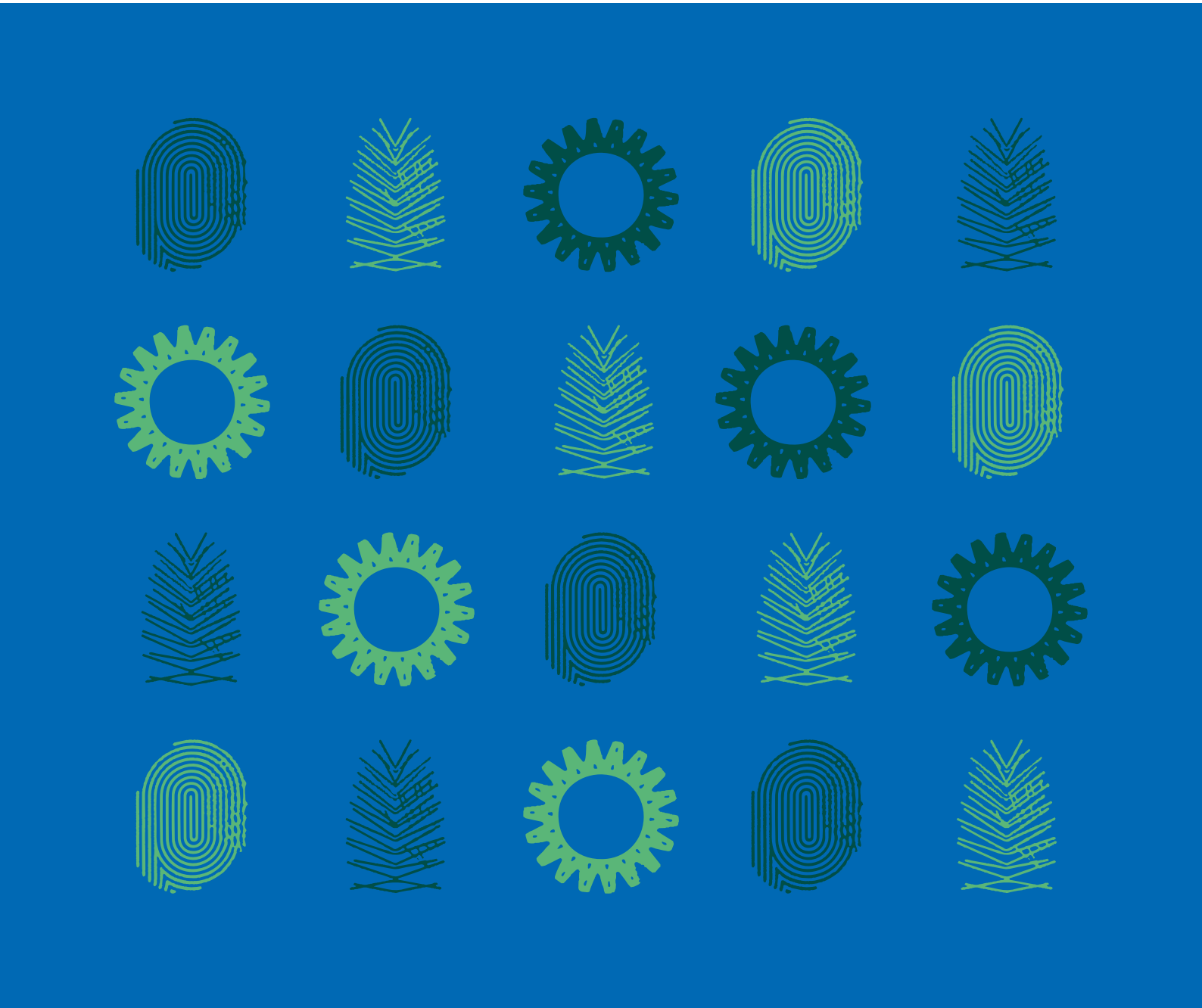
UN environment programme

INCLUSIVE WEALTH AFRICA 2024

MOVING BEYOND GDP



What is Inclusive Wealth?
The Inclusive Wealth Report: Africa (IWR Africa) is a effort led by the United Nations Environment Programme (UNEP) to evaluate national capacities and performance in terms of measuring economic sustainability and well-being. Existing national statistical systems use Systems of Environmental and Economic Accounts, which are geared towards measuring the flow of income. These flows critically depend upon the health and resilience of capital assets accounted for by manufactured capital, human capital and natural capital.

