and 22 percent of gold.[21] These natural resources are pivotal for the economies of many African countries, often constituting a major source of export earnings and government revenues. Figure 1.1 shows the rents from natural resources including oil, natural gas, minerals, forests, and coal as a share of GDP for each African country in 2021.

Figure 1.1 highlights many African countries' very heavy reliance on natural resources, including Libya (61 percent), Democratic Republic of Congo (39 percent), Republic of Congo (38 percent), Zambia (35 percent), and Angola (30 percent). The dominating natural resources are oil, constituting about 56 percent of Libya's GDP, 34 percent of Republic of Congo's, and 28 percent of Angola's; and minerals, which are more pronounced in the Democratic Republic of Congo (29 percent) of GDP and Zambia (28 percent), and which constitute 16 percent of GDP in Burkina Faso and Mali.

The value and contribution of marine resources are also substantial, especially in the

FIGURE 1.1 Total natural resource rents, 2021 (percent of GDP)
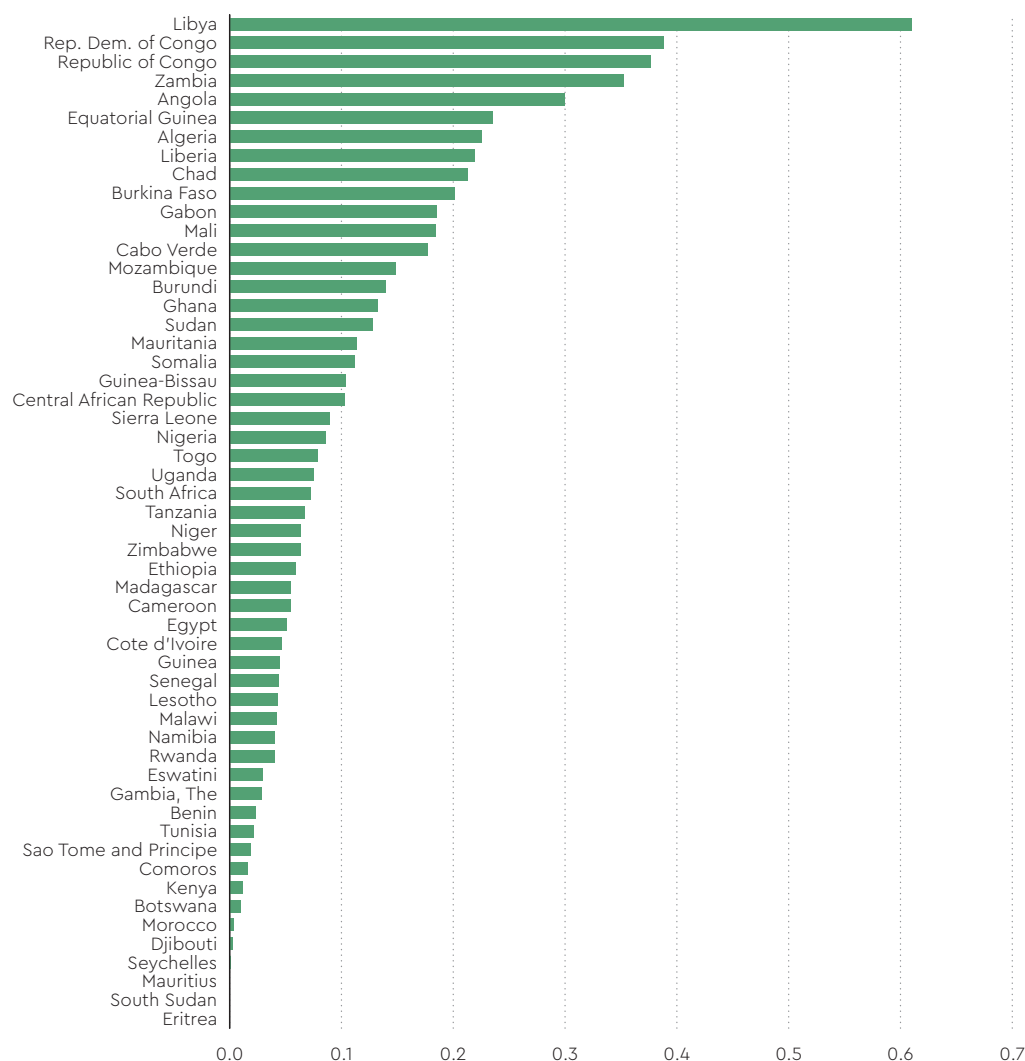
Source: Authors' computations based on data from the World Bank's World Development Indicators.

38 coastal countries in Africa. Marine resources in Madagascar, Namibia, and South Africa, and those around the Gulf of Guinea, contribute greatly not only to the national economy through fisheries, tourism, and ports, but also to food security and biodiversity conservation. In Madagascar, for instance, Cooke et al. (2022) estimate that marine-protected areas contribute close to $200 million annually through provisioning (fisheries) and cultural (tourism) ecosystem services.

Rents from forests are more spread across many countries but are more pronounced in four: Liberia, Burundi, Somalia, and Guinea-Bissau, where the contribution in 2021 ranged from 10 percent to 16.5 percent of GDP. These figures may, however, understate the full contribution of rents from forests, which, besides the usual timber and nontimber products, provide important ecosystem services, including carbon sequestration, which remain largely

unaccounted for. There are also variations across the years. For instance, Burundi's reliance on forests was more than 30 percent for three consecutive years, 2007–2009, but has since declined and stood at 14 percent in 2021. Other countries such as the Democratic Republic of Congo and Liberia also exceeded 20 percent in those same three years. With such heavy reliance on natural resources and associated ecosystem services, quantification and monetization of these assets in Africa and their inclusion in countries' national accounts will ensure more efficient resource utilization. Such information is also essential for designing policies that enable a green transformation and increased wealth in the continent.

The reliance of African economies on natural resources is also seen by the continued dominance of raw materials in Africa's exports.[22] In many cases, the heavy reliance on natural resources has led to unsustainable extraction,

both directly and indirectly through externalities from other economic activities, leading to a decline in or degradation of the natural capital stock, and hence value. Figure 1.2 shows that the majority of Africa's exports still consist of raw materials at their primary level. African countries cannot remain exporters of primary products, whose real prices have been declining over time, making them in fact poorer for the same quantity of exports.

The degradation of natural resources in Africa is already affecting the continent's long-term economic sustainability, environmental health, and social wellbeing. The expansion of agricultural lands, poor agricultural practices, unsustainable logging, and urbanization have all contributed to deforestation and forest degradation, while pollution from agricultural runoff and mining discharges, unsustainable fishing practices, and habitat destruction have contributed to the degradation of both land and aquatic ecosystems. The negative externalities from such activities negatively affect the quality of economies and social wellbeing, and need to be reflected in economic indicators that capture a country's wealth. Or in the words of the Dasgupta Review (2021):

> Many ecosystems, from tropical forests to coral reefs, have already been degraded beyond repair, or are at imminent risk of 'tipping points'. These tipping points could have catastrophic consequences for our economies and wellbeing; and it is costly and difficult, if not impossible, to coax an ecosystem back to health once it has tipped into a new state. Low-income countries, whose economies are more reliant than high income countries on nature's goods and services from within their own borders, stand to lose the most.

Thus, proper inclusion of the value of such degradation could encourage more sustainable management of these resources as governments and societies realize their true value, which reflects the economic cost of such degradation. In addition, accounting for the value of natural assets and ecosystem services such as carbon sequestration of the Congo Basin and other forests provides an incentive for protecting these ecosystems, because their degradation would be reflected as a loss of income or wealth, or as damage to global public goods.

Comprehensive accounting for both natural capital and ecosystem services is therefore essential, particularly for African economies endowed with vast natural assets and where

FIGURE 1.2 Disaggregation of the export sector for African countries (%)
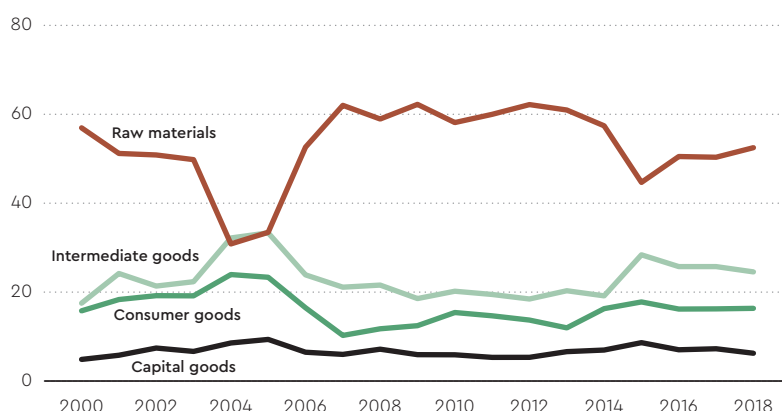
Source: Usman and Landry 2021.

both formal economies and informal livelihoods are still heavily dependent on these resources. National accounts that ignore these values underestimate their capital base and are likely to misdirect policies.

The African Economic Outlook 2023 emphasized that African countries should fully capture the value added of the continent's natural assets to enhance green transformations for more vibrant, inclusive, and sustainable economies.[23] Yet, for the citizens of African countries to fully appreciate the value of sustainable management of such natural assets, they need to see direct benefits accruing to them in terms of job creation and improved livelihoods. The resources generated from valuation and beneficiation of natural assets should therefore be invested in sectors that improve human welfare.

Natural capital accounting (NCA) is a first step towards a more comprehensive assessment of the national wealth by including natural assets. By employing the SEEA, contributions from natural capital and ecosystem services can then be reflected in the System of National Accounts (SNA), which provides metrics such as GDP (see the section on the System of Environmental-Economic Accounting). As countries update their GDP by including returns and negative externalities from natural capital and ecosystem services, a revalued, or "greener," GDP measure will emerge, one that better reflects the true value of African economies. Such a measure would form a better basis for policy decisions than the traditional measures reported in the SNA (figure 1.3).

Accounting for the continent's rich natural capital can raise the wealth profile of resource-rich countries and so their creditworthiness, which in turn can unlock substantial financial resources for development.[24] It can also be used to reduce the risk profile to gain competitive

FIGURE 1.3 Environmental and economic context for natural capital accounting
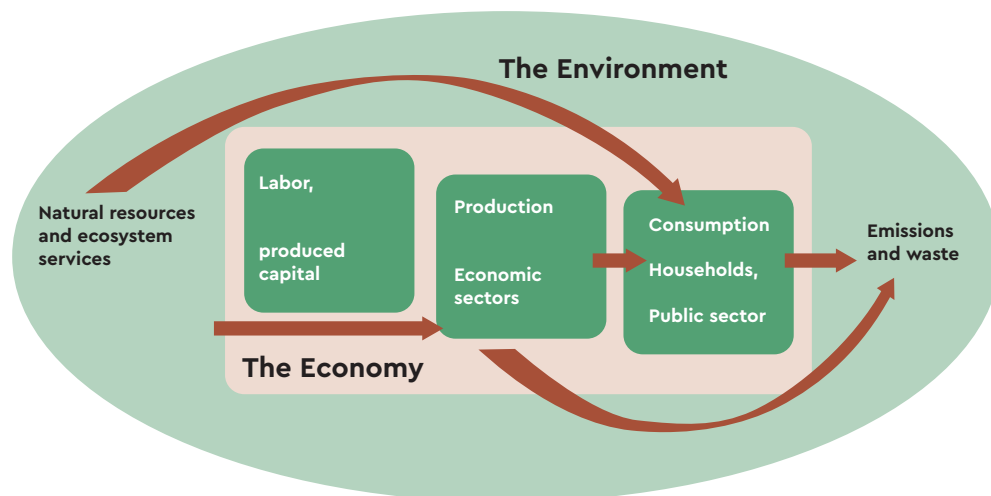
Source: World Bank 2021a, p. 16.

interest rates on debt in international financial markets. Africa can also leverage the value of its vast natural capital to catalyze mobilization of additional funding that targets investments in green infrastructure and other climate-resilient productive assets, as well as the preservation of its natural assets. The failure to capture the vast natural resources and their services, such as carbon sequestration, means that GDP for countries endowed with such resources is undervalued. In contrast, by capturing the value of such assets, many African countries would see the value of their GDP increase, a factor that could also boost their credit rating, a metric that often depends heavily on GDP. It is in this context that President William Ruto of Kenya at the 2024 AfDB Annual Meetings in Nairobi urged the AfDB to take measures that would ensure accurate valuation of African economies, stressing that the undervaluation has disadvantaged African countries in international financial markets.[25]

Limitations of conventional GDP and alternative welfare measures

The SNA is a statistical framework designed to present a full picture of the marketed economic activities in a country's economy. It encompasses accounts that cover the distribution and use of income; financial and nonfinancial assets of an economy; and the ultimate sum of the value of all produced and marketed goods and services—GDP. The first national accounts standard was released in 1953 under the auspices of the United Nations Statistical Commission (UNSC) and consisted of a set of six standard accounts and a set of 12 standard

tables presenting details and alternative classifications of the flows in the economy.[26] Some updates were made in 1968, 1993, and 2008.[27] The SNA serves as a fundamental tool for economic analysis and policymaking, providing a systematic and detailed representation of an economy's performance, structure, and development over time.

The SNA is primarily concerned with economic performance, and does not capture—nor aim to capture—other dimensions of wellbeing. In particular, it does not directly account for social, environmental, and noneconomic factors that affect wellbeing and quality of life, such as social cohesion, political stability, happiness, or environmental (including water) quality. Or as expressed in the headline messages from the Dasgupta Review (2021): "As a measure of economic activity, Gross Domestic Product (GDP) is needed for short-run macroeconomic analysis and management. However, GDP does not account for the depreciation of assets, including the natural environment. As our primary measure of economic success, it therefore encourages us to pursue unsustainable economic growth and development." In short, GDP and other conventional indicators lead decisionmakers to favor policies with short-term benefits over those focused on long-term sustainability.

Concern has also been expressed on the use of GDP to assess national development. The UN (2022) states that, while GDP measures the production of goods and services, it does not capture how these goods and services are produced and distributed across society. This raises questions about the extent to which GDP can be applied to understand other dimensions

of development, such as equality and a just distribution of resources. The international development community holds a consensus that GDP alone is not enough to capture sustainable, just, and inclusive economic development. The "Beyond GDP" discourse has therefore been proposed as a remedy to complement GDP with the aim of changing the focus of policymaking towards such economic development.[28] According to the UN Secretary-General, member states need to move beyond conventional GDP in assessing national progress, including through implementing expanded—or comprehensive—wealth measures.[29]

Alternative measures capture various aspects of sustainability and human wellbeing (see list below). But in many ways, these indicators share the weakness of GDP in that they fail to provide a comprehensive scenario of country performance and development over time. There is therefore a need to find ways to combine those indicators.

UNDP's Human Development Index (HDI) is a composite index that assesses the social and economic development level of countries. It encompasses three core dimensions of human development: (i) life expectancy at birth, which reflects the overall health and longevity of a population; (ii) the level of education, which assesses the access to and quality of education in a country, reflecting the cognitive and social skills available to its population; and (iii) per capita gross national income (GNI) as a proxy for the standard of living and economic wellbeing.[30] The HDI has been criticized for its simplicity and failure to adequately capture the full complexity of human development or the qualitative aspects of development, such as political freedom, security, or environmental sustainability.

The Inclusive Wealth Index (IWI) of the United Nations Environment Programme (UNEP) was developed in response to the "Beyond GDP" movement, with the aim to measure assets that underpin a nation's income flow.[31] A series of "Inclusive Wealth Reports" have been published in 2012, 2014, 2018, and 2023 as a global wealth database of the IWI. The uniqueness of the IWI arises from its stock-based (capital) approach in measuring national wealth, which is a base for the flow of goods and services that are important for the welfare of a nation's people. The approach is contrasted—though complementary to—the flow-based measure of economic performance, that is, GDP, as the IWI measures the stock of capital that makes it possible to produce economic-flow outputs. In addition to produced or manufactured capital, the IWI also measures natural and human capital, including health, education, and renewable and nonrenewable resources. The total sum of each capital value within a nation is its "inclusive wealth," and is based on welfare economic theory. Growth of IWI per capita indicates a sustainable development trajectory.[32]

The IWI suggests that a nation's GDP is not produced from without but depends on the quantities and health of the capital base, notably (i) produced capital such as physical infrastructure; (ii) human capital capturing human health, skills, and education; and (iii) natural capital such as land, forests, water, biodiversity, and ecosystems. The index, by factoring the aspects of underlying productive capital, measures intergenerational wellbeing. The latest Inclusive Wealth Report 2023 assessed the inclusive wealth—produced, human, and natural—for 163 countries over 1992–2018. The report concludes that the exploitation of natural capital is a key driver of global inequality. To ensure their participation in global value chains, market pressures force resource-rich and particularly rural areas of low- and middle-income countries to use and deplete their natural capital much faster than can be supported by their institutional capacity and natural renewal rate. Consequently, underpricing and extreme exploitation of natural capital encourage wealth inequalities in many natural-resource-abundant countries. These inequalities disproportionately impact the poorest.[33]

The World Bank's Changing Wealth of Nations (CWON). The CWON is an initiative by the World Bank (2021c) that measures the wealth of a nation through a comprehensive approach, encompassing a range of assets that contribute to national wealth and the wellbeing of citizens. It goes beyond traditional economic indicators to include natural, human, and produced capital.[34] By accounting for them, the CWON provides a more holistic view of a nation's economic health and sustainability, offering insights into how wealth can be managed for future generations, which is particularly critical for low-income countries, where natural capital makes up nearly half of national wealth.[35]

The Economics of Ecosystems and Biodiversity (TEEB) is an international initiative aimed at drawing attention to the global economic benefits of biodiversity. At the G8+5 Potsdam Meeting of Environment Ministers in 2007, a call was launched for a global analysis of the economic significance of biodiversity, the costs of the loss of biodiversity, and the failure to take protective measures versus the costs of effective

conservation. The TEEB initiative was subsequently launched.[36] It emphasizes the growing costs of biodiversity loss and ecosystem degradation, and the importance of valuing ecosystems and biodiversity to ensure sustainable development. The TEEB provides frameworks for incorporating the value of nature into decision-making across all sectors of society, from governments and businesses to local communities and individuals.

The approach of the TEEB involves: (i) recognizing the wide array of ecosystem services and biodiversity as critical components of the earth's life-support system, which is essential for human wellbeing and economic prosperity; (ii) demonstrating the value of ecosystems and biodiversity through case studies and examples, illustrating how ecosystem services contribute to the economy, how biodiversity loss incurs costs, and how conservation can yield economic benefits; (iii) capturing the values of ecosystem services in decisionmaking processes, including economic tools and policy frameworks that facilitate sustainable use and conservation of natural resources; and (iv) encouraging the integration of natural capital valuation in national accounting systems, business practices, and policymaking to reflect the true value of nature in economic planning and development strategies. The TEEB's work underscores the interdependence of economic health, biodiversity, and ecosystem services, advocating for their preservation not only as an environmental imperative but also a socio-economic necessity.

While all these measures make important contributions to our understanding of welfare and sustainability, and in particular the role of environment and natural resources in achieving societal goals, they are generally only one or two steps from contributing directly to the most important policy metric—GDP. We therefore now look more closely at how natural capital and ecosystem services can be directly included in a "greener" GDP measure that provides a better basis for policy decisions.

Natural capital accounting in the System of National Accounts

Despite the inherent limitations of conventional GDP, it remains the only internationally comparable measure of economic performance. Efforts to enhance GDP metrics by integrating environmental values are therefore ongoing, focusing on augmenting the SNA with satellite accounts and sustainability indicators for economic policymaking. Already, the 2008

SNA emphasized the integration of economic, environmental, and social aspects within the national accounts, aiming to reflect issues related to sustainability and the environment more comprehensively. This is further developed through the SEEA, which extends the economic analysis of the SNA by incorporating environmental data. This section explores key frameworks, beginning with the SEEA initiated in 2012 and its subsequent expansions. Additionally, frameworks such as Adjusted Net Savings and Wealth Accounting, which integrate natural capital to assess national sustainability, are examined. The 2025 SNA revision, aiming to reflect economic dynamics and wellbeing more comprehensively, is also considered.

The System of Environmental-Economic Accounting

SEEA Central Framework (SEEA CF): This integrates environmental and economic data —crucial for understanding the interaction between ecosystems and economic activities. This systems approach organizes data in alignment with the SNA's accounting principles, covering aspects such as water, energy, and biodiversity to offer a comprehensive view of environmental–economic interrelations. It supports in-depth analyses, helps develop relevant indicators and trends, and provides insights into natural resource utilization and the environmental impacts of economic activities.[37]

The SEEA CF's development can be traced back to initiatives such as the 1987 Brundtland Commission and the 1992 Agenda 21, emphasizing the interconnectedness of economic, social, and environmental sustainability. Transitioning from a handbook to an international statistical standard, the SEEA CF has demonstrated broad applicability across diverse economic and environmental contexts, particularly in areas such as water and energy.

Employing a systems approach, the SEEA harmonizes economic accounting with extensive environmental data, ensuring compatibility with the SNA. It focuses on three primary areas:

▶ Physical flows: Quantifying materials and energy within the economy and environment, including natural inputs, product flows, and residuals, in physical supply and use tables.

▶ Environmental assets: Evaluating assets in both physical and monetary terms, addressing direct economic resources and broader ecosystem services, and recognizing their immediate and extended benefits.

▶ Economic activities related to the environment: Examining economic transactions related to environmental protection, resource management, and the production of environmental goods and services.

The evolution from the early versions of SEEA to the SEEA CF marks a progression in environmental-economic accounting practices, with refinements in environmental degradation treatment, universal applicability, updated terminologies, and alignment with the 2008 SNA. These enhancements improved the Framework's clarity, applicability, and consistency with contemporary accounting standards and environmental policy needs.

As a structured approach to environmental-economic accounting, the SEEA CF is vital for addressing the complex interplay of human activities, the environment, and economic development. It supports policy formulation, evaluation, and decisionmaking processes by providing essential data on resource extraction, pollution, and their economic implications. The insights derived from the SEEA facilitate the modeling and assessment of various policy scenarios, particularly in sustainable development and resource management, underscoring its significance in guiding informed environmental and economic policies.

The SEEA CF is not without limitations. It has some gaps in how it covers environmental issues, which can differ across countries. Some countries may have particular environmental problems that a uniform framework may not capture well. Nor does the SEEA CF properly measure the benefits of some natural resources such as ecosystem services. This led to the next step in the evolution of the SEEA.

SEEA Ecosystem Accounting (SEEA EA): Building on the SEEA CF's core principles, this approach emerges as an essential extension, broadening the environmental-economic accounting horizon to encompass ecosystem services and conditions. Enhanced by focused editions like SEEA-Water and SEEA-Energy, the SEEA EA delves into specific resource realms, recognizing the fluid nature of ecosystem accounting and its need for continuous refinement. It covers all ecosystem types, providing a sturdy framework for thorough analysis. The SEEA EA aligns with standard economic accounting by using exchange values for monetary assessments, aiding in comparisons with traditional economic data.[38] It stands as a pioneering statistical framework for organizing and melding biophysical ecosystem data, leading the charge in quantifying ecosystem services, tracking ecosystem changes, and valuing

ecosystem services and assets. It links ecological data with economic and human activities, highlighting nature's contributions to the economy and society in a quantifiable, transparent way. While primarily focused on environmental and economic interactions, the SEEA EA adopts a broader ecosystem data approach, adhering to the 2008 SNA principles, especially in monetary valuations. It acknowledges the limitations of this approach, especially in capturing the ecosystem's broader social benefits and nonuse values.

The SEEA EA emphasizes the importance of a wide range of information, including biophysical data and insights into ecosystem dependencies. It argues that monetary valuations alone cannot fully capture ecosystem value, advocating for a modular and adaptable framework to develop ecosystem accounts gradually. It recommends releasing physical and monetary data concurrently to enhance data interpretation and policymaking, supplemented by data on environmental protection expenditure and industry value added.

Key advancements in the SEEA EA include refining the original concepts of the SEEA Experimental Ecosystem Accounting 2012; and incorporating further explanations, clarifications, and reinterpretations, particularly in applying ecological and biodiversity concepts and in the monetary valuation of ecosystem services and assets. It shifts from land cover/ecosystem functional units to a spatial approach centered on basic spatial units, adopts the Global Ecosystem Typology of the International Union for Conservation of Nature (IUCN) for classifying ecosystem types, and introduces a refined ecosystem condition typology and a comprehensive accounting process. The SEEA EA maintains core ecosystem service definitions while expanding and refining them. It clarifies concepts such as potential supply and ecosystem capability, and extends the asset boundary in physical terms as defined in the SEEA CF, with the help of complementary measures of output and value added, and adjustments for ecosystem degradation and enhancement.

Still, the SEEA EA has limitations. Its measurement scope does not yet cover all ecosystem interactions, nor does it fully acknowledge the intrinsic value of ecosystems or the full spectrum of humans' cultural and spiritual connections with nature. The economic valuations of ecosystems may not reflect their broader social benefits, and compiling monetary accounts faces challenges given significant data and methodological requirements. Therefore, the focus is on developing highly relevant accounts

for decisionmaking with advanced data and estimation techniques.

In essence, however, the SEEA EA and its thematic extensions represent large strides in environmental-economic accounting, signaling a shift towards a more integrated, thorough, and nuanced understanding of the interplay among ecosystems and various human activities in economies.

System of Environmental-Economic Accounting 2012–Applications and Extensions was a crucial addition to the SEEA 2012 for bridging environmental-economic accounting theory with its practical implications in policymaking and research.[39] Supplementing the SEEA CF, the varied applications of SEEA data in decision-making contexts extend the Framework's applications and policy relevance. They focus on account integration and presentation, highlighting how SEEA accounts facilitate the development and implementation of environmental and economic indicators. Thematic extensions focus on economic activities beyond traditional industry classifications, such as tourism and own production of energy, employing methodologies that expand monetary and physical flow tables to include relevant environmental-economic interactions.

The SEEA 2012–Applications and Extensions publication[40] discusses a spectrum of indicators and analyses, encompassing:

▶ Indicators of resource use and environmental intensity, including gross energy input, final water use, and environmental ratio indicators such as intensity and productivity for environmental flows (such as CO_2 emissions and nutrient balances).

▶ Indicators of production, employment, and expenditure related to environmental activities tied to environmental protection and resource management, often expressed in economic terms such as GDP, employment, and exports, including aggregates like national environmental protection expenditure.

▶ Indicators of environmental taxes and environmental subsidies and similar transfers covering environmental taxes (such as energy and pollution taxes), emission permit schemes, and environmental subsidies and transfers.

▶ Indicators of environmental assets, wealth, income, and depletion of resources, addressing physical measures of environmental asset stocks and changes (such as land use depletion), and income and wealth changes related to natural resources.

While not exhaustive, the publication underscores diverse informational needs and the SEEA CF's flexible implementation potential for national and subnational analyses, especially using geographic information system datasets. It contributes to policy areas such as sustainable development and climate change mitigation, offering a foundation for discussions on the economic-environmental relationship. The publication suggests household sector extensions for a comprehensive dataset encompassing social, economic, and environmental data, vital for sustainable development policies and Sustainable Development Goal (SDG) monitoring.

In summary, the SEEA 2012–Applications and Extensions publication serves as an essential guide for the broad spectrum of environmental-economic accounting applications, facilitating their practical implementation in diverse policy and decisionmaking arenas. It emphasizes the interconnectedness of the economy, society, and the environment in sustainable development discussions.

The 2025 System of National Accounts

The 2025 System of National Accounts (2025 SNA), currently being developed, will represent a step-change in national accounts, crucial for compiling and analyzing economic activities. It will serve as the foundation for macroeconomic statistics and policy formulation, offering a comprehensive, coherent, consistent, and integrated set of macroeconomic accounts essential for understanding the distribution of production among various economic groups, and clarifying income flows across different sectors. Draft chapters of the 2025 SNA Report are available on the UN Statistics Division (UNSD) website.

As an update to the 2008 SNA, the 2025 SNA was initiated by the UN Statistical Commission and directed to the Inter-secretariat Working Group on National Accounts. A notable transformation from the 2008 SNA to the 2025 SNA is the enhanced recognition and valuation of economic assets and activities, including environmental sustainability, through capturing resource degradation and treatment of renewable energy and biological resources, thereby reflecting contemporary environmental concerns, and extending beyond the coverage of the 2008 SNA. Additionally, the proposed change in recording natural resource depletion as a production cost is expected to notably impact net domestic product (NDP) in resource-rich countries.

In essence, the 2025 SNA represents substantial progress in national accounts, reflecting

efforts to adapt to and encapsulate the intricacies and dynamics of the global economic system, especially environmental sustainability. This evolution is crucial for producing accurate, relevant, and comprehensive macroeconomic data and analysis, thereby informing policy decisions, and for shaping economic strategies in an increasingly interconnected and rapidly changing world.

Natural capital integration is not the only improvement in the 2025 SNA. Others concern digitalization of the economy, wellbeing, sustainability (of which natural capital is the main subcomponent), globalization, communication, financial and payment systems, Islamic finance, and the informal economy.

## Other related frameworks in environmental-economic accounting

The limitations of GDP as a metric to guide sustainable policies have, as seen, led to several approaches. An obvious step is to go from gross to net measures by including depreciation of capital, including resource degradation. This can be generalized by looking at changes in various capital stocks (see the section on the System of Environmental-Economic Accounting). Among the most notable and internationally recognized frameworks are Adjusted Net National Income, Adjusted Net Savings, and Wealth Accounting, endorsed by global entities such as the World Bank and UN organizations.

Adjusted Net National Income (ANNI) is derived from the conventional measure of GNI by deducting the value of depleted assets, including produced capital (consumption of fixed capital) and natural capital (renewable and non-renewable). This gives a more accurate measure of sustainable income than GNI, which records gross income regardless of whether it comes in part from asset depletion.

Adjusted Net Savings (ANS), also known as Genuine Savings, is a metric for assessing economic sustainability, diverging from traditional net national income metrics by incorporating factors such as natural resource depletion, human capital changes, and environmental damages in its calculation.[41] It advocates for a holistic wealth assessment encompassing produced, natural, human, and environmental capital, challenging the traditional focus on fixed, produced capital, which often overlooks natural resource depletion and environmental degradation.

The ANS framework begins with gross national savings, adjusting for fixed capital consumption, education-related expenditures,

FIGURE 1.4 Computation of Adjusted Net Savings (% of GNI)
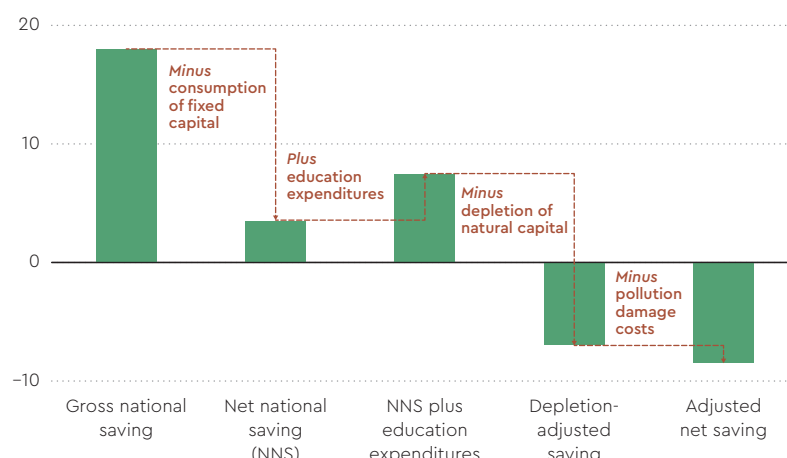
Source: World Bank 2021c.

natural resource depletion, and CO_2 emission-induced environmental degradation (figure 1.4).

The ANS approach has heavily influenced policymaking, is favored for its theoretical coherence and visibility, and is often deemed superior to other composite sustainability indicators.[42] However, its reliance on public expenditure as a proxy for human capital changes, rather than using direct learning outcomes, may detract from its accuracy.[43]

The ANS framework does, though, align with green accounting and social welfare literature, aiming to capture the depletion of natural resources, environmental degradation, and human capital investment.[44] A negative ANS signals unsustainable trajectories, suggesting that future utilities will be lower than current, indicative of insufficient investment relative to optimization objectives.[45]

World Bank tracking since 1970 reveals diverse trends among different countries, with Africa (excluding North Africa) showing a pattern of negative ANS, indicating regional disinvestment. Gross national saving in these areas often falls below 20 percent of GNI, impacted by fixed asset consumption, and exacerbated by natural resource depletion. Resource-rich countries, especially those facing fragility or conflict, display higher negative saving rates, often due to public spending pressures leading to unsustainable fiscal practices.[46]

Wealth Accounting: A comprehensive wealth approach for incorporating natural capital into national accounts has been proposed.[47] The argument is that it is better to measure all forms of a country's capital stock rather than measure annual income, because capital stocks are required to generate income (flow). A country's ability to generate sufficient income for future

generations therefore depends on maintaining or growing its total capital base.

Unlike ANS, however, which is an annual savings rate estimate that can be part of the SNA, comprehensive wealth is a measure of total capital stock and does not directly relate to GDP or other SNA indicators. Comprehensive wealth analyses (such as the wealth accounts developed by the World Bank) lack the details of the flows that the SEEA includes. Still, they serve as a reliable indicator of an economy's sustainability.[48] According to the Dasgupta Review (2021): "[b]y measuring our wealth in terms of all assets, including natural assets, 'inclusive wealth' provides a clear and coherent measure that corresponds directly with the well-being of current and future generations."

Institutions such as the World Bank and UNEP emphasize the importance of integrating natural capital with other capital forms in assessing development. These global bodies are enhancing wealth measurements through comprehensive wealth and inclusive wealth reports, contributing to sustainability discourse.[49] The World Bank (2021) underscores comprehensive wealth's role in augmenting GDP, offering insights into sustainability of the growth of GDP. Yet, valuing natural assets remains challenging due to often-absent market prices or clear ownership, potentially leading to market failures and environmental degradation.[50]

The push by the G7, the United Nations and the European Commission to transcend GDP mirrors the widening consensus for a comprehensive wealth metric encompassing socio-economic progress and sustainability.[51] The International Institute for Sustainable Development broadens this perspective by including natural, human, and social capital.[52]

2

Examples of policy uses of natural capital accounting

Accounting for natural resources in Ethiopia

Ethiopia's economic development depends mainly on the agriculture sector, which has continued to record annual growth rates above 10 percent and relies heavily on natural resources, principally land and water.[53] The sector contributes 42 percent of GDP and an estimated 90 percent of the country's exports.[54] However, the demographic and climate shocks are contributing to land degradation, costing an estimated 2–6.75 percent of agricultural GDP and affecting about 20 percent of the total population.

With the support of the World Bank, Ethiopia has launched an NCA initiative focusing on data, analytics, and institutional strengthening (figure 2.1).

The initial steps included establishing a steering committee for NCA and building an Investment Prioritization Tool, led by the Ministry of Planning and Development and the cross-Ministerial Technical Working Group for NCA, with support from the Resilient and Green Development Advisory Services and Analytics under the Environment, Natural Resources & Blue Economy program of the World Bank. The aim was to help institutionalize NCA approaches in decisionmaking by (i) helping government agencies acquire, maintain, and update data and information on natural capital and the values of ecosystem services; and (ii) using such data in the design and implementation of development policies, programs, and projects.

Other milestones included: i) five trainings on NCA, SEEA, and the Investment Prioritization Tool; ii) data and institutional assessment providing mapping of data custodians, mandates, and data gaps; and iii) a pathway for institutionalizing NCA and for developing a preliminary land cover classification and a draft land account system.[55] The country has since identified the key next steps to further mainstream NCA into policy and investment decisions, including completion of the land account, planning for ecosystem services and extent accounts, development of a roadmap for institutionalizing the NCA, additional capacity building on NCA, and knowledge transfer to ensure effective adoption and management of the Investment Prioritization Tool.

The fully implemented NCA is envisaged to inform country policies, including the Ethiopia Strategic Investment Framework for Sustainable Land Management (ESIF), the 10-year Development Plan, the sustainable land management framework, the climate action through landscape management program, and payment for ecosystem services policies and programs. The government set up the ESIF to provide a programmatic and strategic planning framework to guide the prioritization, planning, and implementation of sustainable land management investment in the country.[56]

These actions illustrate Ethiopia's proactive approach to harnessing the potential of NCA as a tool for sustainable development, ecosystem preservation, and climate resilience. By prioritizing the development and application of NCA and related tools, Ethiopia is working towards integrating environmental considerations into its development strategies, enhancing the management of its natural resources, and contributing to global biodiversity and sustainability goals.

Accounting for Zambia's forests

Natural resources such as minerals, land, water, and forests are integral parts of the Zambian economy. The country has extensive forests, critical for economic and ecological wellbeing.[57] The direct provisioning services by forests, through the harvesting of timber, production of charcoal and fuel-wood, and of non-wood forestry products (honey and beeswax, mushrooms, caterpillars, fruits, etc.), make an estimated contribution of $761.8 million a year, or 3.8 percent of Zambia's GDP in 2010.[58] Forests also provide a wide range of ecosystem services such as air and water filtration, carbon sequestration, and cultural and recreational services, and have a role in biodiversity

FIGURE 2.1 Ethiopia's NCA theory of change

DATA
• Support systematic geospatial and socioeconomic data to support policy applications

ANALYTICS
• Inform government policies on performance-based financing

INSTITUTIONAL STRENGTHENING
• Establish Technical Working Groups and Steering Committee to ensure institutionalization
• Stakeholder engagement through workshops, trainings and consultations

Source: Demisis and Mulatu 2024.

conservation and climate change mitigation.[59] Forests in Zambia are also estimated to provide over 1 million jobs and are a supplemental source of livelihood for rural communities, which depend on natural resources.[60]

These ecosystem services remain, however, largely unaccounted for, resulting in the undervaluation of the contribution of forests to the national economy and, consequently, suboptimal investment in forest conservation. In particular, the first edition of the land accounts, focusing on the period 2010–2015, noted that there had been a reduction in forest cover and wetlands in Zambia, attributed to the expansion of built and cropland areas, and a change in soil moisture due to changes in rainfall.[61] The implication is that Zambia's GDP, adjusted for the size of the value of these negative externalities, would be much lower than the estimate of conventional GDP suggests. The corollary is that optimal investment in the conservation of Zambia's forests and extraction of its minerals would significantly increase the value of its natural capital, with the resulting green GDP providing much-needed headroom for the country to take on more debt and raise resources to finance development, including in green infrastructure, for further protection of ecological services.

To address the gaps in natural resources data, Zambia, along with other countries participating in the World Bank–supported Wealth Accounting and Valuation of Ecosystem Services (WAVES) program, has developed comprehensive forest and land accounts. These accounts provide detailed insights into the country's natural resources, enabling informed decision-making for sustainable management.[62] Forest accounts, for example, have been developed at the national level within the broader context of land accounts. The forest and tourism accounts have shown alarming findings, with forest cover drastically decreased, which has reduced water supply downstream.

This comprehensive approach helps illuminate the full value of forest resources, including provisioning, regulating, and cultural services, thereby supporting sustainable forest management and conservation efforts. A conceptual framework for provisioning services is in figure 2.2. This exemplifies the country's efforts to harness the power of NCA for sustainable development. By providing a comprehensive view of the economic and ecological value of its natural resources like forests, NCA supports informed policymaking and planning, enhancing resilience, and sustainable management of natural resources. NCA has also informed the country's national policy on climate change and Vision 2030.[63] Other policy impacts include informing the Apiary National Strategy (involving honey and wax) under the Ministry of Lands and Natural Resources, and including in the 2021 National Budget a line item for Forest and Tourism Accounts.[64] These accounts were also used to develop many of the indicators for the Voluntary National Reporting on SDGs, which were presented at the High-Level Political Forum in New York in July 2023.[65]

Utilizing natural capital accounting in Uganda

Uganda is known for its diverse ecosystems, including forests, wetlands, and savannas. Through the Uganda Bureau of Statistics, it

FIGURE 2.2 Conceptual framework for forest-provisioning services
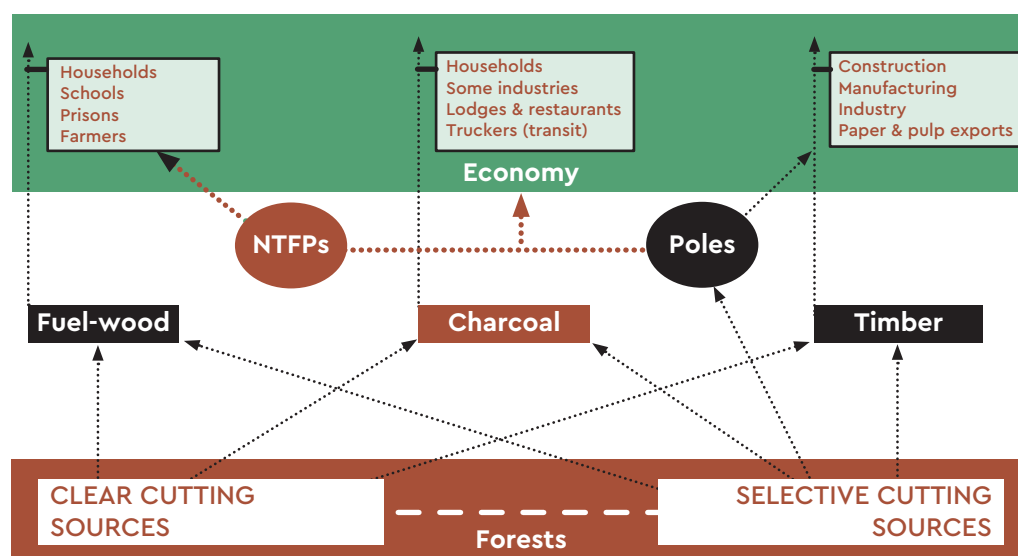
Source: Forestry Department et al. 2023, p. 21.

launched the National Plan for Advancing Environmental Economic Accounting in Uganda in October 2019.[66] The plan is guiding the development of a set of natural capital accounts and integration of wealth accounting into the nation's macroeconomic data.[67] Two of these natural capital accounts, for land and water, were launched in November 2019, while wood asset and forest resources accounts were launched in November 2020. Uganda is one of very few countries in Africa that has published a full set of ecosystem accounts. They were used for preparing a scenario analysis to inform intervention choices under the World Bank Investing in Forests and Protected Areas for Climate-Smart Development Project.[68]

The land accounts have land use and cover associated with human activity alongside natural processes. Over 1990–2015, the land accounts showed a steady expansion of land used for subsistence agriculture, while forest cover declined. The wood asset and forest resources accounts have physical and monetary asset accounts of wood and other selected forestry resources for 1990–2015. These accounts show that the country's demand for wood could more than double between 2015 and 2040, and that if the rate of depletion is not countered, the country could run out of forests outside gazetted protected areas by 2025.[69]

These accounts have fed into policy and its formulation in Uganda. For instance, the Global Program on Sustainability (GPS)/WAVES contributed to Uganda's National Development Plan III finalized in 2020 and to the planning for post-COVID-19 recovery.[70] The ecosystems accounts have also resulted in effective changes, such as a ban on cutting Prunus africana, also known as African cherry, and a quota on its bark exports.[71] Prunus africana is recognized for its economic and medicinal value and its demand has surged, locally and internationally, leading to overharvesting and heavy depletion of its wild population.

The country has set the following targets that seek to ensure sustainable management of natural resources: (i) the annual growth rate of ANNI should be at least as high as that of GNI, to ensure that growth in recorded national income is not at the expense of natural assets; and (ii) the rate of ANS should be maintained at a positive level and should increase over time.

Uganda has also made progress in institutionalizing NCA. For instance, the National Development Plan III includes NCA as one of the strategies to guide investment, development, and management of natural resources, while the publication of environmentally adjusted macro-indicators is now institutionalized within the Ministry for Finance.[72]

3

The current wealth of natural capital in Africa

frica remains heavily dependent on natural capital compared with other regions of the world. This section reports on attempts to take stock of the value of natural capital in Africa and its changes over time.

Natural capital endowment in Africa

Africa's natural capital was estimated at $6.2 trillion in 2018, which could be an understatement given the failure to account for recent mineral and other extractive resource discoveries.[73]

There are, however, notable variations in the endowment of inclusive wealth at national level. The nature of the assets is also diverse, varying from one country to another. Inclusive wealth in

Africa is concentrated in a few countries, while many have low levels of endowments. These factors also mean that the changes in inclusive wealth over time differ immensely between countries. Figure 3.1 shows the changes in the four components of inclusive wealth between 1992 and 2019. Changes in wealth of large economies were dominated mainly by growth in human and renewable natural capital, with human capital accounting for a much larger proportion. South Africa recorded the highest increase in inclusive wealth at more than $4.5 trillion, largely driven by substantial increases in human capital. This is also the case for countries such as Egypt, Kenya, and Tunisia, where the growth in inclusive capital is almost entirely from growth in human capital.

Other countries, such as Democratic Republic of Congo, Gabon, and South Africa, also

FIGURE 3.1 Change in aggregated Inclusive Wealth Index by country, 1992–2019 ($ billion)
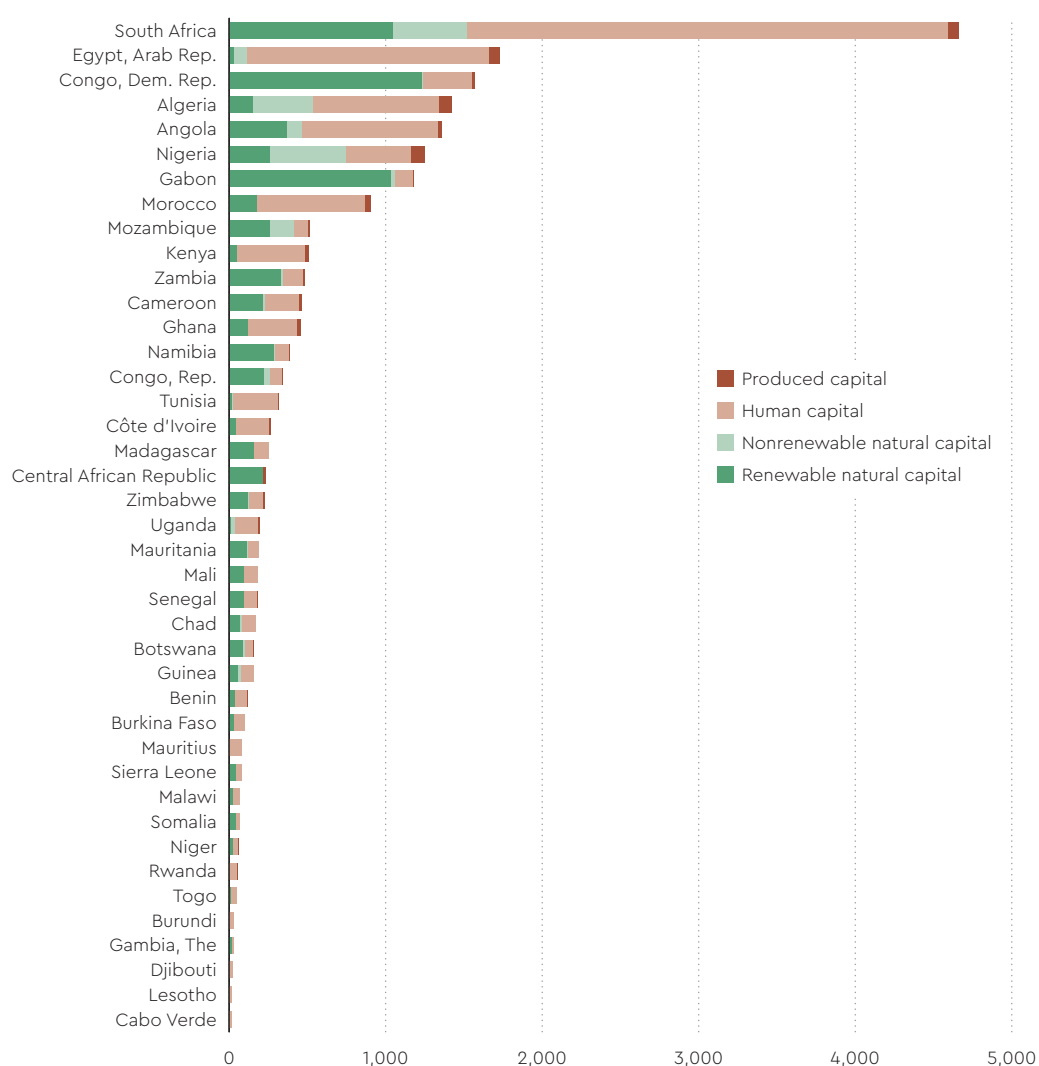
Source: UNEP 2024.

had substantial growth in renewable natural capital. Common among all African economies is the limited expansion of produced capital. Many African countries are highly dependent on natural capital relative to other regions of the world. For instance, fossil fuel, minerals and agricultural products are common features of many African countries. The Changing Wealth of Nations 2021 report shows that natural capital in all African regions (excluding North Africa) constituted about 20 percent of total capital, and was second only to the Middle East and North Africa at 38 percent.[74] In other regions, the dependence rates were lower—North America at 2 percent, and Europe, Central Asia, East Asia and Pacific all at around 4 percent.[75]

The export sector in many African countries is dominated by commodity exports. Figure 3.2 shows the composition of commodity exports as a share of total exports from African countries. It shows a very high dependence

on primary commodities for export earnings. For instance, in South Sudan and Libya, crude oil constitutes close to 100 percent. In Guinea-Bissau, agricultural products, mainly fruits and nuts, account for all exports, while Mauritania's exports are dominated by mining products, mainly iron, accounting for 97.3 percent of exports.