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Abbreviations

AfDB	African Development Bank
AFR100	African Forest Landscape Restoration Initiative
COVID	Coronavirus Disease
EITI	Extractive Industries Transparency Initiative
ESVD	Ecosystem Services Valuation Database
ES	Ecosystem Services
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
G20	Group of Twenty Countries
GFC	Green Climate Fund
GDP	Gross Domestic Product
GGW	Great Green Wall
HC	Human Capital
HDI	Human Development Index
IUCN	International Union for Conservation of Nature
IW	Inclusive Wealth
IWI	Inclusive Wealth Index
IPBES	Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services
NC	Natural Capital
NEPAD	New Partnership for Africa's Development
NGO	Non-Government Organisation
NPV	Net Present Value
PC	Produced Capital
ROI	Return On Investment
SDG	Sustainable Development Goals
SLM	Sustainable Land Management
SSA	Sub-Saharan Africa
SDG	Sustainable Development Goals
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
US	United States of America
USGS	United States Geological Survey

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Executive summary

For nearly a century we have narrowly assessed the wealth of nations against the benchmark of their economic growth, or Gross Domestic Product (GDP), which has diverted us from green, resilient and inclusive development. GDP describes a population's potential to earn income for the consumption of goods and services. However, the limitations of this metric and its disconnection from urgent global challenges are becoming increasingly evident. Gender, income and wealth inequality, climate change, biodiversity loss, land degradation, marketing of harmful goods, pollution and environmental injustice are all externalities of the unrestricted pursuit of higher GDP. Key among these externalities is harm to the planet's natural assets, which sustain and power our economies by providing food, arable lands, clean air and drinkable water. These global challenges elucidate the constraints for future economic growth.

Current public interventions that seek to address the externalities of economic activities do not incorporate the different dimensions of sustainable development into their actions. To do so requires a macroeconomic index that assesses the human, environmental and financial realities of our society. Such an approach aligns with the indivisible, multidimensional nature of the United Nations Sustainable Development Goals (SDGs) and can inform efforts to achieve these goals. The valuable estimations and insights provided by this comprehensive metric can hasten progress on the long-standing global challenges of conserving nature and biodiversity and ensuring universal human rights and gender equality.

Numerous indices exist that aim to comprehensively present societies' economic state. Early types of indices for this purpose, such as the Green GDP, proposed to subtract the cost of natural resource depletion from GDP flows. However, more recent research has shifted away from this approach. In 2021, the Dasgupta Review: The Economics of Biodiversity and Making Peace with Nature, demonstrated that an indicator of wealth as stock, rather than flow, is a more effective measure (Dasgupta 2021; UNEP 2021). The capital stocks that procure wellbeing for populations or that individuals use to generate economic activities need to be assessed to ensure investment for sustainable development.

The Inclusive Wealth Index (IWI), developed by the United Nations Environment Programme (UNEP), is an accounting framework that responds to this need. This framework evaluates nations' capital by classifying it into three primary forms of assets: produced, natural and human capital. Monitoring these sources of wealth motivates their protection against harmful economic activities to ensure their availability for future generations. The IWI framework can play a crucial role in monitoring and achieving the SDGs as well as building green, resilient and inclusive development worldwide (World Bank 2021).

African countries are among the key beneficiaries of the development and applications of the IWI framework. Sources of unsustainable growth on the continent are associated with limited funding for health, gender and economic inclusiveness, and natural environment conservation. Numerous studies link African economic and demographic growth to large-scale land degradation, pollution and endemic diseases. Without appropriate policy interventions, these compounded environmental trends may continue as African multidimensional growth is among the fastest in the world. Furthermore, public interventions to accelerate economic recovery from the COVID–19 recession may put further pressure on African natural capital assets and funding.

The UNEP Inclusive Wealth Report: Africa (IWR Africa) 2024 estimates the Inclusive Wealth (IW) of 41 African nations and provides an effective framework for monitoring capital stocks on the continent. During the period covered by the report – from 1992 to 2019 – average African IW increased by 0.7 per cent annually. This growth was driven by significant investments in produced and human capital which, respectively, increased by 7 and 5 per cent per year between 1992 and 2019. During this period, the continent made progress towards closing its gender gap with an annual growth in female human capital of 5.6 per cent, compared to a 4.6 per cent annual growth of male human capital. However, African renewable and non-renewable natural capital decreased during this same period by a yearly average of 0.8 and 1.3 per cent, respectively. The report also highlights shifts in the composition of wealth in Africa during the study period. In 1992, this wealth was primarily composed of renewable natural capital (ecosystem services and forest wood products), however by 2019 this was overtaken by human capital wealth. This changing wealth composition is primarily attributed to sharp decreases in renewable natural capital stock during the period due to limited investments in its protection.