Trends in natural capital

Figure 3.3 shows that the global value of natural capital, using UNEP's inclusive wealth approach,[76] decreased by 29 percent from 1990 to 2019. The proportion of natural wealth in Africa (excluding North Africa) was stable at around 4 percent of the declining global value.

The Inclusive Wealth Africa 2024 Report[77] looks at the changes made from 1992 to 2019 for 41 countries in Africa, focusing on four different kinds of capital. Figure 3.4 shows that a

FIGURE 3.2 Commodity exports as a percentage of total merchandise exports
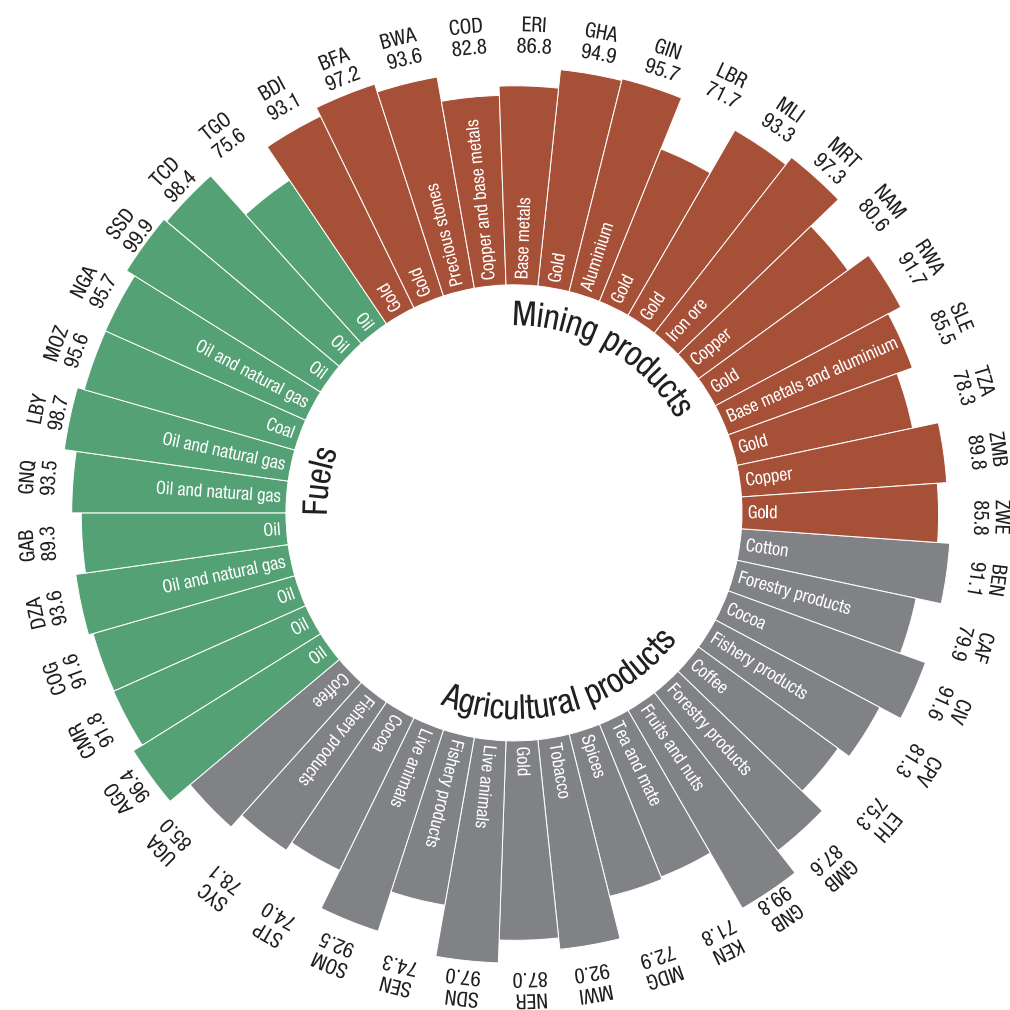
Note: The figure shows the main exported product for each country. See annex 3 for country name abbreviations.
Source: UNCTAD 2022, p. 7.

significant proportion of African wealth originates from natural capital.

The value of natural capital has declined in absolute terms over the last 30 years, while that of human capital has increased. Figure 3.4 shows that in 2019, the total inclusive wealth of African countries was $500 billion, comprising 54 percent human capital, up from $419 billion in 1992, for a 27 percent increase. Renewable capital declined by 24 percent from $229 billion in 1992 to $175 billion in 2019, while the value of nonrenewable natural assets decreased to $45 billion in 2019 from $72 billion in 1992, a 37 percent reduction. This means that African renewable and nonrenewable natural capital decreased by a yearly average of 0.8 percent and 1.3 percent, respectively, during this period.

Figure 3.5 shows the changes in natural capital wealth per capita for selected land assets. While all the other regions recorded substantial per capita growth in at least some assets, in Africa there was a decline in all the assets. Even if some of these land assets may have grown in absolute terms, the increase was not high enough to compensate for the population growth in Africa.[78] For instance, the value of cropland per capita in Sub-Saharan Africa contracted by more than 50 percent, while that of forest timber and forest ecosystem services declined by around 40 percent.

A focus on selected countries, as in figure 3.6, reveals how these trends also differ between countries. In 1995–2018, there was a net decline in per capita wealth for all the selected countries. The main causes of this decline are loss of forest assets and reduced value of croplands,[79]

FIGURE 3.3 Distribution of natural capital by region, 1990–2019 (percent of 1990 value)
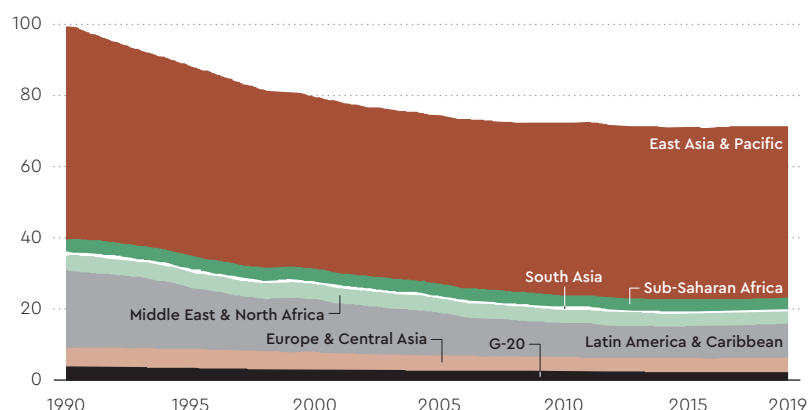
Source: UNEP 2023.

FIGURE 3.4 Total inclusive wealth in Africa, 1992–2019 ($ billion)
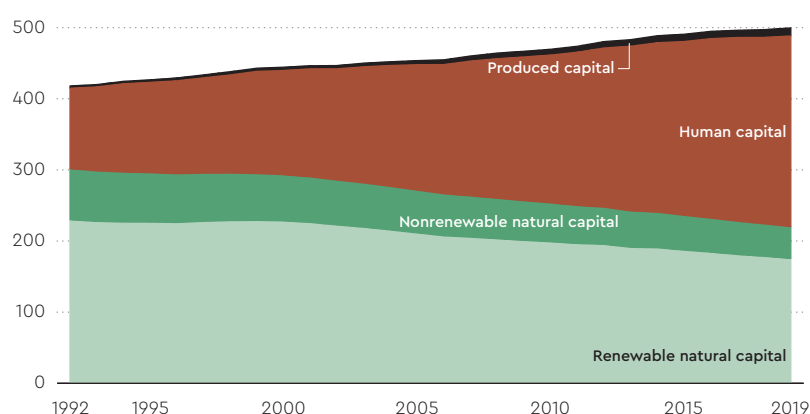
Source: UNEP 2024.

FIGURE 3.5 Changes in natural capital wealth per capita, by land asset and region, 1995–2018 (%)
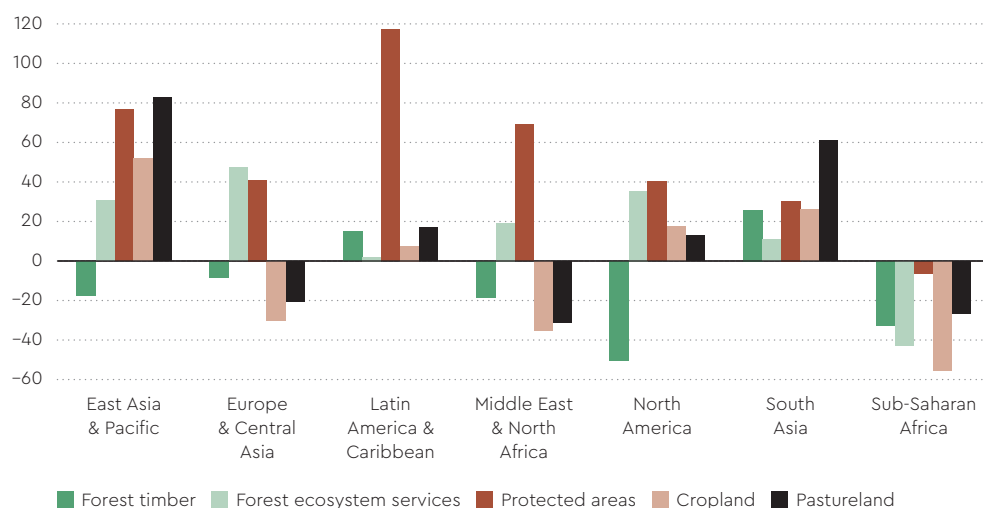
Source: World Bank 2021c, p. 105.

FIGURE 3.6 Change in wealth per capita, by asset, six countries in Sub-Saharan Africa, 1995–2018 (constant 2018 $)
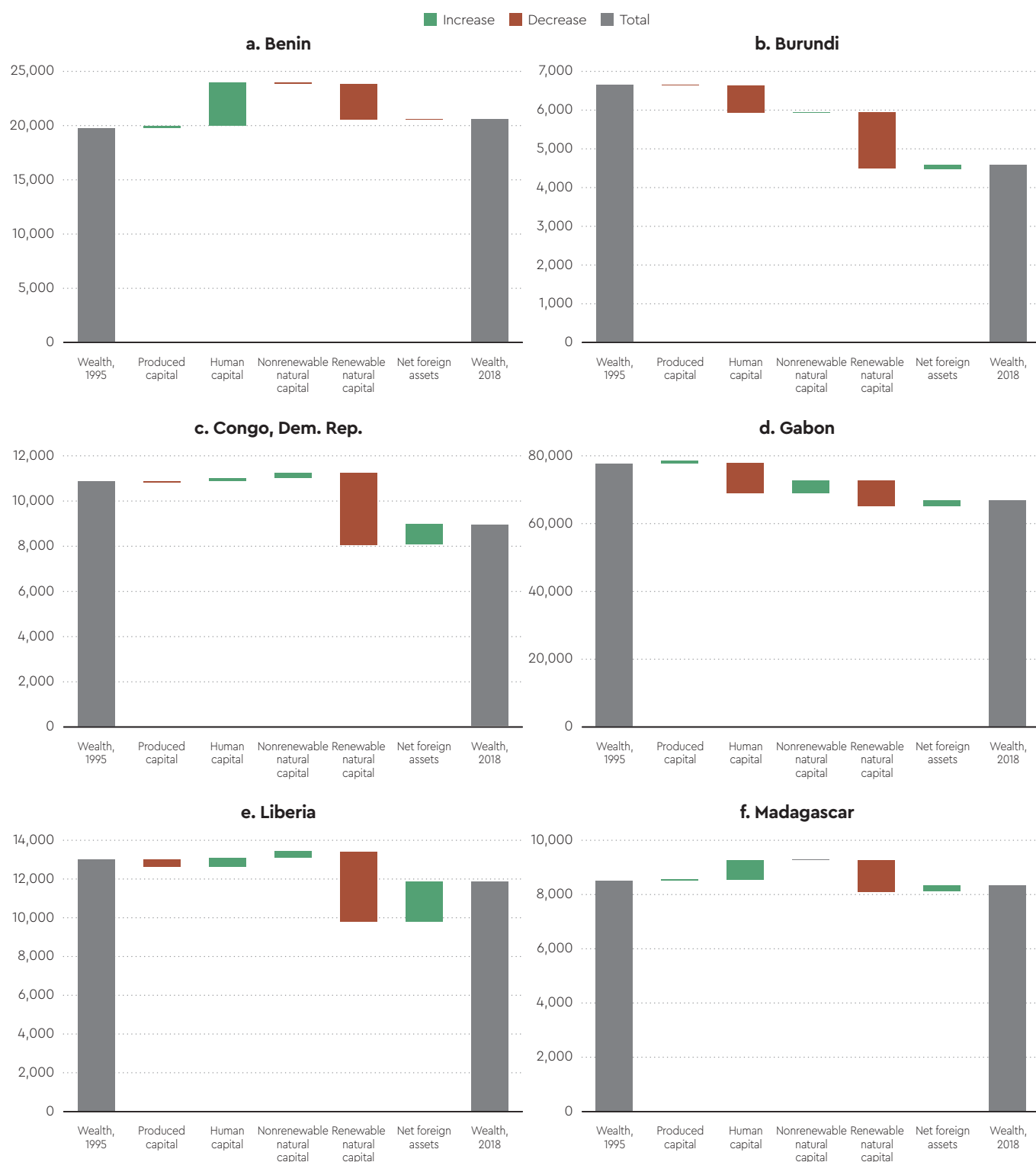
Source: World Bank 2021c, p. 285.

either directly or indirectly through negative externalities of other economic activities such as agriculture or mining. All six countries—Benin, Burundi, Democratic Republic of Congo, Gabon, Liberia, and Madagascar—covered in the World Bank's CWON report recorded reductions in renewable natural capital, which more than offset increases in human capital in Benin, Liberia, and Madagascar, or increases in net foreign assets in the Democratic Republic of Congo and Liberia. There is also a noticeable decline in human capital in Gabon and Burundi.

The loss of these values is in most cases not accounted for, which implies an understatement of the importance of natural capital and its services to the economy. Despite the significant challenges, there is also a growing recognition of the value of natural capital and the need for sustainable management to ensure long-term prosperity. Proper implementation of NCA can help raise awareness of the importance of natural capital in economic activities.

The implications of natural wealth for credit ratings

Accounting for the value of natural wealth[80] can be important for improving environmental, social, and governance (ESG) frameworks, particularly when applied to countries.[81] There are many factors that affect a country's credit rating, such as its per capita income. High GDP per capita typically reflects decades of development of legal institutions, provision of public services, and buoyant private sector actors. Besides income, evidence also shows that ESG indicators are correlated with credit ratings.[82] This, in turn, affects interest rates on sovereign debt. It is therefore not surprising that ESG scores are strongly correlated with income level. This is referred to as the "ingrained income bias" (figure 3.7).

An analysis of the relationship between changes in natural capital and the 10-year bond yield shows that the ingrained income bias dominates and that richer countries, less dependent on natural capital, pay a lower price for credit.[83] However, a different picture emerges on changes in natural capital within a country and over time. An increase in the value of natural capital lowers borrowing costs. And when natural capital is then decomposed into renewable and nonrenewable, it is found that growth in renewable resources decreases borrowing costs for B-rated countries. This finding is especially appealing and relevant for many African countries that possess huge reserves of renewable assets. Thus, concerns raised about the methodology used by major credit rating agencies in assessing sovereign risk of African countries are valid.[84] It is therefore important that the international community provides for mandatory valuation of natural capital and for the incorporation of this value in national income measures to help bolster countries' risk profile and improve their credit ratings.[85] It is therefore critical that credit ratings agencies also factor in these values.

Wealth accounting can also improve the quality of the environmental component of

FIGURE 3.7 Sovereign ESG scores and the ingrained income bias

Note: The vertical axis depicts the (normalized) environmental, social, and governance (ESG) scores of six leading sovereign ESG providers, where higher values indicate better ESG performance. The horizontal axis shows the (normalized) gross national income (GNI) per capita for all 133 count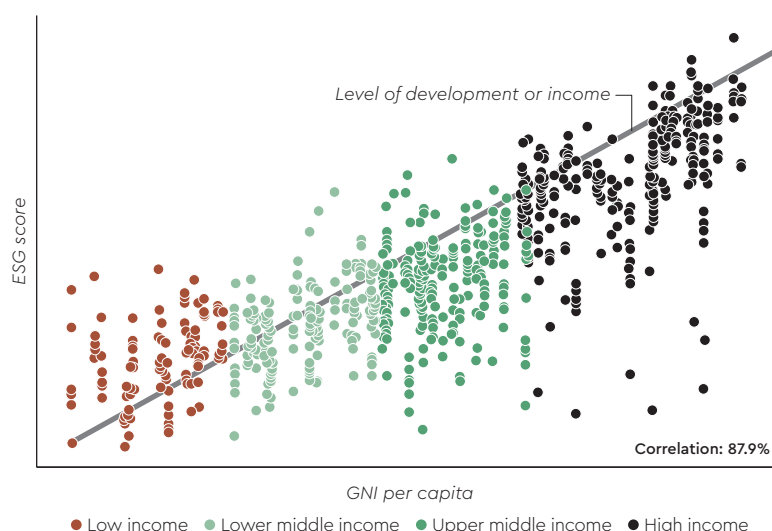ries in 2017. The term ESG providers refers to companies that provide ESG scores for incorporation into investment decisions. ESG providers differ from credit rating agencies, as the latter have an explicit mandate to assess an entity's ability to repay its debt.
Source: World Bank 2021a.

ESG scores.[86] This can be instrumental in improving lending terms in international capital markets. But for this potential to be fulfilled, wealth accounting needs to be transparent and address the "economic materiality" of the resources, revealing the true value of natural assets, which will in turn improve credit assessments and ratings, and potentially lead to lower interest rates on a country's debt.

A potential application: The value of Africa's forests as a carbon sink, with a focus on the Congo Basin

Carbon sequestration as a global public good and emerging carbon markets

Forests around the world are important for carbon sequestration, moderating the temperature and preserving biodiversity, but the volume of this ecosystem service is often underestimated, resulting in underinvestment in forest preservation. Until recently, data on stocks and flows of carbon sequestrated by forests was difficult to collect, but the emergence of big data and other tools such as artificial intelligence and machine learning has now made such collection possible. Using these tools and the methodology developed by the Intergovernmental Panel on Climate Change, the Artificial Intelligence for Environment and Sustainability (ARIES) model has produced global carbon stock maps at a resolution of 300 meters for each year between 2001 and 2020, although currently, data are

FIGURE 3.8 Prices of emission reductions in the EU Emissions Trading System and in voluntary markets, 2016–2021 ($/tonne CO_2e)
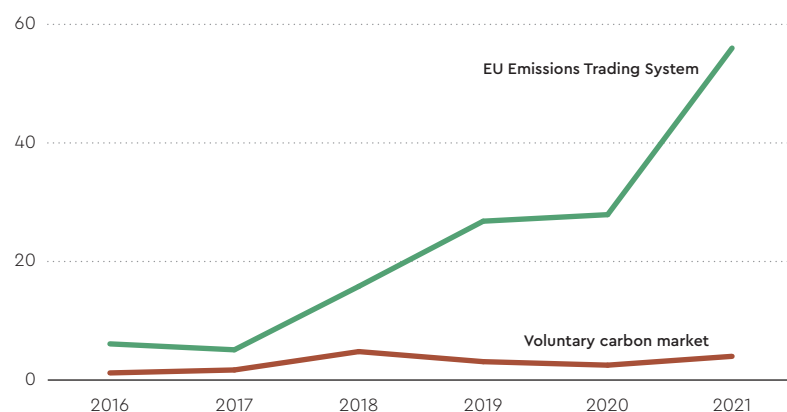
Source: AfDB 2023, figure 3.18.

available only through 2018.[87] In 2018, per the latest available global data on CO_2 sequestration, Africa accounted for approximately 26 percent of all carbon sequestration in forests worldwide.[88] This is a significant contribution, especially given that the continent represents only about 4 percent of global fossil fuel emissions.[89]

Yet, this "global public service" remains largely unaccounted for, as the ecosystem services, including carbon sequestration, provided by natural resources such as forests are not captured by standard measures of economic activities such as GDP. For instance, the estimated value of the climate service of the Congo Basin forest is over $30 billion net of deforestation, while official development assistance for forests in Africa remains low, averaging $0.17 billion per year over the period 2011–2020.[90] Consequently, there is underinvestment in the efforts to preserve the vast forests, contributing to the observed high rates of deforestation and forest degradation.

Carbon markets have emerged as a potential source of revenues to support forest management in Africa. Voluntary carbon markets (VCMs) have emerged gradually over the last decade, catering primarily to corporate needs to offset greenhouse gas emissions. The majority of VCM offsets have been forest related, while others, for example energy or waste related, are also emerging. There is also an increasing interest in participating in transactions under Article 6 of the Paris Agreement. Negotiations are ongoing on the specific details of trade under this article, which, once agreed upon, will be formalized in the Paris Rulebook.

A concern for Africa has been the increasing wedge between the price of VCM offsets that provide actors in Africa with very low prices for

carbon sequestration, and compliance markets such as the EU ETS, where the prices for carbon offsets are considerably higher (figure 3.8). To address this discrepancy, the AfDB launched the Africa Carbon Markets Initiative (ACMI) at COP 27 in Sharm el-Sheikh in December 2022. A recent account of the ACMI is presented in the African Economic Outlook 2024.[91] According to the ACMI, the potential for African carbon credits is estimated at about 2,400 $MtCO_2$ in 2030, with a value of up to $50 billion.[92]

Challenges in estimating stocks and flows of carbon retention

Estimating stocks and flows of carbon retention presents several challenges, which emanate from the dual complexity of natural systems and how they interact with human systems, and in particular what can be included in carbon markets. The first set of challenges relates to the quantification of carbon stocks—what to consider and what to exclude. There are several types and classes of carbon stocks to consider. In the forest sector, there is ongoing debate of the type, nature, and density of forests to include and the quantification of carbon sequestration. For instance, ARIES[93] considers several aggregated classes such as agricultural vegetation, forests, permanent snow and ice, shrub and herbaceous vegetation, sparse vegetation, and wetlands.