The data in this report present an urgent call for leaders and decision makers to move beyond the measure of GDP growth in Africa, and to monitor African IW growth as an index for poverty and inequality alleviation. This report concurs with rich literature and demonstrates that the focus on GDP growth to develop policies on the continent may not be conducive to reducing poverty and inequality. The IWI provides a more inclusive measure of the economies of African countries, particularly given that low-income earners are among the most vulnerable to the depletion of natural capital for economic growth.

Overall, IWR Africa 2024 presents three key messages:

- The renewable natural capital of African countries is in historic decline and there is no room for its mismanagement. A significant proportion of the African population relies on renewable natural capital for their economic activities. Leaders and decision makers must implement policies to actively restore degraded land to ensure the continent's sustainable development.

- African demographic growth is outpacing increases in Inclusive Wealth. To address this, policymakers must facilitate greater investment in the continent, particularly in education, health, produced capital and nature. Security issues should also be prioritised, as countries faced with these challenges lag in wealth investment.

- The African agricultural sector is marked by inequalities, particularly for women, arising from the sector's low incomes, and is linked to the decreasing availability of nature and agricultural yields. Policies aimed at reducing discrimination against low-income female farmers will be key to addressing these challenges.

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01 Introduction

Since 2000, average GDP per capita in Africa has grown 1.6 per cent (World Bank 2023), and has been followed by reductions in poverty levels, improvements in life expectancy (Roser *et al.* 2013) and increases in educational attainment (Lutz *et al.* 2021).

These positive changes are due in part to the efforts of governments, non-government organisations (NGOs) and the private sector to improve macroeconomic indices such as GDP and the Human Development Index (HDI). However, these efforts raise concerns over the sustainability of African development in at least two regards. First, numerous African nations are resource-intensive (Lange *et al.* 2018; UNU–IHDP and UNEP 2012; UNU–IHDP and UNEP 2014). For instance, development sources in Nigeria and South Africa – the two most advanced African nations – are based on export revenues from fossil fuels and precious minerals, both of which are finite resources. This development path may jeopardise future economic growth in these countries. Second, African economic expansion is linked to severe environmental degradation. Growth on the continent has resulted in loss of forest cover (Brandt *et al.* 2017) and biodiversity (Scholes and Biggs 2005), and increased air and water pollution (Coulibaly *et al.* 2020; Steckel *et al.* 2020; Vörösmarty *et al.* 2021). To ensure the sustainability of the African development path it is vital to implement policies that actively monitor the continent's natural capital.

These challenges are not exclusive to Africa. Globally, nations are increasingly contending with similar issues, however, many are financing and implementing new systems of measurement to account for the health of their economy that provide an inclusive view of their societies. A recent report reveals that the Group of Twenty (G20) countries spend approximately US$ 120 billion per year to finance their nature (UNEP *et al.* 2022). In 2022, the United States federal government committed to developing a national strategy to reflect natural assets on the nation's balance sheets (The White House 2022a; The White House 2022b; Office of Management and Budget 2022). The challenges to be addressed by this accounting include climate change, pollution and environmental injustice, each of which impact the United States' economy, environment and public health. This strategy is a recognition of the integral role of nature in the wellbeing of households, businesses and the economy. Nature is the source for numerous supply chains, spurs innovation, underpins firms' success, and protects property and other infrastructure (Office of Science and Technology Policy and Office of Management and Budget Department of Commerce 2022). At the global level, the United Nations (UN) launched the UN Decade on Ecosystem Restoration in 2021, as a global rallying call to heal the planet and protect the priceless benefits that ecosystems provide to our life (UNEP 2021).

The 2024 IWR Africa report urges African decision makers to commit to similar efforts towards natural capital's valuation to ensure sustainable development on the continent. Approximately 60 per cent of the African population are smallholder farmers for whom nature is the primary input for economic production and who are particularly vulnerable to the effects of climate change. Failing to protect nature and reverse its continued degradation will have detrimental impacts on the African economy and people.