The methodological approaches to quantify the stock of carbon are still an active research field, particularly for the use of remote sensing approaches that include spatial extent and resolution, temporal frequence, baselines, and ground-truthing, all of which impact the results and their interpretation.[94] The ongoing debate speaks to both the importance and challenges of the existing methods in carbon sink evaluation and quantification. There are four broad approaches to measure carbon stocks and sequestration, each with strengths and weaknesses: field-based measurements; land cover maps with reference carbon values; statistical and machine-learning models; and mass balance models.[95]

Example of carbon stocks in African countries

In this illustration, carbon stocks are measured using the land cover maps with reference to carbon values, simulated for different levels of minimum percentage canopy cover. This approach is cheaper to implement but comes with the weakness of failure to account both for variability within land cover classes and for global change drivers other than land cover change.[96] Figure 3.9 shows Africa's forest

FIGURE 3.9 Africa's total forest vegetation carbon stock, 2020 (billion tonnes)
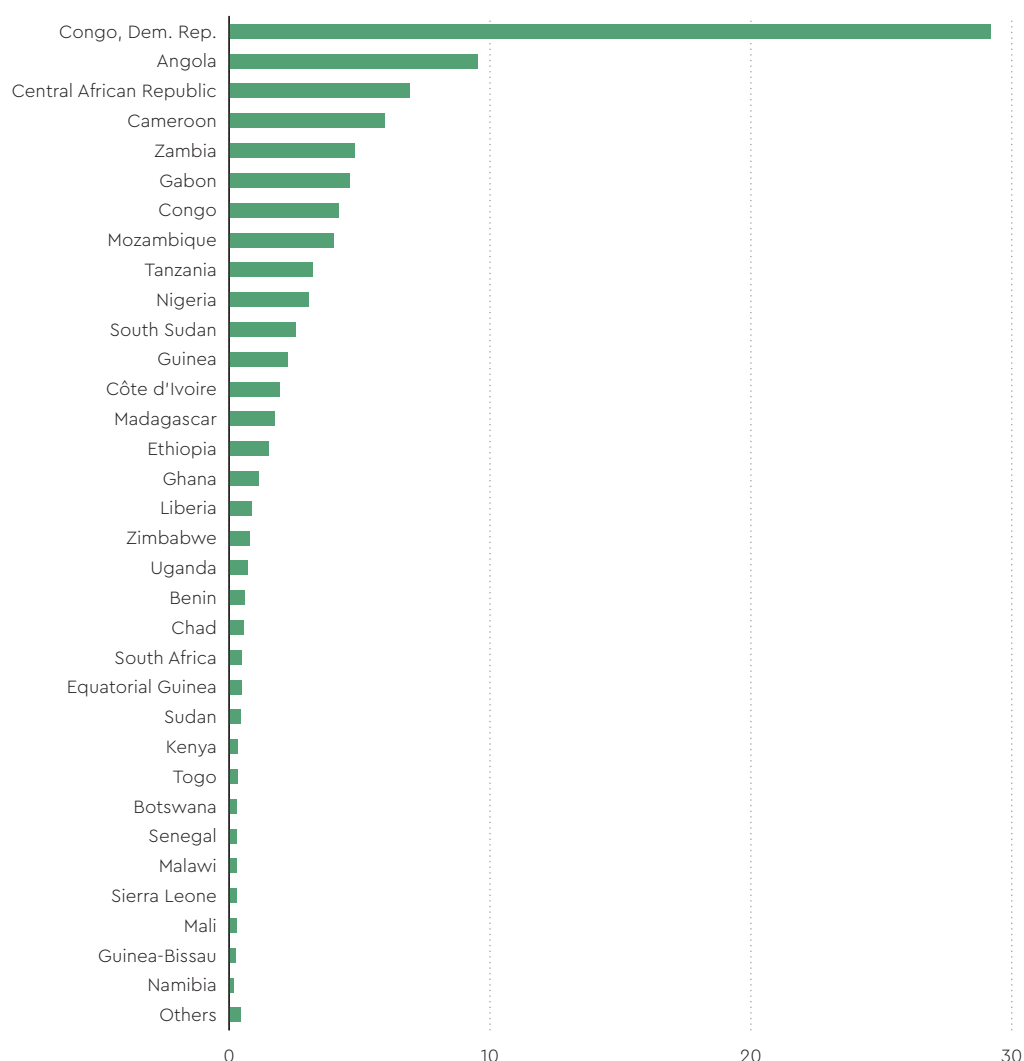
vegetation stocks of carbon in 2020. The data is compiled using the ARIES model to produce carbon stock maps for each year in 2001–2020.[97] The Democratic Republic of Congo, home to the larger part of the Congo Basin forest, accounts for more than 20 billion tonnes of carbon in above ground biomass (AGB), or 41 percent of total AGB in Africa.

Other countries—Angola, Central African Republic, Cameroon, Zambia, Gabon, Republic of Congo, and Mozambique—account for more than 4 billion tonnes of forest vegetation carbon stock . Collectively, these eight countries account for about 73 percent of the carbon stock on the African continent. The Congo Basin forest covers a landmass of 298 million hectares and straddles six countries: Cameroon, Central African Republic, Democratic Republic of Congo, Republic of Congo, Equatorial Guinea, and Gabon. Other studies have estimated gross

carbon removal from the Congo Basin forest at 1.1 gigatonnes a year in 2011–2019.[98]

In addition, the Congo Basin is the world's largest tropical peatland, holding about 30.6 billion tonnes of carbon belowground, representing 28 percent of global peat carbon stock on an area of approximately 145,500 km2.[99] And while this is a resource of huge global importance, the peat stocks remain vulnerable to land use change as only 8 percent of it lies within nationally protected areas.[100] Yet they possess enormous value that should be properly accounted for.

Outside the Congo Basin forest, countries with substantial AGB carbon stocks include Mozambique, Zambia, Tanzania, and Madagascar, whose stocks range between 1 billion and 2 billion tonnes AGB.

Example of carbon sequestration flows in African countries

Africa's carbon sequestration contributes hugely to global carbon removal. Figure 3.10 shows the net carbon removal based on geospatial data[101] and Global Forest Watch, which uses a geospatial forest carbon flux monitoring framework based on the land use, land use change, and forestry part of the Agriculture, Forestry and Other Land Use (AFOLU) guidelines, as developed by the Intergovernmental Panel on Climate Change. The stacked bars in figure 3.10 represent individual African countries, and the line, the continent's net flux. The net flux is computed by subtracting annual emissions from average annual removals over 2001–2023.[102] Carbon removal is based on annual averages over the model period, while emissions are from stand-replacing disturbances[103] and do not include emissions from forest degradation.[104]

Figure 3.10 suggests that net carbon sequestration in Africa has declined precipitously from about 2003. The continent's net carbon flux was nearly 2 billion tonnes CO_2e in 2003, but declined to a negative net flux by 2017. The decline is partly due to increasing emissions in some countries, especially after 2012, and the continued deforestation and degradation of Africa's forests. Nonetheless, after 2017, there is some stability, albeit with fluctuations, especially among net emitting countries (Madagascar, South Africa, Sierra Leone, and Liberia). The decline also implies lost opportunities to capitalize on Africa's carbon sequestration potential.

Example of valuation of sequestration and comparison with GDP

The preceding sections have highlighted the difficulty in objectively determining the volume of carbon storage and sequestration, mainly due to methodological challenges and complexities in determining the flows. There are also challenges in determining the relevant price of carbon retention, especially for inclusion in the SNA.[105] On what should be valued, the SEEA EA suggests that global climate regulation from terrestrial ecosystems should be a single service, consisting of two components —sequestration and retention—where carbon sequestration is the ability of ecosystems to remove carbon from the atmosphere and carbon retention is the ability of ecosystems to retain the stock of carbon. The SEEA EA also suggests including both AGB and below ground biomass (BGB), as well as soil organic carbon. Unfortunately, this paper is limited by data availability and uses only AGB. The importance of other components provides scope for Africa's investment in relevant techniques for data collection and management.

For valuation, the SEEA EA states (Para. 9.31):[106]

A specific market concerns observed prices from emission trading systems which may be used to estimate prices for global climate regulation services. The number of countries with such trading systems is increasing, as is the quantity of carbon being traded and hence these markets may provide suitable price data. If the trading system is not considered

FIGURE 3.10 Annual greenhouse gas net flux by country (billions of tonnes CO_2e)
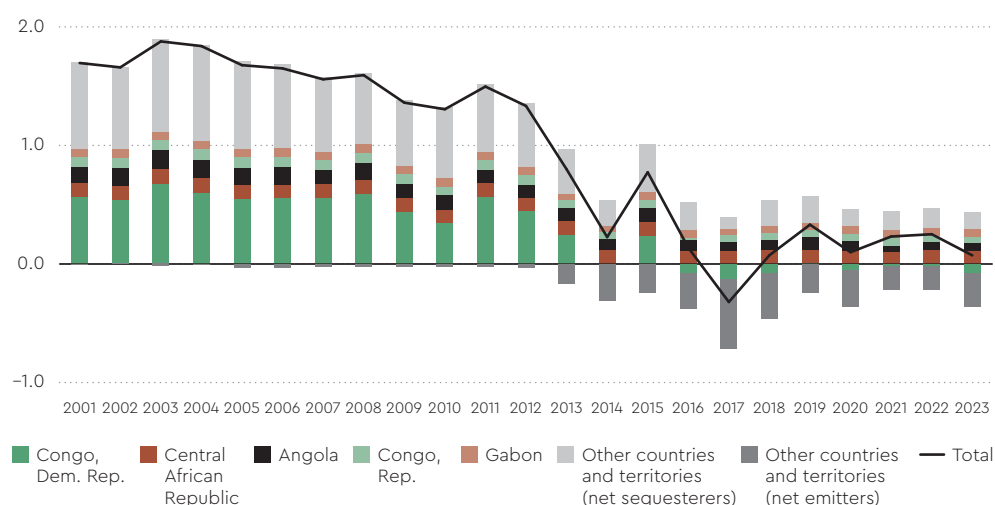
Note: Tree cover data used in the analysis were produced by the University of Maryland's GLAD laboratory in partnership with Google (Hansen et al. 2013). In the data, gross removals are constant, as an annual average over the model period, while emissions are provided for each year.
Source: Harris et al. 2021.

sufficiently mature, an alternative is to use data on the marginal costs of abatement, which is more widely available, or data on the social cost of carbon when derived from models that are consistent with the exchange value concept, i.e. limited to an assessment of the effects on measures of output.

Proper valuation of carbon retention in Africa should be prioritized because there are still no established compliance markets, and the VCMs remain opaque, with a huge divergence between the two systems.[107] Given the lack of agreement on the proper value of carbon retention for Africa, figure 3.11 provides the range between the average VCM price and the current price on the EU ETS for the monetized value of country-level net forest carbon sequestration, given the flow values shown in the previous section. The red bars represent

the value based on the VCM price estimated at $5 per $MtCO_2$.[108] A more relevant value would be one based on the EU ETS price, estimated at $70 per tonne.[109]

Using the EU ETS price could yield net value of carbon capture of about $20 billion for the Democratic Republic of Congo and around $8 billion for the Central African Republic and Angola. In the Congo Basin forest collectively, with an estimated gross carbon removal of 1.1 gigatonnes, would have a sequestration value as high as $77 billion using the EU ETS price, or at least $5.5 billion using the VCM price.[110]

These estimates on the monetary value of carbon sequestration services are quite significant for many African countries, whose conventional GDP is relatively low. As an illustration, Figure 3.12 shows the value of carbon sequestration in the Congo Basin forest relative to traditional GDP. This illustrates the importance

FIGURE 3.11 Value of net carbon flux ($ billion)
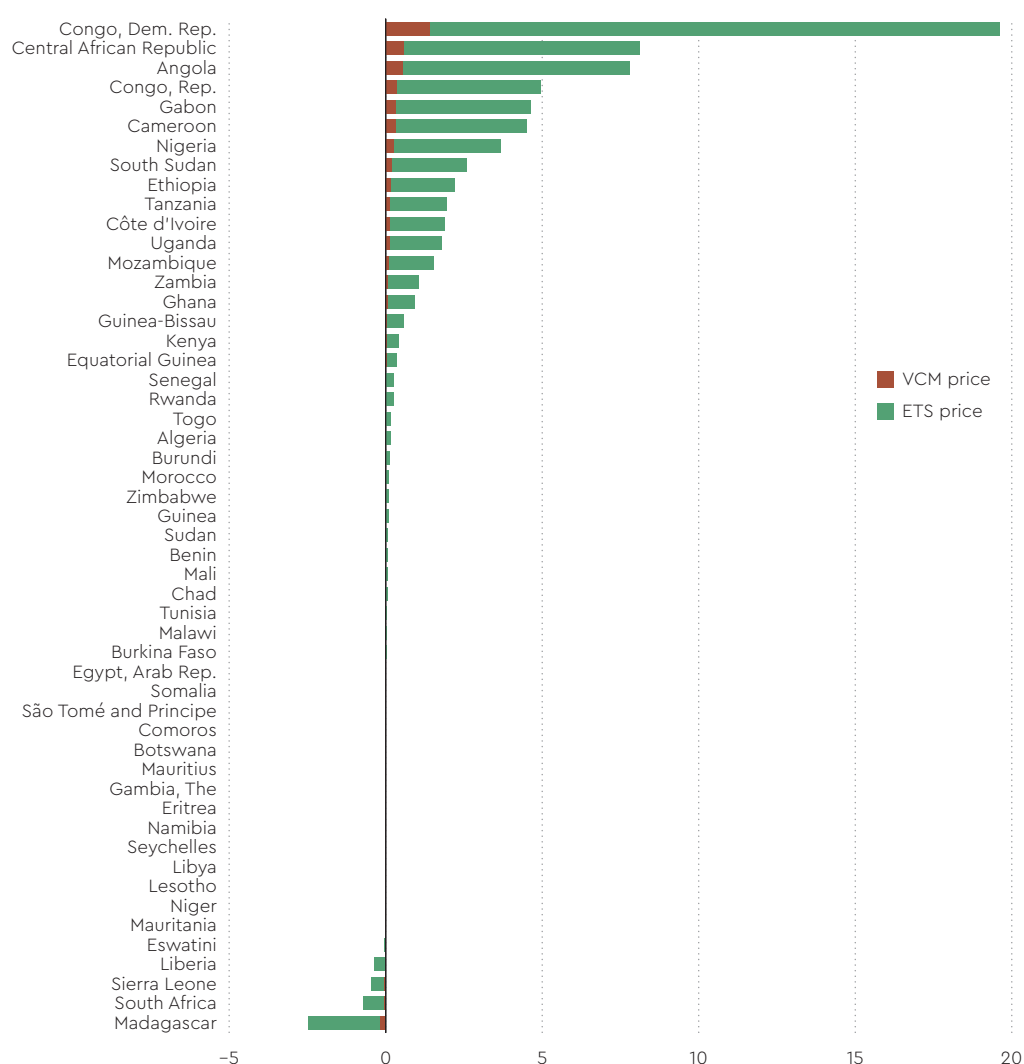
Source: Harris et al. 2021.

FIGURE 3.12 Net carbon flux as a percentage of GDP for 2022, at $70/tonne CO_2e
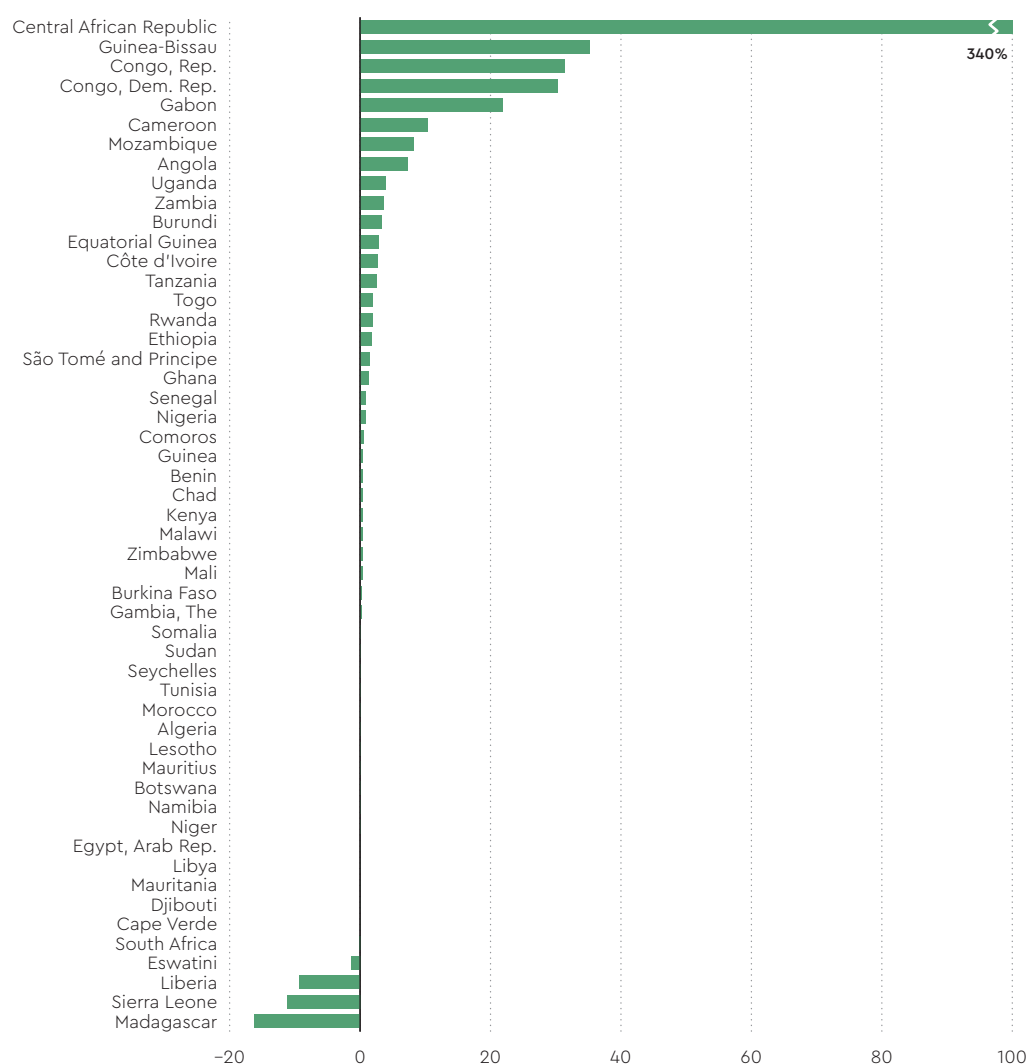
Source: Carbon removal data is from Harris et al. 2021. GDP data is from the World Bank's World Development Indicators.

of the forest's ecosystem services to these countries' economies, when the value of natural capital—here depicted by the value of carbon sequestration—is fully accounted for.

The Central African Republic had an estimated GDP of about $2.4 billion in 2022. The estimated value of its net carbon sequestration is over $8 billion. The value of carbon sequestration is more than three times the country's GDP. In figure 3.12, net carbon flux as a proportion of GDP for the Central African Republic is 340 percent; the scaling of the chart is capped at 100 percent to prevent it from dwarfing values for other countries. This is an extreme case and demonstrates the potential benefits that inclusion of currently unaccounted-for ecosystem services could have on the country, and elsewhere across the continent. If this service was captured in the SNA, the country's GDP would increase fourfold. Other countries with a relatively high proportion of net carbon

flux to GDP are Guinea-Bissau at 35 percent, Republic of Congo at 31 percent, Democratic Republic of Congo at 30 percent, and Gabon at 22 percent.

According to previous studies, the estimated value of carbon sequestration generated by the Congo Basin forest was $55 billion per year, equivalent to 36 percent of the GDP of the six host countries.[111] In addition, the forest provides huge timber and forest ecosystem capital to countries in the region. For instance, the Democratic Republic of Congo has the highest forest timber and forest ecosystem capital, valued at $126.8 billion and $51.1 billion, respectively.[112] This also brings out the potential problem of double counting, since the retention is typically lost at harvest.

Africa is experiencing heavy forest-cover loss from deforestation and degradation, driven mainly by logging and land use change, which has led to a steep decline in carbon

sequestration). For instance, the Democratic Republic of Congo—home to 61 percent of the Congo Basin forest—recorded the highest forest-cover loss, estimated at more than 5.9 million hectares in 2001–2021.[113] Illegal logging continues unabated due to underinvestment in forest protection and management, which may reflect lack of people's appreciation of the value of indirect forest ecosystem services, such as forests' role as a carbon sink and hence conservation,[114] which are far removed from their lives and the direct benefits of timber and agricultural land. If the ecosystem services from the forest are not accounted for and the host countries are not compensated for the global public goods provided by the Congo Basin forest, the true opportunity cost of logging and land use change will remain undervalued. In turn, this encourages unsustainable harvesting of forests to extract the only easily realizable value—timber. Proper accounting for intangible ecosystem services should be the basis for public policies that provide long-term welfare improvements.

Estimates of the value of sequestered carbon developed in this paper present several challenges requiring cautious interpretation, particularly due to the inherent limitations and potential inaccuracies of the chosen approaches. As mentioned, one major weakness is the complexity and variability inherent in natural systems, which makes precise quantification of sequestration difficult. The problem therefore arises of objectively quantifying carbon stocks and flows, which involves complex interactions within natural systems and between these systems and human activities.

Nonetheless, the estimates produced in this paper consider the net carbon flux and its economic value, highlighting potential significant contributions from countries like the Democratic Republic of Congo. This approach relies on crude estimates and assumptions about the price of carbon, for which there is currently no comprehensive market in Africa. Whereas the estimates presented above relate to the forest ecosystem and are preliminary, there are other aspects of natural capital and ecosystem services that could potentially tilt the estimates, including those pertaining to other environmental flows and renewable resources. Yet, despite these weaknesses, the computed estimates for the value of carbon sequestration showcase the potential GDP change of African countries if natural capital were fully accounted for.

Based on the above preliminary estimates and assumptions, the continent's GDP in 2022 could increase by $66.1 billion when adjusted for carbon sequestration, representing a potential expansion of about 2.2 percent (table 3.1). The Congo Basin countries—Cameroon, Central African Republic, Democratic Republic of the

TABLE 3.1 GDP of African countries with sequestration adjustment, 2022 (current $ billion)

COUNTRY	TRADITIONAL GDP ($ BILLION)	SEQUESTRATION-ADJUSTED GDP ($ BILLION)	CHANGE	
			$ BILLION	PERCENT
Central African Republic	2.45	10.56	8.11	330.81
Congo, Rep. of	13.51	18.46	4.95	36.63
Congo, Dem. Rep.	66.44	86.07	19.62	29.54
Gabon	21.12	25.73	4.62	21.86
Cameroon	44.94	49.43	4.49	9.99
Mozambique	18.41	19.93	1.52	8.27
Angola	122.02	129.83	7.81	6.40
Uganda	47.57	49.35	1.78	3.75
Zambia	29.12	30.18	1.06	3.64
Côte d'Ivoire	70.32	72.21	1.89	2.69
Tanzania	73.53	75.47	1.94	2.64
Ethiopia	120.36	122.56	2.20	1.83
Nigeria	477.38	481.04	3.66	0.77
Others	1,910.42	1910.29	−0.13	−0.01
Total	3,025.63	3,091.72	66.10	2.18

Note: Sequestration-adjusted GDP is computed based on the countries' GDP numbers at current prices adjusted for the estimated values of carbon sequestration.
Source: Author calculations based on EU ETS carbon offset price (see figure 3.8). Carbon sequestration data is from Harris et al. 2021. GDP data are from the Statistics Department, African Development Bank.

Congo, Republic of Congo, Equatorial Guinea, and Gabon—accounted for 63.7 percent of the estimated increase in sequestration-adjusted GDP. This demonstration effect is expected to trigger renewed global commitment towards NCA and provide the required impetus for African countries to sustain efforts at developing action plans for revaluing their GDP estimates. This will not only ensure that African countries recognize the economic value of their natural resources and incorporate these values into national economic planning, but also attract international funding to and investment in the mandatory valuation of ecosystem services.

The estimates of the value of carbon sequestration and its potential to increase African countries' GDP provide an opportunity for African leaders of the C-15 to lead the continent's advocacy for implementing mandatory requirements for countries to adopt policies for greening their GDP. A mandatory update of methodologies for measuring the wealth of countries to include their green wealth should be introduced and enforced. This approach will ensure that Africa leverages its natural capital to expand its economy, and increase its risk profile to mobilize resources in international capital markets to finance structural transformation.[115] The need for proper valuation of natural capital and associated ecosystems should focus on attracting investment in NCA beneficiation and conservation. The estimates presented in this paper represent the AfDB's initial effort to highlight the importance of proper valuation and beneficiation of Africa's natural capital for the continent's development efforts.

4

Natural capital accounting in Africa: Commitments and interventions

The UNSC spearheaded the efforts towards the SEEA by establishing the Committee of Experts on Environmental-Economic Accounting in 2007.[116] The committee had the primary objective of mainstreaming environmental-economic accounting as part of the official statistics. This process culminated in the SEEA CF, which was adopted by the UNSC at its forty-third session in March 2012. This section discusses the historical stages in the adoption and implementation of the SEEA in African countries.

Commitments

The commitments towards the SEEA in Africa began with the 2012 Gaborone Declaration for Sustainability in Africa, by 10 African countries (figure 4.1). Commitments included that to "integrate the value of nature into their national policies and programs, recognizing that nature is needed for economic growth and sustainability."[117] Conservation International was then designated by the government of Botswana as the secretariat for the declaration, with the mandate to promote further efforts to incorporate the value of nature in economic and social development decisions, among other roles.

In March 2015, the Gaborone Declaration was endorsed as the implementation vehicle for the African Ministerial Conference on the Environment's Regional Flagship Program on Africa's partnership for the Green Economy.

The Nairobi Declaration on Climate Change and Call to Action made at the inaugural Africa Climate Summit in September 2023 is another continental-level commitment towards Green GDP. This declaration called for the revaluation of GDP through the proper valuation of the

continent's abundant natural capital and ecosystem services.

These regional and continental declarations have motivated country-level resolve and initiatives to value nature, such as the Botswana Sustainable Environmental Diagnostic, the Natural Capital Accounting program in Ethiopia, the Environmental Sustainability Compliance Programme for the consumer goods sector in South Africa, and a program to ensure environmental sustainability in Rwanda.[118]

Interventions

Several interventions have been implemented to support the rollout of the SEEA, such as the WAVES and the Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES) programs.[119] Other initiatives include the Mapping and Assessment of Ecosystems and their Services and the Integrated System for Natural Capital and Ecosystem Services Accounting in EU territory.[120]

WAVES was a World Bank–led global partnership launched at the 2010 Convention on Biological Diversity meeting in Nagoya, Japan.[121] The project aimed to promote the mainstreaming of natural resources in development planning and national economic accounts. In particular, the project's objectives included building international consensus around NCA and helping countries adopt and implement these accounts. The project has seen engagements with several countries in the Global South. In Africa, Benin, Botswana, Chad, Côte d'Ivoire, Egypt, Ethiopia, Ghana, Kenya, Madagascar, Mauritania, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Togo, Uganda, and Zambia have all received World Bank support either under the WAVES program or the sequel programs WAVES Plus or GPS. These countries have implemented different activities on NCA, including establishing a coordinating mechanism among country-level generators and users of accounts. WAVES is now part of the GPS at the World Bank, which pursues broader objectives while continuing to assist low-income countries around the world, including in Africa, in establishing natural capital accounts.

NCAVES was launched in 2017 with an aim to advance the development of policy applications of environmental-economic accounting, particularly for ecosystem accounting. Pilot testing of the SEEA EA was done in five participating partner countries: Brazil, China, India, Mexico, and South Africa, with support from the

FIGURE 4.1 State signatories to the Gaborone Declaration for Sustainability in Africa

Source: Conservation International 2014.

EU. NCAVES sought to contribute to improving the measurement of ecosystems and their services and to mainstreaming biodiversity and ecosystems in policy planning and implementation.[122] The findings and experiences from NCAVES are said to have contributed to the adoption of the SEEA EA as a statistical standard in 2021 by the UNSC and helped establish the Africa Natural Capital Accounting Community of Practice (Africa NCA CoP).[123]

These interventions have brought to the fore a realization of the value of nature in human activities and wellbeing. Several studies have also been carried out to evaluate the contribution of the environment towards national development. For instance, a study was conducted to provide a first set of monetary ecosystem accounts at a subnational scale in South Africa, following SEEA EA guidelines.[124] Working on Kwazulu-Natal, the study estimated that the production of wild resources was South African Rand (ZAR) 3.1 billion in 2011, the resource rent value of livestock (commercial and communal) production was ZAR 1.47 billion, while the value of *in situ* ecosystem inputs to crop production was estimated at ZAR 7.5 billion. Other services are nature tourism, estimated at ZAR 0.64 billion; carbon storage and sequestration, ZAR 0.27 billion; wild pollination services, ZAR 0.05 billion; the estimated contribution of river flow regulation to infrastructure cost savings, ZAR 3.12 billion; sediment trapping through erosion control, ZAR 0.33 billion; and water quality amelioration, absorption, and breakdown of organic and inorganic pollutants in surface and subsurface water runoff, ZAR 0.016 billion.

Africa NCA CoP: This is another platform to promote NCA in Africa.[125] It is a regional learning and knowledge platform that aims to build momentum and mainstream NCA into statistical production and policy in all African countries by supporting best practices through capacity building and knowledge sharing with support from GPS, the Secretariat of the Gaborone Declaration for Sustainability in Africa, UNSD, and UNEP.[126]

The AfDB, alongside the Green Growth Knowledge Partnership, the World Wide Fund for Nature (WWF), and Economics for Nature launched the Natural Capital for African Development Finance (NC4-ADF) initiative in 2020.[127] The initiative sought to lay the foundation for mainstreaming natural capital in African development finance, covering AfDB operations as well as those of peer multilateral development banks (MDBs). The objective of the project is to mainstream natural capital in the operations of the AfDB and in the processes of its regional member countries (RMCs), to maintain Africa's natural capital, and to use it sustainably for the benefit of current and future generations. The project therefore contributes to ensuring that development interventions are designed and financed by incorporating the value of natural capital.

Status of natural capital accounts in Africa

The interventions described above and the political commitment among African countries have given impetus to implementing SEEA activities, seen in a gradual increase in countries' adoption and implementation of the SEEA. Global assessments of SEEA implementation have been conducted. The status of implementation is three-staged, reflected in SDG subindicator 15.9.1b: stage I is compilation of accounts, stage II includes the dissemination of accounts, and stage III is attained when there is regular compilation and dissemination. The 2023 global assessment reached out to 193 member states and 22 territories.[128] A total of 152 member states and territories responded: 90 of them—59 percent—were implementing the SEEA. Of these 90, 66 countries (73 percent), mainly in the Global North, fell under stage III (regular compilation and dissemination), 11 countries (12 percent) fell under stage II (dissemination), and 13 countries (15 percent) fell under stage I (compilation).

Africa, however, is still lagging in implementing the SEEA, with the lowest proportion among regions. Only 38 percent (16 countries out of 42 responding) of African countries were implementing the SEEA, compared with 93 percent in Europe and North America, 60 percent in Western Asia, and 57 percent in Central, Eastern, Southern, and South-Eastern Asia.[129] Table 4.1 lists responding African countries based on the stage of SEEA implementation.

Forty-two African countries responded to the UNSD global assessment survey (table 4.1). Of these, only 16 countries (38 percent) are implementing the SEEA: 8 in stage I, 3 in stage II, and 5 in stage III. Nonetheless, there is still momentum, as 23 more countries have indicated plans to implement the SEEA.[130]

Several African nations have already established institutional frameworks that enable them to create environmental accounts. These include South Africa (the only African country member of NCAVES), Botswana, Egypt, Ethiopia, Morocco, Madagascar, Rwanda, Uganda, and Zambia—all members of the World Bank's WAVES, WAVES Plus, or GPS programs.

TABLE 4.1 African countries and stage of SEEA implementation, 2024

NOT IMPLEMENTING		STAGE I	STAGE II	STAGE III
Algeria	Madagascar	Burundi	Ghana	Botswana
Angola	Malawi	Cameroon	Senegal	Kenya
Benin	Mali	Egypt	South Africa	Nigeria
Burkina Faso	Mauritius	Morocco		Uganda
Cabo Verde	Niger	Mozambique		Zambia
Central African Republic	Sierra Leone	Namibia		
Congo, Rep. of	Somalia	Rwanda		
Ethiopia	South Sudan	Tunisia		
Gambia	Sudan			
Guinea	eSwatini			
Lesotho	Togo			
Liberia	Tanzania			
Libya	Zimbabwe			

With the support of the European NCAVES project, South Africa was one of the first countries in Africa to embark on developing environmental satellite accounts, notably water accounts since the 2000s. Subsequently, the country developed accounts for other sectors such as energy, fisheries, and mining around 2015. By 2020, South Africa had satellite accounts for water and ecosystems (reserves, rivers, and lands). Today, the country plans to expand its natural accounts to include air emissions and biodiversity accounts. All these accounts have been developed by the South African National Biodiversity Institute, a structure set up to coordinate NCA activities, some of which will eventually be transferred to the Statistical Institute, except for biodiversity accounts, which will remain the institute's focus.

Apart from South Africa, assisted by NCAVES, other African countries have been supported by the World Bank through WAVES, WAVES Plus, and GPS. The main goal of these programs is to help these countries develop natural capital accounts to better understand the value of this key asset, in which Africa has a particular advantage. Examples of countries that have benefited from World Bank programs to develop specific accounts are:

▶ Egypt, which has developed accounts for air emissions and waste.

▶ Morocco, where accounts have been established in both volume and value for the fisheries sector, and volume accounts have been developed for agriculture.

▶ Uganda, assisted by WAVES Plus in creating volume accounts for the ecosystem sector and forestry accounts.

▶ Zambia, which has prepared accounts in both volume and value for the forestry sector, for land, and for water.

All but one (89 out of 90) of the countries and territories implementing the SEEA compile the SEEA CF but there are regional variations in the categories of accounts. For African countries, the top five categories are energy; water; agriculture, forestry, and fisheries; land; and ecosystems extent, and there are some similarities with other Global South regions but quite different from the priorities in North America and Europe, which focus more on air emissions and energy; material flow, environmental protection, and management expenditure; taxes and subsidies; environmental goods and services; and ecosystems extent.[131]

Implementation of the SEEA EA is still low globally. In Africa, only six countries—Ghana, Morocco, Senegal, South Africa, Uganda, and Zambia—are implementing the SEEA EA.[132] The 2022 global assessment shows that only 41 countries were implementing the SEEA EA.[133] Although this is an increase of almost 14 percent from the 2021 assessment, the number remains relatively low compared with the 89 implementing the SEEA CF. Of the 41 countries implementing the SEEA EA, 19 are from North America and Europe, and Africa is represented by the six countries mentioned above.

Status of System of National Accounts in Africa

An analysis of the accounts prepared by African countries reveals disparities between countries on the degree of implementation of both the SNA and SEEA. The status of SNA implementation among African countries shows significant progress but also highlights challenges for full implementation of the SEEA, including lags in implementing the SNA. The 2008 SNA, an update of the 1993 SNA, aims to provide a comprehensive framework for compiling national accounts data, offering more detailed and harmonized economic data.

In the 2023 global assessment, 38 out of 54 (70 percent) African countries are using the 2008 SNA,[134] while 13 (24 percent) are still working with the 1993 SNA.[135,136] Others such as South Sudan and Libya still use the 1968 SNA; for Eritrea, no information is available. Needless to say, the limitations in implementing the SNA make it harder to introduce the SEEA, and the resulting metrics less useful.

Besides the lags in transitioning, many countries also fail to compile all the accounts required by the national accounts systems. For instance, the balance sheet—one of the main links between the two systems—is important to better analyze natural capital accounts, according to the SEEA.

While the lack of completeness in the national accounts, according to the SNA, is no longer a reason for excluding countries from implementing the SEEA, implementing the 2025 SNA will require countries to make the necessary efforts to integrate the two accounts from the previous SNA and for the SEEA to have integrated national accounts with the natural capital dimension. In its development, the new 2025 SNA validates most of the recommendations related to natural capital except that relating to recording natural losses.[137] Of the 14 guidance notes on the consideration of "well-being and sustainability," nine are proposed to consider the new features of the SEEA in the 2025 SNA.

Status of GDP rebasing in Africa

The 2008 SNA recommends updating the GDP base year every five years to ensure that the changes in economic structures are well reflected. This recommendation is targeted at ensuring improvements in accuracy of estimates, at incorporating new data sources, and at capturing key developments in the economy. However, most RMCs do not meet the five-year periodicity for various reasons, especially the high costs for undertaking the requisite surveys. The AfDB survey carried out in June 2023 showed the progress made by RMCs in rebasing their GDP numbers. Findings showed that:[138] 4 RMCs (Rwanda, Uganda, Kenya, and South Africa) are compliant with the internationally recommended base year updating standard of 5 years; 38 RMCs use a base year 5–15 years old; 11 RMCs use a base year more than 15 years old; and one RMC (Eritrea) compiles *ad hoc*.

The compilations of current GDP have implications for member countries' economic standing. Economic structures, as well as concepts, methods, and sources of data, are constantly evolving. Various factors explain the updating of a base year, including: the appearance of new products or the disappearance of old ones; changes in consumption, production, and marketing habits; the appearance of new and better sources of quality data; and methodological changes such as those that occurred with the adoption of the 2008 SNA. GDP rebasing allows policymakers to use a set of economic statistics more representative of a country's economic structure. It inevitably modifies macroeconomic indicators expressed in terms of GDP, notably GDP per capita or debt-to-GDP ratios. As a result, rebasing can have significant economic consequences, including affecting a country's sovereign credit ratings.

The current GDP estimates in RMCs are constrained by the challenges relating to methodology adopted and the base year in use. These constraints have nontrivial implications for the national, continental, and global development agendas.

▶ Underestimation of RMCs' GDP numbers: GDP rebasing following the standard periodicity and international standards (2008 SNA) provides coherent, reliable, comparable, and up-to-date economic aggregates. Above all, it leads to credible GDP estimates that are essential to the design of indicators for steering the economies of RMCs and monitoring and evaluating numerous development projects and programs, including the High 5s and the Ten-Year Strategy. The use of outdated base years leads to the underestimation of economic activities in Africa. A survey conducted by the AfDB showed that GDP rebasing increases GDP numbers on average by 15 percent, with exceptional cases such as Nigeria (90 percent), Gambia (52 percent), and Comoros (72 percent). Such large increases point to the fact that the numbers used before the rebasing were heavily underestimated. Detailed results by country (where available) are in Annex 1.

▶ Sectoral misrepresentation in published figures: The lack of comprehensive GDP numbers due to the use of outdated base years and compilation manuals leads to the misrepresentation of the relative importance of various sectors of the economy, which in turn creates incorrect assessments and forecasts of economic performance, misguided investment decisions, a wrong policy focus, and suboptimal resource allocation.

▶ International perception and credibility: Regular rebasing is a mark of robust statistical practice. Thus, failure to rebase raises

concerns about the overall quality and reliability of a country's statistical system, explaining why countries that do not rebase their GDP regularly are perceived as less economically dynamic, thereby affecting their global economic rankings. International organizations, financial markets, and bilateral partners may question the credibility of a country's economic statistics, undermining financial aid, trade agreements, and economic partnerships.

GDP rebasing is hampered by a lack of institutional and technical capacity in many African countries. The reasons given to justify outdated periodic rebasing in RMCs include the shortage of financial resources to organize essential surveys (see Annex 1). Few RMCs are willing to invest in statistics as a public good to inform policy decisions. A number of national statistical systems have therefore depended on donor support to undertake some of these key surveys, an approach that we consider unsustainable. While funding in the form of grants for statistical production has declined globally, RMCs are also reluctant to borrow to invest in statistical production, including GDP compilation. At the AfDB, the only support that can be provided to RMCs through the Regional Public Goods envelope and the administrative budget is around technical assistance, and not to conduct surveys. This challenge is compounded by limited human resources, including turnover of skilled staff in national statistical offices.

The AfDB needs to include discussions on improving GDP numbers as part of its dialogue with RMCs in order to explore the possibilities of incorporating some of the required surveys in its operations. These will complement the technical assistance efforts spearheaded by the Statistics Department (ECST) and allow gradual improvement in the timeliness and quality of national accounts compilation in the region.

Supporting capacities in international and regional institutions

United Nations Statistics Division

UNSD has the mandate to develop standards and norms for statistical activities, and support countries' efforts to strengthen national statistical systems.[139] It is pivotal in supporting SEEA implementation, including the capacity to support NCA in Africa, as evidenced by various initiatives and collaborations aimed at promoting such implementation globally, including in Africa. In particular, UNSD promotes international-standard methods, classifications, and definitions used by national agencies, and assists member states to improve national statistical services by providing advice and training. UNSD is, together with UNECA and the World Bank, the most important provider of technical assistance to Africa when it comes to SEEA.[140]

With regional partners, UNSD has held capacity-building workshops and technical training tailored for African countries. For example, the report on the provisional agenda for the fifty-fifth session of the UNSC refers to the importance of building capacity in member states, emphasizing support for those with limited resources, as with many African countries. Notably, UNSD maintains the SEEA standard, and develops and disseminates guidance notes, methodological frameworks, and tools for SEEA implementation, providing essential policy support to African nations.[141]

Further, UNSD participates in research and development to expand the SEEA framework, including ecosystem accounting, which is highly relevant for Africa's rich biodiversity. This work includes developing thematic accounts like carbon, water, and biodiversity, which are crucial for sustainable management of Africa's natural resources. Through these efforts, UNSD demonstrates the capacity to provide support that African countries can tap into so as to expand their NCA and promote sustainable development and environmental stewardship.

World Bank

The World Bank has been a primary supporter of NCA in Africa, promoting sustainable development by integrating environmental data with economic decisionmaking. It has supported several interventions for establishing NCA such as WAVES and its successor GPS, in which the World Bank provided technical expertise and financial assistance. These interventions have benefited several African countries and generated a wealth of learning for use in ongoing and future interventions. Examples include support for Botswana to develop water and mineral accounts; for Rwanda to develop land, water, and ecosystem accounts; for Madagascar to develop NCA focusing on forestry and mining sectors; for Ethiopia to develop land, water, and forest accounts; and for South Africa to develop natural capital accounts, including water and energy accounts.

The World Bank is also implementing the project "Accounting for Natural Capital in the Congo Basin Forest Countries," covering six countries in the Congo Basin forest: Cameroon,

Central African Republic, Democratic Republic of Congo, Republic of Congo, Equatorial Guinea, and Gabon.[142] The project, part of the World Bank's advisory services and analytics program, seeks to help these countries leverage finance for sustainably managing their forest ecosystems. Under this project, the World Bank is supporting the development of NCA and has commissioned consultants to carry out a two-year project to (i) compile and develop capacity on NCA and adjusted macroeconomic indicators; (ii) support dialogue on mainstreaming the consideration of forest ecosystems and values into national development and sectoral planning; and (iii) build capacity in sustainable forest management.

These examples reflect the World Bank's commitment to supporting African countries in their efforts to develop and implement NCA frameworks through technical expertise and financial assistance. This support is crucial for countries lacking the necessary resources or expertise to undertake such comprehensive accounting on their own.

United Nations Environment Programme

UNEP is the leading global authority on the environment and aims to find solutions to the triple planetary crisis of climate change, nature and biodiversity loss, and pollution and waste.[143] Its work is focused on helping countries transition to low-carbon and resource-efficient economies, strengthening environmental governance and law, safeguarding ecosystems, and providing evidence-based data to inform policy decisions.[144] The lead UN body on environmental matters, UNEP uses science-policy interventions to accelerate the sustainability of natural resource endowments in Africa through its Regional Office for Africa, and has collaborated with other institutions and UN agencies to drive initiatives supporting NCA. For instance, it has collaborated with the AfDB in developing the Natural Capital Atlas for Africa.[145]

In addition, UNEP has a dedicated entity, the World Conservation Monitoring Centre, which supports governments with knowledge, tools, and capacity to measure and account for impacts and dependencies on natural resources.[146] This Centre has contributed to NCA through its partnership in programs and initiatives aimed at mainstreaming natural capital in development decisions such as one with UNEP, which evaluated the contribution of forests to national income in Ethiopia and linkages with the Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiative.[147]

United Nations Economic Commission for Africa

UN Regional Commissions are important for supporting NCA initiatives in their regions. As part of their mission, they promote sustainable development and economic integration. For instance, UNSD has been collaborating with UN Regional Commissions in conducting seminars and capacity building on NCA.[148] In Africa, the UN Economic Commission for Africa (UNECA) continues to provide policy advocacy, capacity-building support, technical assistance, and research- and knowledge-sharing to promote NCA. In particular, UNECA seeks to enhance the knowledge base needed to strengthen human and institutional capacities, and aims to broaden stakeholder participation in protecting Africa's environment and in improving management of its mineral resources.[149] Through its African Centre for Statistics, UNECA provides technical assistance to African countries to help them develop their statistical systems and capacities.[150] UNECA is the second-largest provider of technical assistance on NCA in Africa.

UNECA is part of many regional engagements organized by UNSD to build capacity in African countries on NCA. One example is the African Climate Policy Centre, whose work intersects with NCA, especially in areas related to climate finance, adaptation strategies, and the valuation of ecosystem services as part of comprehensive climate policy development.[151] UNECA has also promoted green and blue economy initiatives, efforts that also encompass components of NCA, and partnerships for sustainable development in which UNECA partners with other UN agencies including UNSD and with other international organizations and regional bodies.

African Development Bank

The AfDB has a mandate to mobilize resources for economic and social advancement of its 54 RMCs by promoting investment in public and private projects to reduce poverty and improve living conditions. It focuses on addressing infrastructure deficits; strengthening regional integration; providing technical assistance and policy advice for sustainable development; and promoting investments in health, education, and environmental sustainability. The AfDB has immense experience of, and capacity for, implementing NCA in Africa. For example, the commitment of its African Natural Resources Management and Investment Centre (ECNR) to the NCA agenda is evident through its engagement in initiatives such as the Africa NCA CoP and the NC4-ADF. Similarly, the Macroeconomic

Policy, Forecasting and Research Department (ECMR) is conducting policy analysis and providing advice to African governments that makes it vital for effective utilization of NCA/SEEA data, particularly in guiding policy reforms.

Likewise, the Statistics Department (ECST) is crucial in providing technical assistance for collecting and compiling national statistics, and is also positioned to support SEEA implementation in RMCs and to form synergies with 2025 SNA implementation. The Country Economics Department (ECCE) can play a defining role with its country economists bridging the gap between regional actors and countries.

Finally, the mandate of the African Development Institute (ECAD) revolves around strengthening RMC capacities to achieve sustainable development and poverty reduction. It does this through capacity building, knowledge broking, policy dialogue, research, policy analysis, technical assistance, advisory services, partnerships, and collaboration. Specifically, it has launched a Virtual Academy on Natural Capital with ECNR and the Green Growth Knowledge Partnership.

International Institute for Sustainable Development

An independent think tank, the IISD advances the concept and application of NCA and related wealth measures to promote inclusive and sustainable development.[152] According to it, a country's wealth encompasses five types of capital: financial, produced, human, social, and natural (figure 4.2). It argues that each type is important because each is an input into the broad "societal production function" for wellbeing.

With the support of Canada's International Development Research Centre, the IISD has developed comprehensive wealth accounts to complement GDP in three countries: Indonesia,

FIGURE 4.2 Five types of capital

Source: International Institute for Sustainable Development.

Ethiopia, and Trinidad and Tobago. This work was based on the IISD's methodology for estimating comprehensive wealth in Canada (2016 and 2018). The IISD has worked closely with economic experts and researchers from universities in the three project countries—Universitas Indonesia, Mekele University in Ethiopia, and the University of the West Indies—to develop expanded wealth measures to complement GDP using national data. Its country experts were responsible for liaising with national statistical offices, central banks, and other data providers to collect data, calculate indices, prepare reports, and consult on policy recommendations. The IISD team provided guidance, capacity building, and quality control, and arranged peer-support meetings among the country experts. The approach was strongly collaborative from the start, with the goal of ensuring country ownership of the methods and results.[153] The project was guided by a project advisory committee of experts from UNEP, the World Bank, and the Organisation for Economic Co-Operation and Development (OECD), as well as independent experts.