A key factor that contributes to poor environmental practices in Africa is the low return on investment in natural resources. For example, forest clearing for agricultural expansion is still widely practiced, due in part to the continent having the lowest average agricultural yield per square kilometre in the world (Alliance for a Green Revolution in Africa 2020). Increasing agricultural productivity through more efficient agricultural practices can reduce forest clearing and preserve natural capital.

Women farmers contribute a large share of African food production, yet they face continued discrimination in access to agricultural inputs (UNDP 2016). Adopting agricultural approaches and strategies that are gender-responsive can increase average agricultural productivity. Policies targeting women in this context can limit land conversion practices for agricultural activities. However, a sound index is yet to be applied in macroeconomic policy formulation that reduces the tension between environmental protection and economic growth on the continent.

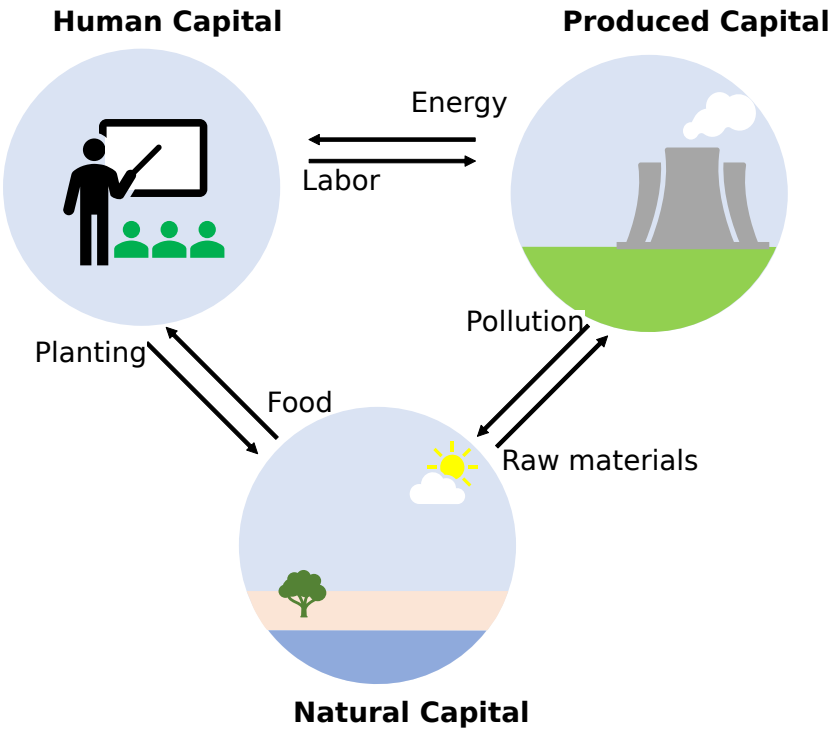
This report provides an opportunity for African leaders and decision makers to value the continent's nature and monitor variations in the holistic concept of capital, which is paramount to ensuring the protection of natural capital and sustainable growth.

What is Inclusive Wealth?

The IWI framework analyses changes in a country's productive base more comprehensively than the GDP metric, which is the most commonly applied macroeconomic index worldwide. GDP is an index of economic flow that values economic production during a period. In contrast, the IWI estimates the stock of resources that enable economic production within countries. In doing so, IWI assesses the capacity of societies to reach certain levels of economic performance in the present and future.

Figure 1.1 presents an economy's stock of three types of capital – natural, human and produced – that are valued in the IWI accounting framework. Natural capital refers to underground resources (fossil fuels, precious minerals and metals), and environmental resources (ecosystem services, and fish and fauna stocks). Human capital is the wealth stemming from the working population and represents individuals' health, education levels and income by gender. Produced capital represents the value of an economy's assets, such as roads and buildings. The IWI is the sum of the valuation of these three types of capital and constitutes the economic base that determines a nation's capacity for economic growth, their Inclusive Wealth (IW). Variations in the IWI represent the capacities of nations to improve their citizens' wellbeing in the present and future. Accordingly, the IWI provides tangible data that can inform policy towards sustainable development and achieving the SDGs (Arrow *et al.* 2012; Polasky *et al.* 2015).