This experience shows that with support, countries can produce expanded wealth measures. The IISD found that Ethiopia has made good progress in expanding its comprehensive wealth, though its level remains far below that in many other countries. The stock of wealth measured in constant 2017 Ethiopian Birr (ETB) per capita grew by 103 percent from ETB 102,853 ($12,071) in 1992/1993 to ETB 208,522 ($24,472) in 2019/2020.

World Wide Fund for Nature

WWF has been at the forefront of integrating NCA into conservation and sustainable development practices. Its approach to NCA aims to measure and value the world's natural resources, emphasizing the critical role they play in supporting economies and wellbeing. WWF advocates for integrating NCA into national economic and environmental policy frameworks and has collaborated with a range of partners to promote NCA adoption and implementation. In addition, WWF implements demonstration projects and case studies, whose findings are used in its capacity building and technical assistance to countries adopting NCA. For instance, it is one of the collaborating organizations in the AfDB's Natural Resources Management and Investment Action Plan on designing nature-asset classes, policies, and solutions to help countries leverage their natural asset values to scale up green finance and investments for sustainable development. WWF has also supported
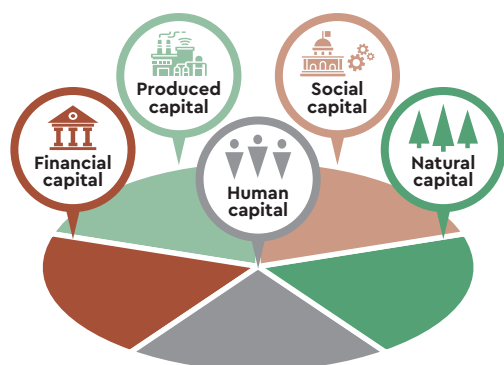
country-level NCA efforts, such as Zambia's second Forest Account report.[154]

Africa Natural Capital Accounting Community of Practice

In Africa, the World Bank has supported countries through a regional effort under the Africa NCA CoP, which WAVES Plus started in 2019, sparking momentum, and many countries have since started NCA programs. The Africa NCA CoP was officially established on 1 July 2020 and has since provided a platform for African countries to learn, seek, or share knowledge, and to bring together professionals from governments, institutions, nongovernmental organizations, and academia interested in or working on NCA in Africa. Several regional and global organizations in Africa, such as AfDB, UNECA, UNEP, and UNSD, have provided technical support to the initiative, while the World Bank's WAVES (and now GPS) funded the secretariat and major events. Recently, more than 500 members were participating in activities of the Africa NCA CoP as individual or organizational members and as country focal points, with 36 African countries represented. Many governments have appointed focal points, enabling it to communicate with them directly.

The end of the World Bank's leadership in supporting the NCA CoP in 2024 presents an opportunity for the AfDB, with its convening power in the continent, to leverage its experience in hosting similar activities and to increase its commitment to this program. Under the leadership of the AfDB, the Africa NCA CoP could advance the work on measuring the green wealth of nations, implement the SEEA as part of the 2025 SNA, and ensure the uptake of green policies in African countries.

A similar platform is the Global Ocean Accounts Partnership's Africa Community of Practice, which seeks to support the integration of oceanic economic, social, and environmental data into decisionmaking using frameworks like the SEEA. In particular, this CoP focuses on supporting African nations in establishing and developing their ocean accounts to better manage and sustain ocean resources, not only contributing to environmental conservation but also boosting economic opportunities and supporting livelihoods of communities dependent on marine resources.

Natural Capital for African Development Finance

In 2020, the AfDB and the Green Growth Knowledge Partnership joined forces with WWF and the Economics for Nature team to launch this NC4-ADF project. The project's objectives are to mainstream natural capital in AfDB operations, maintain Africa's natural capital, and use it sustainably to benefit people and make economic progress. The project ensures that development interventions are designed and financed with due consideration of the value of natural capital. The project (i) integrates natural capital into the AfDB's development finance operations; (ii) prioritizes the role of natural capital in Africa's post-COVID-19 recovery; and (iii) convenes peer signatory MDBs to develop a common vision for mainstreaming nature-based solutions in support of the MDB Joint Nature Statement released at COP 26 in 2021. The program has an applied, cocreative approach based on four pillars, and offers multiple opportunities for high-level impact, in part because it:

▶ integrates natural capital in African infrastructure finance;

▶ develops a business case for natural capital in development finance institutions;

▶ integrates natural capital in African sovereign credit ratings; and

▶ builds capacity for NCA and assessment in Africa.

The AfDB has prioritized these pillars with the Green Growth Knowledge Partnership and its Natural Capital Expert Group since November 2017. There are both global and on-site components managed through a Joint Implementation Committee drawn from key partners. These activities are building blocks for gaining internal support, momentum, and capacity at the AfDB, and in Africa, to mainstream natural capital in development finance on the march to 2030. Activities under the NC4-ADF initiative contribute directly to mainstreaming natural capital at both AfDB and country level. The goal is being achieved through cocreated knowledge generation, capacity building, the convening of global and regional stakeholders, political and institutional advocacy, and global communication.

The project has two phases. Phase 1 used targeted policy instruments to support, for current and future generations (i) long-term transformational and incremental adaptation towards reducing vulnerability and enhancing adaptive capacity and resilience; (ii) the collective wellbeing of people; (iii) the protection of livelihoods and economies; and (iv) the preservation and regeneration of nature. Phase 1:

▶ Co-established the Africa NCA CoP with partners.

▶ Assessed the $161 million AfDB Kakono Hydropower Project in Tanzania using the Sustainable Asset Valuation[155] methodology to demonstrate why sustainable infrastructure delivers better value for money.

▶ Assessed the natural capital of the Pemba-Lichinga Integrated Development Corridor in Mozambique, a $47 million Special Agro-industrial Processing Zone (ADF grant). The assessment modeled ecosystem services and biodiversity measures under the project baseline scenario and compared them with a natural capital scenario.

▶ Convened peer signatory MDBs to develop a common vision for mainstreaming nature-based solutions in support of the MDB Joint Nature Statement released at COP 26 in 2021.

▶ Produced three policy briefs on mainstreaming natural capital in African development finance: (i) Financing green recovery using natural capital approaches across Africa: A brief on the role of development finance institutions in financing green recovery using natural capital approaches in Africa; (ii) Practical applications of natural capital approaches to evaluating investment projects in Africa; and (iii) Activating the green recovery action plans in Africa through nature-based solutions and natural capital approaches.

▶ Finalized a technical note on the regional status of investments in nature-based solutions from a scan of MDB portfolios. The draft technical note sought to understand the status and trends of MDB investments in nature-based solutions for climate and water resilience in Sub-Saharan Africa with a focus on the AfDB the World Bank over 10 years (2012–21).

▶ Designed a Virtual Natural Capital Academy. (The draft modules and learning materials are being finalized for launch.)

Despite these achievements, phase 1 did not properly use a whole-of-system approach, and measures of economic growth were not well captured. Insufficient funding also limited the scope of capacity strengthening required to mainstream natural capital in African development finance. With the adoption of the Kunming-Montreal Global Biodiversity Framework in Montreal in December 2022 and the AfDB's African Economic Outlook 2023 focusing on harnessing natural capital for green growth, the NC4-ADF initiative required technical, spatial, and temporal expansion of scope, leading

to the design of phase 2, which hinges on a theory of change focusing on addressing the institution-, knowledge-, and policy-based barriers for GDP transformation, while building climate and nature resilience in 13 African countries.[156]

Country selection was based on weak natural resource governance[157] given the lack of institutional capacity, particularly for managing natural resources (water, forest, land, and minerals), which led to low levels of access to financing instruments to provide capital liquidity and know-how for supporting green economic activities. The need for resource mobilization targeting ADF-eligible countries under some existing AfDB trust funds, such as the Climate Action Window, was a major reason for selecting phase 2 countries. Other reasons were poor knowledge of environmental and biodiversity valuation tools and analysis, including 'nature as an asset'; linkages to climate resilience and GDP growth; limited access to best practices or technology to improve natural resource management; and the need to reduce or manage key drivers of loss and degradation of ecosystems by most financial regulators.

With these points in mind, phase 2 was designed to manage the emerging unacceptable levels of risks to nature from large investment projects. The NC4-ADF project logic is to build resilience by managing climate and risks to nature through an integrated system of policy, skills acquisition, and institutional capacity in NCA to measure and integrate Africa's green wealth into GDP. The project's chances of success are based on the following key assumptions:

Strategic relevance of NCA: NC4-ADF phase 1 raised awareness and brought to the forefront the importance of policy- and decision-making related to natural capital in shaping Africa's development pathways. Following the foundational work under each of the pillars in the first two years of the program, the third year consolidated this work into outputs to be used for engagement, advocacy, knowledge generation, and concrete policy- and capacity-building support to public development banks, financial regulators, and African Union member states.

Long-term political and institutional aspirations: African governments are interested and invested in providing long-term support to climate-resilient extractive activities that are increasingly based on green economic development. These are driven by the inclusive value

of natural wealth to catalyze investments in core sectors that will reduce harm to nature, biodiversity, and the climate; lower the impact of degradation; and provide new opportunities to build resilient, sustainable societies.

Green wealth GDP adjustment requires changes in policy-based, financial, and nature-smart interventions: Catalytic investments in nature-based solutions, combined with broad de-risking and "soft" support including policy guidance, technical assistance, and training, can equip governments, financial regulators, local communities, businesses, political actors, and institutions with the agile support required for developing nature-based economic models. It is assumed that valuations, including those of nature and biodiversity, will crowd in more investment.

Adequate demand for self-perpetuated growth —country ownership: Each African coastal country has an exclusive economic zone with obligations to manage all the resources it contains, from the surface to the subsoil. There are adequate resources and demand for investment in GDP revaluation based on natural capital and ecosystem services to support the long-term sustainability of the proposed interventions. Activities proposed as part of this NC4-ADF project would doubtless catalyze a paradigm shift that will deploy internal resources, businesses, and community support not only to perpetuate a revalued GDP, but to drive a nature-positive change that propels inclusive economic growth, creates jobs, and promotes responsible natural resource use, resulting in enhanced climate change resilience.

5

An agenda for green national accounts and policies in Africa

As seen in previous sections, NCA has been increasingly applied in Africa since the 1990s. Even so, African countries still have a long way to go to fully include the values of its natural capital and ecosystem services into the metrics used for policy analysis and strategic decisions. A concerted action agenda is therefore warranted. But before outlining such an agenda, we consider some of the experiences from previous interventions. As the World Bank WAVES program had a very similar objective when launched more than a decade ago, it is apposite to relate to its theory of change (table 5.1), as a starting point for crafting a new agenda to increase the application of NCA in Africa.

Lessons learned and policy shifts

The WAVES program has, to date, been the most comprehensive for building NCA-related capacity in multiple countries, in Africa and beyond, for policy uses. The program has condensed its experience into 10 lessons (box 5.1).

NCA implementation has come a long way from being an academic exercise. Already at the first Global Forum on Natural Capital in November 2016, there was a consensus that NCA should focus on changing policies rather than generating accounts (table 5.2).[158]

At the same forum, the 10 living principles for NCA were launched (table 5.3). The table summarizes perspectives and approaches that are also relevant in developing and implementing an agenda of action for better recognition of the so-far undervalued natural resources and ecosystem services in Africa.

An actionable agenda for mainstreamed natural capital accounting and green policies in Africa

Despite ambitious initiatives by international organizations, MDBs, and national governments,

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BOX 5.1 Ten lessons learned from implementing WAVES

Mandate: Continued high-level support for the development and use of natural capital accounts is essential for securing NCA's mandate and for opening up the most strategic entry points.

Policy focus: If natural capital accounts are designed to be decision centered, they can be uniquely fit to inform today's difficult, interconnected decisions.

Flexibility: Country programs have been most successful when they have combined quick analyses to support decisions with longer-term development of NCA.

Engagement: NCA takes off when diverse data suppliers and potential data users are well connected, building trust and realizing synergies in their work.

Cooperation and coordination: A national steering committee of NCA producers, users, and quality assurers, supported by technical working groups, can smooth the path to developing, using, and embedding NCA. A complementary policy working group can further embed the results in policymaking.

Communications: A dedicated communications strategy can engage stakeholders, ensure that NCA's role and results are visible and understood, and deliver the right messages to target audiences.

Institutionalization and capacity: Effective NCA is an iterative system, not a one-off project; time needs to be allowed to develop, use, prove, and embed NCA.

Transparency: Knowing how and by whom data were acquired, analyzed, interpreted, and made accessible is critical for NCA's credibility and trustworthiness, but there is no single solution.

Multiple levels: NCA adds value at all scales from national to local; although WAVES is focused nationally, some of the toughest decisions that NCA can inform are proving to be intensely local and distributional.

Networking: Bringing together a community of practice can accelerate the learning, expand the knowledge base, build the capacity, and provide the confidence necessary to improve NCA.

Source: WAVES Plus Closeout Report 2016–2022, p. 10.

TABLE 5.1 WAVES theory of change

ACTIVITIES	OUTPUTS	OUTCOME	PROGRAM OBJECTIVE
Support to integrate natural capital approaches in decisionmaking ▶ Country support ▶ Global engagement	▶ NCA developed in pilot countries ▶ Pilot country capacity building provided ▶ Worldwide dissemination and learning on NCA undertaken	Strengthened capacity at country level in production and use of NCA for decisionmaking	NCA data and analyses informing government decisions

Source: World Bank 2021a.

TABLE 5.2 A shift from supply- to demand-side emphasis in natural capital accounting

FROM…	TO…
Technical focus—get NCA methods and data right	Decision focus—get natural capital policy right
Supply side—NCA production is separate from policy production; NCA struggles to get policy uptake	Demand side—policy players engage with NCA players, and thus shape NCA purpose/focus
Government focus on policy—as a government domain, that is, "what government wants"	Stakeholder view of policy—what business, civil society, and government want, and how they agree
Focus on formal policy decision—NCA trying to change one policy decision or plan	Enable policy discourse by many—NCA helping debate and review as well as making decisions
Data provision—NCA producers putting out raw data and hoping they will be used	Information demand—"policy entrepreneurship," or getting policy-relevant information to many users
NCA is a "magic bullet"—promoted on its own	NCA works with complementary tools
Experimental one-off approaches	Mandated—comprehensive and routine NCA system

Source: Vardon et al. 2017, p. 6.

TABLE 5.3 The 10 living principles for natural capital accounting

COMPREHENSIVE	
1. Inclusive	Acknowledging the diverse stakeholders concerned with decisions affecting natural capital, responding to their information demands, and respecting different ideas of value, using appropriate means of engagement
2. Collaborative	Linking producers and users of natural capital accounts for policy analysis and policymakers using natural capital accounts results and building mutual understanding, trust, and ability to work together
3. Holistic	Adopting a comprehensive, multidisciplinary, interdisciplinary approach to the economic and environmental dimensions of natural capital and to their complex links with policy and practice
PURPOSEFUL	
4. Decision centered	Providing relevant, timely information for indicator development and policy analysis to improve and implement decisions with implications for natural capital
5. Demand led	Providing information that decisionmakers at specific levels request or need
TRUSTWORTHY	
6. Transparent, open	Enabling and encouraging public access and use of natural capital accounts, with clear communication of results and their interpretation, including limitations of data sources, methods, and coverage
7. Credible	Compiling, assessing, and streamlining data from all available sources and deploying objective, consistent science and methodologies
MAINSTREAMED	
8. Enduring	With adequate, predictable resourcing over time, assuring continuous application and availability, and building increasingly rich time series of data
9. Continued improvement	Learning focused, networked across practitioners and users, testing new approaches, and evolving systems to better manage uncertainty, embrace innovation, and take advantage of emerging opportunities
10. Embedded	Natural capital accounts production and use becoming part of machinery of government and business, building capacity, increasing institutional integration for sustainable development, and incorporating natural capital account use into procedures and decision-support mechanisms

Source: World Bank 2021a, p. 108.

NCA implementation has so far been piecemeal in Africa. According to the most recent global assessment, only 15 countries in Africa have compiled at least one account in the past five years.[159] Even if we add the five additional countries that have received support by WAVES and NCAVES, more than half of countries in Africa are still very early in the process of adopting NCA. It is therefore time for a concerted effort to account for African resources.

The following actionable agenda can provide a structure for such an initiative. The agenda contains the basic building blocks shown in figure 5.1. The impact in terms of improved inclusive and sustainable policies for green growth comes from integrating relevant metrics that fully capture the true values of natural resources and ecosystem services. However, to provide this information, participating countries need to build capacity while they further sharpen the methodologies and valuation tools. Key for implementation will be to nationally and regionally institutionalize the initiative and coordinate efforts. All of these activities need to be supported by sustainable financing to ensure long-term viability and impact.

Because the ultimate objective is to improve policy, participating countries should also focus on the contributions that improve data, as well as the organization of SEEA accounts and related analyses that can contribute to policy. Figure 5.2 shows how these interactions were

depicted by the WAVES program in its closeout report.

Institutionalizing natural capital accounting

Mandate: The first point in the lessons learned from the WAVES program was the importance of mandate. It is therefore essential to gauge the high-level commitment and ambitions in each country as the starting point for further interventions.

Assessment and gap analysis: The next step is to assess the current level of adoption. The UNSD global assessment survey had responses from 42 African countries. Although 27 of them replied that they were not implementing the SEEA, there is still key information compiled as part of this assessment. This can be combined with further information gathering necessary to tailor interventions to each participating RMC. To this, a gap analysis should be added, identifying gaps in institutional frameworks, capacities, and data availability. This is best done by field missions to compare written assessments with realities on the ground.

Legal and policy frameworks: Implementing actors would work with RMC governments to develop and amend legislation and policies that mandate the inclusion of the SEEA in national accounting systems and NCA perspectives in

FIGURE 5.1 Building blocks of an actionable agenda for mainstreamed natural capital accounting and green policies in Africa
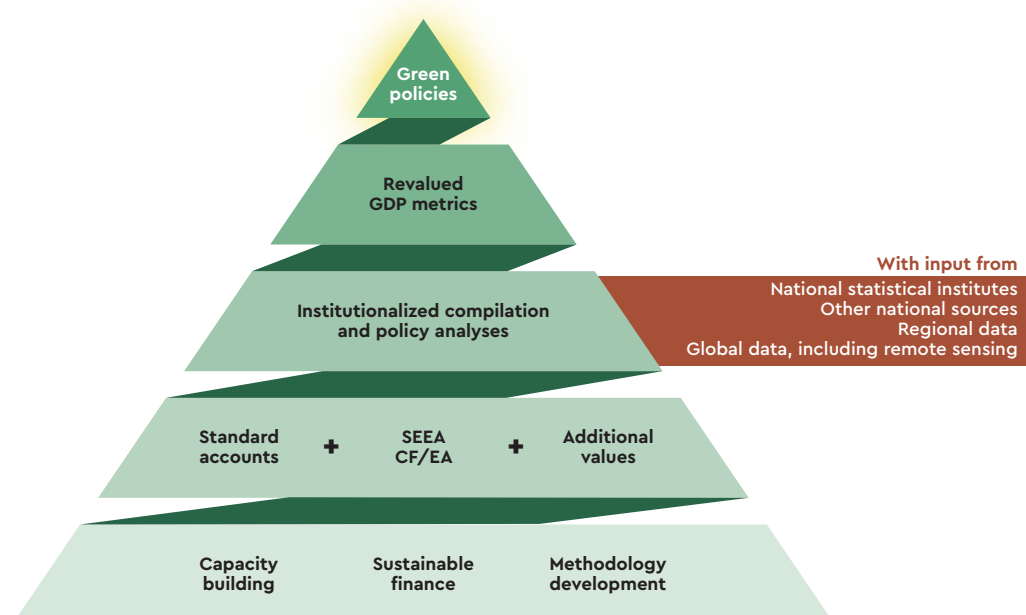
Source: Author's illustration.

FIGURE 5.2 The natural capital accounting policy cycle and information system
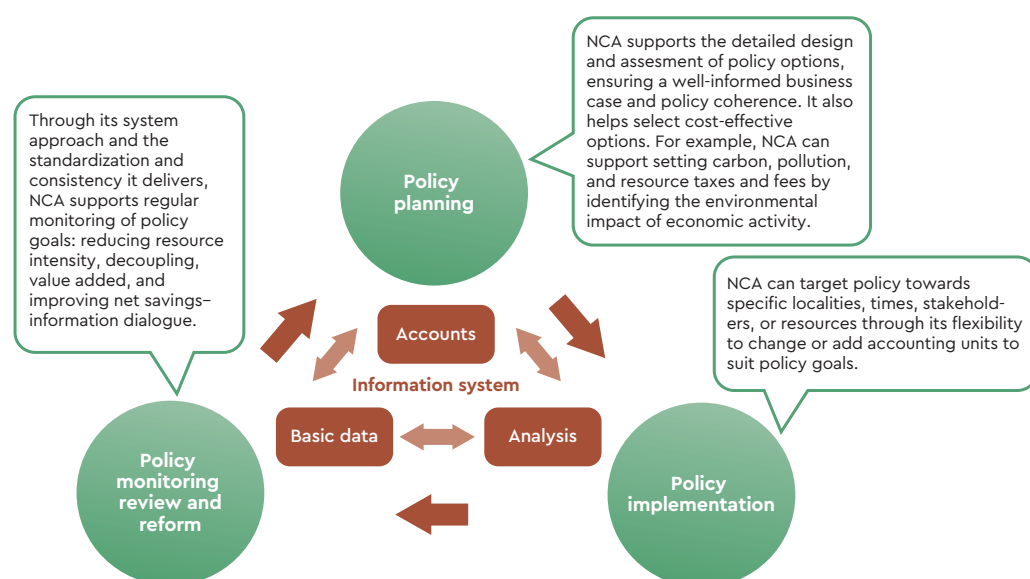
Source: Vardon et al. 2016

decisionmaking processes. In doing so, there are excellent opportunities to draw on the experiences of countries that have already started implementation in previous interventions.

Establishment of dedicated units and platforms: Experience shows that sustained implementation of NCA demands that implementation responsibilities be institutionalized. There is therefore a need to support the establishment or strengthening of dedicated NCA units within national statistical offices, as well as ministries of finance or environment. These units would be responsible for developing, coordinating, and applying NCA. Given that the SEEA is now part of the 2025 SNA, institutionalizing the SEEA should be seen as a component of this new standard. There is also a need for interministerial coordination and interactions with other stakeholders in society.

Integrating NCA findings into policy

The second key lesson from the WAVES programs was to maintain a policy focus. Improved policies that increase sustainability and value added are, after all, what is also needed to improve credit rankings. It is therefore essential to encourage the integration of NCA findings into national development plans, sectoral policies, and strategies to ensure both sustainable use of natural resources and economic planning that considers the value of ecosystems. Successful policy integration requires involvement of more stakeholders than, for example, statistics bureaus. Most important is that the main users of the policies, such as ministries of

finance and environment, need to be on board. But there is also great value in involving local academic institutions and think tanks in the policy analysis of the new data. On areas of policy integration, the following are pertinent:

Strategic policy analysis: Existing national development plans, sectoral policies, and strategies should be analyzed to identify potential entry points for NCA integration. Such analysis could be the starting point for new strategies and plans that more fully consider the value of natural resources and ecosystem services.

Specific policy formulation: Dedicated analytical teams (internal or external to the government) could collaborate with policymakers and civil servants to formulate new, or revise existing, policies by incorporating NCA findings to ensure sustainable resource management and economic planning.

Monitoring and evaluation: Many, if not most, of Africa's challenges are very time sensitive. Poverty needs to be battled at the same time as climate adaptation is addressed, as energy access is provided, and as food production is increased —to name a few. The role of, and implications for, natural resources and ecosystem services will be easier to assess with NCA and corresponding data in place. Mechanisms should therefore be established for monitoring and evaluating major interventions, particularly their impacts on ecosystem services. Similarly, it would also be advisable to evaluate the impact of NCA on policy and planning processes. It is important that impact

evaluations be carried out by actors independent from the implementing agencies, such as independent academic institutions.

Regionalizing coordination and support

While there are many NCA-related processes that countries can conduct better at national level, such as data collection, adoption of standards, and country-specific policy analysis, other matters could be more efficiently handled by international or regional institutions, such as the AfDB. The following are examples of responsibilities that could be included in a regional support function for accelerated implementation of NCA in Africa:

Coordination of international support: Many African countries already rely on international support for implementing the SEEA. The 2023 UNSD global assessment reports that 25 African countries receive technical assistance.[160] This number is expected to increase rapidly, because 23 of 27 currently non-implementing countries are planning implementation. There is therefore an obvious need for regional coordination of NCA international support in Africa to support efficient implementation that reduces duplication of effort.

Knowledge sharing and exchange: A regional facility could also convene regional workshops, conferences, and study tours to promote experience sharing and mutual learning among African countries. Several countries are already quite advanced, having reached stage III in SEEA implementation. Agencies in these countries could partner with agencies in less experienced countries to facilitate mentoring and accelerate implementation.

Improved support systems: There is also a need to invest in new information technology (IT) and artificial intelligence (AI) capacity. New technological innovations can reduce the workload, freeing staff to carry out more important tasks. Improved IT and AI systems and platforms can be smart investments in future efficiency of domestic agencies. For example, a regional facility could invest in developing a mobile application and dashboard for geospatial mapping of natural capital, biodiversity hotspots, and stocks and flows for Africa ("Nature-Fit"), which can be made available to countries.

Provision of shared practices: Much of the necessary material for national implementation can be provided by a regional facility. Examples include: (i) translation of the SNA and associated manuals into countries' official languages; (ii) adaptation of SNA standards to the African context; (iii) adaptation of classifications (such as ISIC. rev5, CPC. rev3[161]) to the African context; (iv) integration of the 2025 SNA changes into the tools used by national accountants; and (v) implementation of adequate IT tools (currently, ERETES and NADABAS are the most commonly used by African countries).[162]

Expanding the Africa Natural Capital Accounting Community of Practice

Regional coordination and support could also utilize the Africa NCA CoP. It is a vibrant CoP that involves more than 500 people from 36 African countries, and can be leveraged on to ensure sustained NCA implementation in the region. It is also an ideal vehicle to enable dialogue between stakeholders who need to be involved in NCA implementation, such as government agencies, civil society, and businesses. The 2023 Africa NCA CoP policy forum in Nairobi was concluded with a unanimous call for an expanded, refreshed, and regionally embedded NCA CoP to drive the data and analysis needed for answering Africa's future challenges. It asserted the value and urgency of expanding the NCA CoP, especially for training, capacity building, peer-to-peer knowledge exchange, and leadership within Africa. The forum emphasized that the Africa NCA CoP should be embedded in African regional institutions if it is to play a leadership role in the rollout and use of NCA in Africa. Given this call for action, the following activities are proposed:

Strengthening the Africa NCA CoP: This requires enhancing the operational capacity of the Africa NCA CoP through funding, technical support, and leadership development. According to its steering committee, the Africa NCA CoP should be embedded in African regional institutions. By assuming responsibility to host the NCA CoP, the AfDB will be able to demonstrate its capacity to support African countries with policy dialogue, advisory services, and technical assistance on measuring the green wealth of nations, and thereby help ensure the uptake of green policies in African countries.

Networking and collaboration: The NCA CoP network should be expanded to include more countries, institutions, nongovernmental organizations, and private sector stakeholders interested in NCA. This activity also requires a stronger secretariat with more staff.

Knowledge management: A knowledge management platform should be developed to

facilitate exchange of information, resources, and experiences among NCA CoP members. This activity could possibly be merged with some of those proposed in the next section.

Building capacity

Training programs: Successful implementation of the SEEA and resulting policy analysis will depend entirely on the availability of well-trained human capital in each country. Previous interventions, such as short-term training of civil servants in pilot countries, have shown positive results in increased awareness and improved skills. Such dedicated capacity development opportunities must be provided at a much larger scale than previously to support the aspired implementation of NCA, focusing on data collection, analysis, and application.

But retooling alone is not enough for the needed leap—new people have to be hired. According to the UNSD global assessment, African countries have an average of only 3.2 full-time equivalent staff employed for compiling SEEA accounts.[163] Recruiting and retaining staff with relevant expertise can also create positive ripple effects to the rest of the organization. Given the importance of natural resources and ecosystem services to African countries, and the dearth of essential human capital in this area, there should also be dialogue with academic institutions to ensure that their graduates have the necessary skills to sustain implementation.

The combined demand for national accounting and policy analysis related to natural resources should be enough to warrant dedicated programs. It is equally important that trained staff are given incentives to remain in the dedicated institutions. As it is a common problem that capacity building leads to increased turnover of staff, special efforts are therefore needed to ensure that trained staff are granted incentives to remain in their specialized roles.

Technical assistance: Even with this domestic capacity, experiences from other international programs show that there will still be a role for international expertise to support implementation. As an example, the World Bank reports on positive outcomes from its targeted technical assistance support in its WAVES Plus program.[164] Provisions should therefore be made for ongoing technical support to national teams through expert consultations, mentoring, and advisory services.

Opportunities and synergies with 2025 SNA implementation: The 2025 SNA will provide all countries with a unified framework for incorporating natural capital into the ongoing work to update national accounts. Indeed, the 2025 SNA modifies the classification of nonfinancial assets, which had two categories in the 2008 SNA (non-produced nonfinancial assets and produced nonfinancial assets), into five categories: (i) produced nonfinancial assets; (ii) non-produced nonfinancial assets; (iii) natural capital; (iv) human capital; and (v) social capital. This modification will allow for the inclusion of natural capital as an asset capable of generating operations in goods and services and thus be properly integrated into the measurement of macroeconomic aggregates.

African countries face the challenge of developing natural capital accounts adapted and compliant with the 2025 SNA. To overcome it, alignment with current manuals (SEEA CF and SEEA EA) is crucial to avoid the lags observed in applying the various SNA versions still used in Africa (1968, 1993, and 2008). The rollout of the 2025 SNA and the related capacity-building activities provide a great opportunity to also make progress in implementing the SEEA. There is, however, an obvious risk that national statistical institutes will be stretched, or even overburdened, by the 2025 SNA. It is therefore essential that extra resources for capacity building, and new positions related to the SEEA, are made available. A stepping stone for this is provided in the action plan in Annex 2. This is aimed at improving the quality of economic statistics of RMCs and at supporting accelerated implementation of the 2008 SNA in many African countries, preparatory to their adopting the 2025 SNA and the subsequent mainstreaming of natural capital and ecosystem services in national accounts.

Developing methodologies
Africa still has a long way to go in implementing NCA. This holds, in particular, for proper valuation of ecosystem services that are often complex, with large spatial variations in values that are not even registered in ordinary markets. There is therefore still a great need for developing methodologies further, not least for improving the valuation of African nonmarket ecosystem services. The focus would be to ensure that NCA methodologies are robust, adaptable, and capable of addressing the specific challenges and priorities of African countries, as now outlined.

Ecosystem services valuation: Developing methodologies to value ecosystem services accurately is crucial, particularly given the need to consider spatial variation and that many of

these values are expected to change over time. The SEEA EA distinguishes 37 ecosystem services.[165] Among the more important for African policies, as well as for global agreements—but also challenging to value for African countries —are global climate regulating services, such as carbon retention, as well as the multiple aspects of biodiversity.[166]

Of particular importance for Africa is the proper valuation of both fossil fuel reserves (and the social cost of carbon if developed) and carbon sequestration opportunities such as forests, peatlands, and agricultural systems that sequester carbon. The net effect can be expected to differ greatly between countries. Still, ecosystem services valuation for Africa can be jump-started using a combination of remote sensing and AI. In a report on valuation of ecosystem services for inclusion in the SEEA[167], eight such relevant knowledge platforms are presented. Of special interest for this report is ARIES, an integrated, open-source modeling platform that has been specifically designed to facilitate ecosystem accounts. In addition, a general research agenda is already proposed related to the development of ecosystem accounts.[168] This is important because the current framework for integrating ecosystem services in the SNA is still constraining the inclusion of these values in policies. Major strides can therefore also be taken independent of SEEA implementation. There is therefore also a need for a dedicated PhD program at regional level to ensure continued methodology development over time, tailored to African needs.

Improving credit ratings through NCA: There are expectations that an enhanced NCA can improve the credit ratings of African economies rich in natural resources. The AfDB argues that "rich natural capital on the continent stands as a barometer of the confidence and creditworthiness of African governments" and that African countries should earn better ratings thanks to their wealth of natural capital.[169] The AfDB called for a two-pronged approach for African countries: the current credit rating approach ought to reflect natural capital in sovereign credit rating methodologies, and to support RMCs in enhancing credit risk profiles by integrating the true value of their natural capital. Although the AfDB has voiced such aspirations, more evidence is needed on exactly how improved natural capital valuation can be translated into improved credit ratings, including identifying what it would take to move from resources to reserves estimates, and thereby get access to reserves-based lending.

Unpaid ecosystem services in trade: The value of unpaid ecosystem services and other environmental costs embedded in country exports and imports should also be considered more closely. These include the hidden costs of land, forest, and marine degradation, as well as pollution. For African countries, the amounts embedded in natural resource intensive exports (including minerals) are much greater than the amounts embedded in their imports (mainly capital goods and some services). It may be possible to make computations of the net amount that African countries provide as "free" goods, especially to countries in the Global North, the main export destinations for Africa's natural resources.

Disaggregating these costs by commodity could be very useful, not least as part of trade negotiations. For example, mining causes significant environmental damage, including greenhouse gas emissions, acidification, eutrophication, and eco-toxicity, the costs of which are not accounted for in value, resulting in overestimation of the returns from mining. Some estimates of these impacts have been made for minerals,[170] and there are even studies on individual mining sectors.[171] For agricultural production, the hidden costs include loss of forest (where land is converted), nitrogen and phosphorous emissions, and other damage to ecosystems. Estimates of such costs have been made by country for the agriculture sector.[172] Such analyses could be extended to identify the costs associated with exports of key commodities from selected countries to the rest of the world.

Integration with policy- and decisionmaking: Methodologies must be developed with a clear path towards integration into policy- and decisionmaking. This includes having a good understanding of the interests and information needs of stakeholders, as well as creating NCA outputs that are policy relevant, easily understandable by nonexperts, and capable of being incorporated into existing economic and environmental planning frameworks. The focus should be on demonstrating how NCA can inform policies in key sectors such as agriculture, forestry, mining, energy, and tourism, which are fundamental to Africa's development.

Data collection, management, and analysis: Robust methodologies for collecting, managing, and analyzing data are needed to support NCA, such as establishing standardized protocols for data gathering on natural capital assets and flows to ensure comparability between

countries, developing databases to store and manage the data, and utilizing IT tools to analyze and disseminate findings. Addressing the current glaring gaps in data availability and quality is especially important for countries with limited resources, particularly in human capital.

Addressing scale and complexity: The methodologies must be adaptable to the diverse contexts of African countries, given the varying scales (national, regional, and local) and the complexity of natural capital assets. This involves developing both scalable approaches that can be customized to different ecosystems and socioeconomic conditions, and methodologies that can handle the interconnectedness of natural capital components.

Engagement and stakeholder participation: Methodologies should facilitate engagement and participation from a broad range of stakeholders, including government, the private sector, communities, and civil society. This approach will ensure that NCA is inclusive and reflects the values and priorities of all segments of society. Engaging stakeholders in developing and applying NCA can enhance its relevance and acceptance.

Ensuring sustainable financing

Finally, there will be a strong need for financial and technical support for program implementation in RMCs. Previous pilot programs, with limited geographic reach, have been running to the millions of dollars. As implementation depending on the reallocation of existing scarce resources will remain slow, we turn to the steps necessary for ensuring sustainable financing.

Comprehensive financing strategy: There is a need to develop a comprehensive strategy for financing NCA initiatives that can cover both the common costs (that can be considered as a public good for the continent) and the specific costs related to implementation in African countries. Based on past experience, it is expected that it will be quite costly both to push the boundaries of valuation of ecosystem services and to mainstream more ambitious accounting in African countries. The first step in the strategy will therefore be to identify just how expensive this can be. After establishing the target funding, the strategy would need to identify sources of international support and of domestic funding; innovative financing mechanisms; and a blend of African Development Fund (ADF), non-ADF, Bank Trust Funds, and cofinancing from donor and domestic funding.

Partnership development: Quite a few international actors are already involved in supporting NCA implementation. Most African countries implementing the SEEA receive technical support, with an increasing number of actors involved. It will therefore be essential to build partnerships not only with such international organizations, but also with financial institutions and private sector partners, to secure sustainable funding and support for NCA.

Use of related markets: The financing strategy should seek opportunities in related markets, such as carbon markets and biodiversity financing. The African Economic Outlook 2023 identifies such opportunities.[173] However, it will still take dedicated work to ensure that these markets are truly beneficial to the countries involved, particularly to vulnerable groups that might be affected. Synergies between improved NCA and these markets should be identified.

Investment in NCA projects: To secure sustainable financing, the design and implementation of specific NCA projects should be developed as clear investment cases, demonstrating the benefits of NCA for green growth and improved wellbeing. Such design would need to go hand in hand with the necessary skills. The AfDB team is already working towards capturing Climate Action Window funds to help build the fundraising capacities of pilot countries. Training staff at these institutions on how to raise funds autonomously will be important to sustain NCA implementation in African countries.

Implementation modalities and the AfDB's role

The AfDB is well positioned to play a pivotal role in mobilizing African countries to embrace the measurement of natural capital and to integrate it into their GDP estimates. It should, first, demonstrate the potential GDP of RMCs if natural capital were fully accounted for. As seen in this paper, the AfDB can make a compelling case for African countries to invest in NCA. By fully integrating natural resource flows into their GDP calculations, particularly from renewable resources, African countries can better reflect their true economic potential and promote sustainable development practices.

Further, it is important for the AfDB to continue advocating for the adoption of the SEEA, which provides a standardized framework for integrating environmental data with economic accounts. This should be complemented by

accelerated provision of technical assistance and funding to develop the necessary infrastructure and expertise for environmental accounting in Africa, and so enhance the capacity of national statistical offices to collect and analyze environmental data accurately. In addition, collaborating with international organizations and leveraging existing carbon markets can also help in establishing reliable valuation mechanisms for natural capital, as envisaged in the 2025 SNA. The AfDB can also fund pilot projects in selected African countries that demonstrate the practical applications and benefits of fully integrating natural capital assets into their national accounts.

Applying the findings from this paper could catalyze a series of interventions laying the groundwork for significant contributions to NCA and SEEA implementation across Africa, improving green growth, wellbeing, and credit ratings. This section now provides some potential implementation modalities, highlighting the critical role of the AfDB, given its mandates and capacities.

The AfDB emerges as the logical leader in Africa for developing improved economic indicators on which to base nationwide policies. In developing such initiatives, the AfDB should consider drawing on other organizations, such as the World Bank and OECD, which have made substantial investments and impressive progress in institutionalizing NCA in their organizations. These experiences could lay the groundwork for developing implementation modalities and institutionalizing capacities at the AfDB and other African institutions, in light of the above actionable agenda (see the previous section).

Institutionalizing natural capital accounting: Much of the institutionalization will need to take place at high interministerial level in each RMC. For successful implementation at continental level, there is also need for concerted action as done with the Gaborone Declaration in 2012. And the above quote from the Nairobi Declaration on Climate Change and Call to Action bears repeating: "We call for revaluation of the Gross Domestic Product of Africa through the proper valuation of its abundant natural capital and ecosystem services including but not limited to its vast forests that sequester carbon to unlock new sources of wealth for Africa. This will entail the use of natural resource accounting and development of national accounting standards."[174] Similarly, the Africa NCA CoP in the Nairobi Declaration Statement and Call to Action (September 2023, Section 15) "[c]all on

governments, the African Union (AU), the African Development Bank (AfDB), other regional bodies, including the United Nations Economic Commission for Africa (UNECA), technical experts, business and finance sector, donors, and decision-makers to collaborate and support the Africa NCA Community of Practice in unlocking Africa's natural capital for sustainable development and climate resilience."

The AfDB, with its strong mandate and expertise, is particularly well placed to heed the call. Under the primary coordination of the Vice Presidency for Economic Governance and Knowledge Management, there are five particularly relevant departments that can fulfill important roles in implementing and institutionalizing NCA at the AfDB: ECMR can play a coordinating role and ensure that the policy focus of the work is maintained; ECNR has strong analytical expertise related to managing renewable and nonrenewable resources; ECST is key in collecting and compiling data and providing policy advice to support the region on the SNA and in facilitating data collection, which is particularly relevant given the 2025 SNA; ECCE is needed for country engagement and dialogue with national authorities, and to serve as a key "relay" for data collection and capacity building; and ECAD provides capacity development to policymakers and stakeholders in RMCs and within the AfDB.

Integrating NCA findings into policy: While most of the policy analysis needs to be carried out at country level by ECCE, more general analysis is also needed, much of which could be harvested from academic institutions and think tanks, but it has to be synthesized and made available to implementing partners. ECMR is the obvious anchor for this work, with the resource experts in ECNR and country economists in ECCE.

Regionalizing coordination and support: A strong regional coordination function will be required. The AfDB is well positioned to provide this, given the combined strengths of ECAD, ECCE, ECMR, ECNR, and ECST. However, such an initiative would also need a strong institutional anchor and dedicated professional capacity. Combining this anchor with the hosting of the Africa NCA CoP could also be considered, to maximize synergies.

Expanding the Africa NCA CoP: The AfDB, particularly ECNR, is a cofounder and cochair of the Africa NCA CoP. In this role, the AfDB could now increase its engagement, particularly given the

strategic position of the NCA CoP to be embedded in an African regional institution. The NCA CoP could then be one implementing arm of the implementation agenda, and its steering committee (which also includes representatives of key implementing countries) could be relied on as a sounding board for the initiative. Other communities of practice could be relevant for implementation, such as the African Group on National Accounts, which was created to support implementation and standardization of SNA methodologies. The experience from the NCA CoP is that many of the elements in the actionable agenda, such as strong local ownership of national strategies, sustained financing, and external technical support, are also important to maintain the vibrancy of the NCA CoP.

Building capacity: The most urgent capacity-building activities relate to upgrading the skills of civil servants in related ministries and agencies in the RMCs. UNSD, the World Bank, and other international organizations have already designed and provided such training. This material could be used at a much larger scale by the African Development Institute through its recently procured virtual learning platform, supported by the Virtual Academy on Natural Capital. ECNR, ECST, ECAD, and ECCE can also be instrumental in adding content to the training and country-level dialogue. International organizations and experts in the field should be invited to contribute to the effort. As mentioned, ECST and ECCE will be instrumental in implementing the 2025 SNA in Africa through their close working relationship with UNSD and RMCs. (See also the action plan in Annex 2.) There also is a

first-rate opportunity to increase SEEA implementation, but additional financing is required.

Developing methodologies: Much of the methodology development and improved valuation work will need to be carried out in academic institutions, particularly in African universities and professional societies. It would be ideal to have the proposed regional anchor (see above) responsible for organizing this work, using the expertise and networks of ECCE country economists and ensuring that the work is fed into NCA implementation in participating countries. ECCE could be a key source for on-the-ground monitoring and evaluation of the work from the AfDB side.

Ensuring sustainable financing: Because this function also involves partnership coordination, it would be beneficial if it was combined with the other coordinating functions in the NCA anchor at the AfDB. The AfDB has a strong history of designing and implementing financing solutions, so the ideal situation would be for it also to host a facility for implementing NCA/SEEA in Africa. The same development-partner coordination could be used at country level by ECVP through its country economists, as this is in its purview.

Through these implementation modalities and the AfDB's role, the actionable agenda not only recognizes the AfDB's centrality for advancing NCA in Africa but also lays out a collaborative framework involving external partners and internal departments, positioning it as a leader in the continent's transition to greener, more sustainable economies.

6

Conclusion and next steps

This paper is grounded in the fact that Africa is rich in resources but its population remains poor. A natural first step towards receiving a better return from its resources is to account for them by assigning proper monetary values and including them in the core metrics used for policy decisions. The objectives should therefore be to:

▶ Institutionalize regular estimation of produced, human, nonrenewable, and renewable natural capital (stocks).

▶ Utilize these more comprehensive capital measures to improve credit ratings, lower financial costs, and increase investments in Africa's green transition.

▶ Based on these improved stock measures, on the expanded valuation of ecosystem services, and on ambitious implementation of the SEEA in the rollout of the 2025 SNA, develop improved flow metrics that go beyond GDP as currently calculated.

▶ Use the data and these more inclusive metrics for improved policymaking that better utilizes the wealth of natural resources and ecosystem services to improve wellbeing and sustainability throughout Africa.

▶ Use knowledge of natural assets to design and implement policies that can transform African economies by investing in programs and projects that sustainably create substantial value added from African resources that also contribute to employment and good working conditions.

While the combination of NCA and a revalued GDP is not a silver bullet, it provides useful information that helps countries better manage Africa's vast resources. Thankfully, this is made much more possible through the advances in NCA and incorporation of important aspects of the SEEA in the 2025 SNA. In some cases, there is also a need to continue to push the boundaries for what is being valued, and how. The challenge is now to implement these advances, collect, and then make good use of these data in policy analysis and strategic decisions. This paper has outlined how to do this and has proposed an actionable agenda. Key steps for its realization are:

▶ That Heads of State mandating the agenda's implementation maintain attention to it by, for example, hosting a side event with the C-15 at the Summit of the Future at UN Headquarters in September 2024, as well as hosting a special event at COP 29 to present these plans and obtain feedback.

▶ That the active role of African regional organizations such as the African Union, AfDB, and UNECA is maintained to ensure coordination of, and support for, the agenda.

▶ That the Africa NCA CoP will be hosted by the AfDB or one or several such regional organizations.

▶ That there is agreement among regional actors and most African countries on a concerted effort to implement supply and demand support for NCA, the SEEA, and other relevant approaches in Africa, and that sufficient human and financial resources are allocated.

▶ That international organizations active in implementing NCA agree to coordinate their implementation efforts in Africa under the auspices of the Africa NCA CoP, hosted by the AfDB and/or the African Union Commission.

▶ That there is a commitment to continued methodology development for inclusion of all relevant values in core economic metrics, such as GDP, and that these are translated into better policies and financial terms in the international credit markets.

▶ That institutions and capacity are strengthened at global, regional, and national levels to implement this agenda.

▶ That the awareness and appreciation of this agenda are maintained through information-sharing, strategic dialogue, targeted dissemination, and enhanced social media presence.

▶ That all African countries are encouraged to rebase their GDP, drawing on updated NCA incorporating the latest SEEA principles to keep their GDP estimates accurate and at par with those of their peers.

Status and action plan of SNA implementation in Africa

TABLE A1.1 Results of survey conducted by the AfDB on status of SNA implementation

N°	COUNTRY	CURRENT BASE YEAR	NEXT SCHEDULED BASE YEAR	REASONS WHY COUNTRIES HAVE BEEN UNABLE TO REBASE	IMPACT ON GDP OF GDP REBASING	SNA
1	Algeria		2024	Access to detailed information	8.50%	1993
2	Angola	2002	2015	Missing data and some consistency from the data sources		1993
3	Benin	2018	2024	Reduced staff numbers and insufficient financial resources to carry out specific surveys	36.70%	2008
4	Botswana	2016	2025	Outbreak of COVID-19, which led to virtual meetings with consultants; analysis of surveys results; compilation of Supply and Use table (SUT) for the first time without physical technical assistance	During the latest GDP rebasing, it decreased by 3.6% due to update on taxes on products to harmonize the compilation with Southern African Customs Union member states	2008
5	Burkina Faso	2018	2024	Human and financial resources	13.50%	2008
6	Burundi	2016		Source data availability	20%	2008
7	Cameroon	2005		Availability of data for extension of the central framework (financial accounts in particular)	3.60%	2008
8	Cabo Verde	2015		COVID-19	9.6%	2008
9	Central African Republic	2005	2019	Quality of human resources, dependency on funding from technical partners		2008
10	Chad	2005			25.40%	2008
11	Comoros	2011	2023	Availability of data, insufficient human, financial, and material resources	0.72	1993
12	Congo, Dem. Rep.		Yes	Insufficient data for implementation (financial difficulties in collecting certain dataà		1993
13	Congo, Rep.	2005	2024	Financial, material, and human resources		1993
14	Côte d'Ivoire	2015	2023	Financing of the project of rebasing of the annual national accounts as well as the alignment of the quarterly national accounts	38.20%	2008
15	Djibouti	2015				2008
16	Egypt	2021/ 2022	No, it's updated	Limited challenges	No	1993
17	Eritrea					
18	Ethiopia	2015/ 2016	2023	Internal conflict	High	1993
19	Gabon	2001	2019	Training of executives on the processing of Financial Intermediation Services Indirectly Measured (FISIM) and insurance according to SNA 2008, public administration, availability of sources such as balance of payments, structural survey for public administration		1993

N°	COUNTRY	CURRENT BASE YEAR	NEXT SCHEDULED BASE YEAR	REASONS WHY COUNTRIES HAVE BEEN UNABLE TO REBASE	IMPACT ON GDP OF GDP REBASING	SNA
20	Gambia	2013	2023	Financial constraints	Yes	2008
21	Ghana	2013	2025	Timeliness of data from surveys and censuses and the comprehensiveness of the data	27%	2008
22	Guinea-Bissau	2015	2025	Difficulty of technical staff in number and quality to respond to the challenges of appropriation concerning preparation of national accounts	Yes	2008
23	Equatorial Guinea	2006	2023	Absence of major surveys such as census of establishment, business register, supply and use tables, census of agriculture		1993
24	Guinea	2016	2023	Financial and human problems	No	1993
25	Kenya	2016		Resource constraints to conduct benchmark surveys	8.1%	2008
26	Lesotho	2012	2025	Lack of funding to undertake surveys for rebasing		2008
27	Liberia	2016	2023	Obtaining data for compiling GDP on a timely basis	N/A	2008
28	Libya	2008		Lack of data due to administrative and political difficulties		1968
29	Madagascar	2018	2023	Financial, nonexistent statistical infrastructure, human resources, political instability	20.5%	1993
30	Malawi	2017	In 2024	Understaffing (4 officers) to release national accounts in timely fashion. Financial challenges for conducting surveys required	The new base year has a wider coverage of Industries and products than the old base year	2008
31	Mali	2019		Financial and human resource problems		2008
32	Morocco	2007	2023		0.082	2008
33	Mauritania	2020	2025	Human resources	22.70%	2008
34	Mauritius	2018		Response rate in data collection	Around Rs 9.7 billion change due to GDP rebasing. GDP has also changed due to improvement in methodologies	2008
35	Mozambique	2014	Will be 2019			2008
36	Namibia	2010	2025	Absence of major surveys such as census of establishment, business register, supply and use tables, census of agriculture	−3.7%	2008
37	Niger	2018	2023–2024	Need financial support	33.50%	2008
38	Nigeria	2010	Yes, proposing 2023	Financial constraints to finance supplementary data to complement benchmark survey conducted	Back-casting series from 1981 to 2021	2008
39	Rwanda	2017	We plan to rebase by 2024 with base year 2023	In 2023, had planned to rebase GDP on base 2020, but never had quality data for 2020 due to COVID-19	Level of GDP has changed up 2%	2008
40	São Tomé and Príncipe	2010/ 2011	2023	Financial difficulty in carrying out small studies, training technicians involved in national accounting, and in the process of changing the base year	Yes, the GDP rebasing had a positive impact on the national GDP	1993

N°	COUNTRY	CURRENT BASE YEAR	NEXT SCHEDULED BASE YEAR	REASONS WHY COUNTRIES HAVE BEEN UNABLE TO REBASE	IMPACT ON GDP OF GDP REBASING	SNA
41	Senegal	2014		Difficulties in obtaining certain sources of data (production costs in the primary sector, data on armaments, R&D); classification of companies (mineral exploration, companies with several declared activities, etc.)	0.294	2008
42	Seychelles	2014	2024	Lack of data to match methodology	3.32%	2008
43	Sierra Leone	2006	2023	Staff retention in the section, inadequate technical support	No	1993
44	Somalia	2017	2023	Had collected the household budget survey in 2022 and planned to rebase in 2023		2008
45	South Africa	2015	Next round of benchmark is in 2025	N/A	Figures in 2015 (2015 base) at current prices were higher by 9.2% compared with 2015 (2010 base)	2008
46	South Sudan	2009	It depends on the availability of data	Data gap for rebasing; the data we are using is outdated	Never rebased since independence	2008
47	Sudan	1981/ 1982	Planned when resources are available	Financial constraints to conduct surveys	GDP new base year reflects the real Sudan economy	1968
48	eSwatini	2011	Plan is to change it by 2023/2024	Technical assistance and financial constraints to procure experts	GDP was revised upwards	2008
49	Tanzania	2015	Not applicable to Tanzania	There is no significant change, as Tanzania has already implemented 2008 SNA in the 2015 base year. However, the remaining areas of SNA such as institutional sector accounts need to be implemented in the next GDP revision	Better portrays economic activities in the country by taking on board new activities and taking out obsolete ones	2008
50	Togo	2016	2023	Financial constraints		2008
51	Tunisia	2021	N/A		6%	2008
52	Uganda	2016/ 2017	2025	Financial resource constraints, data issues	1%	2008
53	Zambia	2010		Financial constraints		2008
54	Zimbabwe	2019	N/A	Lack of sufficient data due to pandemics and related shocks	No change in growth rate of past series	2008

N/A is not available.

An action plan for accelerating RMCs' compliance with the 2008 SNA framework

This action plan is aimed at improving the quality of economic statistics of regional member countries (RMCs) and at supporting the accelerated implementation of the 2008 SNA in many African countries, preparatory to the adoption of the 2025 SNA and the subsequent mainstreaming of natural capital and ecosystem services into national accounts. This action plan rests on five pillars and 15 concrete actions.

Pillar 1: Diagnostic assessment of the needs of lagging countries

Action 1: Organize field missions to assess the state of national accounts compilation in the 15 countries identified as lagging to clearly establish their needs. For a country like Eritrea that has no formal GDP numbers, an extended mission will be conducted to review the available administrative data and advise on the best indicator to be generated for the country. This action on Eritrea needs to be immediate.

Action 2: Advocate for the coordination and building of synergies for technical and financial support from all partners—African Development Bank Group (AfDB), International Monetary Fund (IMF), World Bank, United Nations Economic Commission for Africa (UNECA), African Union, The Economic and Statistical Observatory of Sub-Saharan Africa (AFRISTAT), Common Market for Eastern and Southern Africa (COMESA), etc.—involved in national accounts in the targeted RMCs.

Pillar 2: Support for basic data collection and tailored advocacy campaign

Implementation of the 2008 SNA encourages GDP rebasing, a process that requires a range of datasets from main surveys and administrative sources. This requires the involvement of all stakeholders in the national statistical system.

Action 3: Strengthen the AfDB's team of national accounts staff (currently two experts) with top-notch consultants (at least four) in national accounting with varied linguistic profiles to cover all targeted countries.

Action 4: Engage the AfDB's ecosystem in the data collection and financing awareness campaign for producers, users, and national authorities. This will involve engaging with the AfDB operations team on possible inclusion of GDP improvement in country dialogue and the possibility of including the undertaking of requisite surveys for improving national accounts data compilation as part of the benchmarks for programs with RMCs. Considerations may be made to include a grant component to facilitate improvement of economic data in Bank-financed projects.

Action 5: Support RMCs based on identified needs to organize the key surveys necessary for 2008 SNA implementation and to gather all relevant available data from administrative sources. The most recurring surveys that are key for this process are the census of business establishments, household budget surveys, labor force surveys, education surveys, specific trade and transport margin surveys, Non-Profit Institutions Serving Households (NPISH) surveys, and intermediate employment surveys. The costs of these surveys vary depending on the country environment. However, on average, a household budget survey central to rebasing would require between $0.4 million and $0.8 million. New data sources such as "big data" and use of artificial intelligence will be explored.

Pillar 3: Drive the compilation of national accounts based on the 2008 SNA

Action 6*:* Accelerate the provision of technical support to specific RMCs with inadequate skilled human resources to process the data collected for the compilation of their national accounts.

Action 7: Facilitate the recruitment of resident experts to support small national teams responsible for the compilation of national accounts.

Action 8: Expand technical support to national teams to cover the updating of their national accounts classifications (mainly products and activities).

Action 9: Provide technical support to RMCs in implementing one of the IT tools (such as ERETES or NADABAS) recommended by the African Union for compiling national accounts for reasons of comparability and reliability.

Pillar 4: Support data validation, national accounts back-casting, and data dissemination

Action 10: Organize data validation missions. These will include peer reviews by experts from RMCs that are advanced in national accounts compilation as reviewers for the lagging countries.

Action 11: Once the national accounts for any of the lagging RMCs have been validated, the AfDB will financially support the dissemination and publishing of the new economic indicators.

Action 12: Organize technical missions to requesting countries to conduct back-casting exercises based on the new base year with a view to making the data series consistent and reliable, as an instrument to help manage the economy and development projects.

Pillar 5: Facilitate the implementation of the 2025 SNA and the mainstreaming of natural capital and ecosystem services into national accounts of RMCs

In 2025, a new SNA will be adopted by the United Nations. For smooth and timely implementation, an African strategy must be developed accompanied by an awareness campaign for RMCs. Also, the continent is well-endowed in natural capital and ecosystem services capital that will be mainstreamed in national accounts figures following the recommendations of the forthcoming 2025 SNA.

Action 13: Maintain close engagement with relevant stakeholders, including academia, with a view to domesticating the methodological advancements planned under the SNA 2025 towards assisting the RMCs in their adoption of the SNA 2025, including helping to identify the implied data requirements for the new methodology.

Action 14: Organize in 2025 a regional workshop for reflection on the strategy for implementing smoothly the 2025 SNA in Africa.

Action 15: Work with RMCs on how to mainstream natural capital and ecosystem services in their current national accounts in line with the recommendations in the forthcoming 2025 SNA. This can begin by focusing on advanced countries on natural capital and ecosystem services satellite accounts like South Africa, Uganda, and Zambia.

Country name abbreviations

TABLE A3.1 Country name abbreviations used in figure 3.2

ABBREVIATION	COUNTRY
AGO	Angola
BDI	Burundi
BEN	Benin
BFA	Burkina Faso
BWA	Botswana
CAF	Central African Republic
CIV	Côte d'Ivoire
CMR	Cameroon
COD	Democratic Republic of Congo
COG	Republic of Congo
CPV	Cabo Verde
DZA	Algeria
ERI	Eritrea
ETH	Ethiopia
GAB	Gabon
GHA	Ghana
GIN	Guinea
GMB	Gambia
GNB	Guinea-Bissau
GNQ	Equatorial Guinea
KEN	Kenya
LBR	Liberia
LBY	Libya

ABBREVIATION	COUNTRY
MDG	Madagascar
MLI	Mali
MOZ	Mozambique
MRT	Mauritania
MWI	Malawi
NAM	Namibia
NER	Niger
NGA	Nigeria
RWA	Rwanda
SDN	Sudan
SEN	Senegal
SLE	Sierra Leone
SOM	Somalia
SSD	South Sudan
STP	São Tomé and Príncipe
SYC	Seychelles
TCD	Chad
TGO	Togo
TZA	Tanzania
UGA	Uganda
ZMB	Zambia
ZWE	Zimbabwe

Notes

1   https://www.afdb.org/sites/default/files
     /2023/09/08/the_african_leaders_nairobi
     _declaration_on_climate_change-rev-eng
     .pdf.
2   UNEP 2023.
3   UNEP 2023.
4   World Bank 2021c.
5   Wang 2021.
6   Gbohoui et al. 2023.
7   Vezér, Mayaki, and Morrow 2019.
8   Gratcheva and Wang 2021.
9   AfDB, 2023.
10   The C-15 is a group of African countries—
     Angola, Cameroon, Central African Republic,
     Republic of Congo, Democratic Republic
     of Congo, Côte d'Ivoire, Equatorial Guinea,
     Gabon, Ghana, Kenya, Malawi, Rwanda, Tan-
     zania, Togo, and Zambia—constituted by the
     African Union to lead the continent's pursuit
     and advocacy on the proper valuation of Afri-
     ca's natural capital and its potential for green-
     ing their GDP. Outcomes from the group's
     discussions will inform the African Union's
     global engagement in advocating for a man-
     datory requirement for countries in the world
     to adopt policies for greening their GDP.
11   AfDB 2024.
12   2018 meeting in Canada.
13   UN 2021, p. 34.
14   UN 2022
15   UN 2022
16   UN 2022, p. 23.
17   UN 2022, p. 32.
18   Zero draft of the Pact for the Future. https://
     www.un.org/sites/un2.un.org/files/sotf-co
     -facilitators-zero-draft_pact-for-the-future
     .pdf.
19   https://www.afdb.org/sites/default/files
     /2023/09/08/the_african_leaders_nairobi
     _declaration_on_climate_change-rev-eng
     .pdf.
20   The Congo Basin is a vast watershed area
     in Central Africa covering about 3.4 million
     km2. It includes most of Democratic Repub-
     lic of Congo, Republic of Congo, Central
     African Republic, and parts of Zambia,
     Angola, Cameroon, Tanzania, Burundi, and
     Rwanda (https://www.appsolutelydigital
     .com/CongoBasin/chapter1-1.html). The

     watershed area does not perfectly align
     with administrative boundaries. In the liter-
     ature, and to a certain extent in this report,
     the Congo Basin refers to the following
     six countries: Cameroon, Central African
     Republic, Democratic Republic of Congo,
     Republic of Congo, Equatorial Guinea, and
     Gabon.
21   AfDB and UNEP 2024
22   Usman and Landry 2021.
23   AfDB 2023.
24   AfDB, 2023.
25   See https://youtu.be/qAt7jW7DxaU at
     3:25:28 for President Ruto's expectations on
     AfDB in this regard.
26   https://unstats.un.org/unsd/national
     account/HistoricSNA.asp#:~:text=The%20
     2008%20SNA%20is%20an,and%20the%20
     needs%20of%20users.
27   World Bank 2021a.
28   UN 2022.
29   UN 2023.
30   See technical note 1 at https://www.undp.org
     /sites/g/files/zskgke326/files/migration
     /ar/PNUDArgent-TechnicalNotesHDI2018
     _0.pdf.
31   UNEP 2023.
32   Arrow et al. 2012.
33   World Bank 2021b.
34   World Bank 2021b.
35   World Bank 2021b.
36   https://teebweb.org/about/timeline/.
37   United Nations and System of Environmen-
     tal-Economic Accounting 2014.
38   United Nations and System of Environmen-
     tal-Economic Accounting 2021; Brandon et
     al. 2021.
39   United Nations and System of Environmental-
     Economic Accounting 2017.
40   United Nations and System of Environmen-
     tal-Economic Accounting 2017
41   World Bank 2005; Brandon et al. 2021; Bolt
     et al. 2002.
42   Bolt et al. 2002.
43   Daly and Posner 2011; Howarth and Kennedy
     2016.
44   Pearce and Atkinson 1993; Hamilton 1993;
     Hamilton 1994; Hamilton, Pearce, and Atkin-
     son 1997.

45 Hamilton and Clemens 1999.

46 World Bank 2021c.

47 Arrow et al. 2012.

48 Cohen et al. 2017.

49 Brandon et al. 2021; Lange et al. 2018; Managi and Kumar 2018.

50 World Bank 2021c; Hardin 1968; Ostrom 1990; Carney 2015.

51 UN 2022; 2018 meeting in Canada and Stieglitz et al 2009.

52 IISD n.d.

53 Mekeberiaw and Aytenfisu 2024.

54 https://www.land-links.org/document/land-and-ethiopias-journey-to-self-reliance/.

55 Ethiopia's NCA Initiative Poster (September 2022–September 2024).

56 Ibid.

57 Forestry Department, Ministry of Green Economy and Environment, and Ministry of Finance and National Development Planning 2023.

58 UNEP 2015.

59 Forestry Department, Ministry of Green Economy and Environment, and Ministry of Finance and National Development Planning 2023.

60 UNEP 2015.

61 World Bank 2021b.

62 World Bank 2021a, 2021b.

63 World Bank 2019.

64 World Bank 2023.

65 World Bank 2023.

66 https://www.ubos.org/wp-content/uploads/publications/11_2019NP-AEEA.pdf.

67 World Bank 2021b.

68 World Bank 2024a.

69 World Bank 2021b.

70 World Bank 2022.

71 World Bank 2019.

72 World Bank 2021b, 2022.

73 AfDB 2023.

74 World Bank 2021c.

75 World Bank 2021c.

76 UNEP 2023.

77 UNEP 2024.

78 World Bank 2021c.

79 World Bank 2021c.

80 This section draws heavily on the chapter "Natural Allies: Wealth and Sovereign Environmental, Social, and Governance Frameworks" by Gratcheva and Wang (2021) and the references within it. Thanks to Dr Bekele Shiferaw of the World Bank for pointing out its relevance for this paper.

81 Gratcheva and Wang 2021.

82 Gratcheva, et al. 2020; Wang 2021.

83 Wang 2021.

84 Gratcheva and Wang 2021.

85 AfDB 2024.

86 Gratcheva and Wang 2021.

87 https://data.integratedmodelling.org/about.

88 https://github.com/integratedmodelling/im.nca.postprocessing/blob/main/aggregation_region/vegetation.carbon.stock/data/vcs-aggregated-country.xlsx.

89 Mostefaoui et al. 2024.

90 Mitchell and Pleeck 2022.

91 AfDB 2024.

92 This figure is for current emissions through 2030, as outlined in the ACMI Roadmap Report (ACMI 2022). According to the AfDB (2022) *African Economic Outlook 2022,* total climate finance due to Africa to compensate for historical and future emissions is between $4.76 trillion (lower bound) and $4.84 trillion (upper bound), averaging $4.6 trillion for 2022–2050. These estimates reflect Africa's carbon credit at the current average international social cost of carbon. These amounts are very high, reflecting the opportunity costs to Africa of historical emissions by other world regions between 1850 and 2021.

93 https://data.integratedmodelling.org/organization/.

94 Dossa and Miassi 2024; Schwantes et al. 2024.

95 Schwantes et al. 2024.

96 Schwantes et al. 2024.

97 im.nca.postprocessing/aggregation_region/README.md at main · integratedmodelling/im.nca.postprocessing · GitHub.

98 Mitchell and Pleeck 2022.

99 Dargie et al. 2017; Crezee et al. 2022.

100 Crezee et al. 2022.

101 Gibbs and Harris 2024.

102 The Global Forest Watch data include annual values for CO_2 emissions by country but only the annual average for the period for gross removals (sequestration). Therefore, gross removals, and the resulting net flux, reflect the annual averages over the model period of 2001–2023. This is one of many areas where the data sources would need major improvements before being applied at country level.

103 Stand-replacing disturbance refers to the complete death of the living tree biomass, which implies a complete removal of tree cover or a change in land cover from forest to non-forest (Yu et al. 2023).

104 https://www.globalforestwatch.org/blog/data/whats-new-carbon-flux-monitoring/.

105 The important issue of valuation of carbon retention for inclusion in wealth accounting and the SEEA is discussed in much greater

detail in a forthcoming chapter of the World Bank *Changing Wealth of Nations 2024* report.

106 Edens 2021.

107 AfDB 2023.

108 https://www.un-redd.org/sites/default/files/2022-11/Forest%20carbon%20pricing%20brief%20-%20FINAL.pdf.

109 https://carboncredits.com/carbon-prices-today/ The EU ETS price (in euro) is based on supply and demand of carbon credits and the price changes constantly, as does the exchange rate between the euro and the US dollar. The price of $70 per tonne of carbon was calculated at the time of writing the report in July 2024.

110 https://carboncredits.com/carbon-prices-today/.

111 Mitchell and Pleeck 2022.

112 AfDB 2023.

113 AfDB 2023, p. 137.

114 Mitchell and Pleeck 2022.

115 AfDB 2024.

116 UN and System of Environmental-Economic Accounting 2021.

117 https://www.conservation.org/projects/gaborone-declaration-for-sustainability-in-africa.

118 World Bank 2021a.

119 This analysis is expanded in the section on supporting capacities in international and regional institutions.

120 Edens et al. 2022.

121 https://www.wavespartnership.org/.

122 https://seea.un.org/home/Natural-Capital-Accounting-Project.

123 https://www.wavespartnership.org/en/edit-basic-page-africa-natural-capital-accounting-community-practice.

124 Turpie et al. 2021.

125 https://seea.un.org/content/africa-community-practice.

126 World Bank 2022.

127 AfDB, 2024a

128 UNSD 2024.

129 UNSD 2024.

130 UNSD 2024.

131 UNSD 2023.

132 Ethiopia is also implementing the SEEA EA as part of the GPS, but not in time to be reported to UNSD.

133 UNSD 2023.

134 Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cabo Verde, Central African Republic, Chad, Côte d'Ivoire, Djibouti, eSwatini, Gambia, Ghana, Guinea-Bissau, Kenya, Lesotho, Liberia, Malawi, Mali, Morocco, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Somalia, South Africa, South Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, and Zimbabwe.

135 Algeria, Angola, Comoros, Democratic Republic of Congo, Republic of Congo, Egypt, Equatorial Guinea, Ethiopia, Gabon, Guinea, Madagascar, São Tomé and Principe, and Sierra Leone.

136 UNSD 2023.

137 https://unstats.un.org/UNSD/national account/RAdocs/ENDORSED_WS1_Framework_HH_Wellbeing_Sustainability.pdf.

138 A new 2024 survey to update the GDP Rebasing status of RMCs is underway by the ECST and the results are expected in the last quarter of 2024.

139 https://unstats.un.org/UNSDWebsite/about/.

140 UNSD 2021.

141 World Bank 2021a.

142 World Bank 2024b.

143 https://www.unep.org/who-we-are/frequently-asked-questions#:~:text=UNEP's%20mandate%20is%20to%20find,loss%2C%20and%20pollution%20and%20waste.

144 https://www.unep.org/who-we-are/about-us.

145 AfDB and UNEP 2024.

146 https://www.unep-wcmc.org/en/nature-economy.

147 UNEP 2016.

148 Harper 2023.

149 https://www.uneca.org/green-economy-and-blue-economy.

150 https://www.uneca.org/data-and-statistics.

151 https://www.uneca.org/acpc.

152 https://www.iisd.org/.

153 IISD n.d.

154 Forestry Department, Ministry of Green Economy and Environment and Ministry of Finance and National Development Planning 2023.

155 https://www.iisd.org/savi/.

156 Burundi, Cameroon, Central African Republic, Democratic Republic of Congo, Côte d'Ivoire, Ghana, Kenya, Mozambique, Rwanda, Tanzania, Togo, Zambia, and Zimbabwe.

157 Natural Resource Governance Index 2021.

158 Vardon et al. 2017.

159 UNSD 2024.

160 UNSD 2024.

161 International Standard Industrial Classification of All Economic Activities (ISIC) is the international reference classification of productive activities. The Central Product Classification (CPC) consists of a coherent and consistent classification structure for

products (goods and services) based on a set of internationally agreed concepts, definitions, principles, and classification rules.

162 The AfDB's current work on an action plan for refining the functions of the AfDB's African Natural Resources Management and Investment Centre, which includes the above as a key pillar, is a step in the right direction.

163 UNSD 2024.

164 World Bank 2021b, p. 10.

165 UN 2021, p. 131.

166 NCAVES and MAIA 2022.

167 NCAVES and MAIA 2022.

168 UN and System of Environmental-Economic Accounting 2021.

169 AfDB 2023.

170 OECD 2019.

171 Badakhshan et al. 2023.

172 FAO 2024; Lord 2023

173 AfDB 2023.

174 https://www.afdb.org/sites/default/files /2023/09/08/the_african_leaders_nairobi _declaration_on_climate_change-rev-eng .pdf.

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