Figure 1.1. Interactions between capital types



Note: Adapted from The Economics of Biodiversity: The Dasgupta Review

Overall, the IWI estimation identifies the following three key issues, highlights their relevance to the African economy, and can support policymakers to identify their solutions:

1. Identification of the capital types on which investment should be focused for African sustainable development. Current economic assessment indices lack inclusiveness in their descriptions of factors that enable economic activities in our societies. The composition of IW in three capital types reveals the sources of wealth that are positively or negatively varying and whether assistance (e.g., more investment) is required. It further assists in resolving investment dilemmas between different forms of capital.

2. Valuation of the IWI growth gauges the sustainability of economic growth. Development that occurs through export revenues from finite natural resources may stop without proportional investment in their productive bases. The variations in economies' productive bases identified by the IWI can assist governments in formulating policies that direct their national economies towards green, sustainable and inclusive development (World Bank 2021).

3. Assessment of the availability of the economic productive base per worker for future economic activities through measurement of the IWI per capita.

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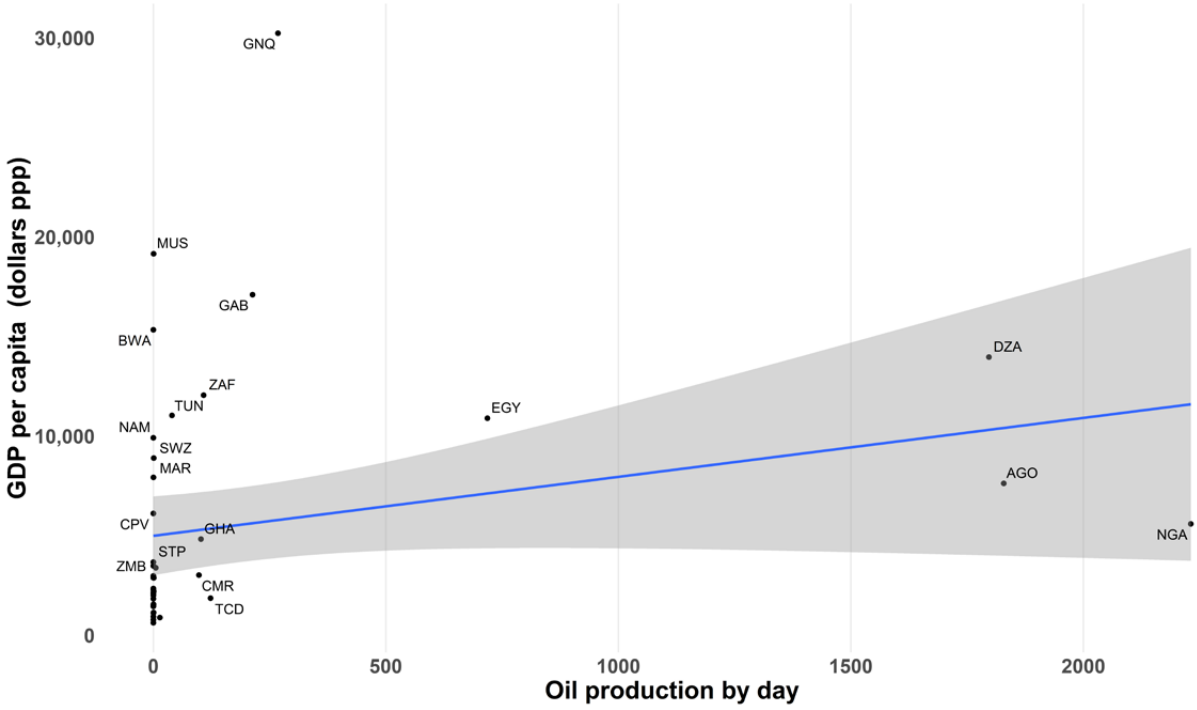
02 Economic outlook for Africa

Investment in Africa: an historic high

Investment in Africa has reached historic highs. The primary factors that catalyse investment and growth in Africa are its increasing connection with the global economy, the rise in commodity prices of African exporting goods, and institutional improvement. In the past, soaring prices of oil, minerals and other commodities contributed to this economic growth (Leke *et al.* 2010). Oil and gas exporting countries in Africa have, on average, the largest GDP per capita, as presented in figure 2.1. However, recent estimates reveal that infrastructure investment and training in other sectors currently account for two thirds of the continent's growth (Ayodele 2018). These sectors include wholesale and retail, transportation, telecommunications and manufacturing, and highlight a development path away from reliance on fossil fuel and precious mineral export revenues. These industries have grown due to the continent's high return on capital. Estimates suggest that the rate of return on Foreign Direct Investment (FDI) inflows approximates 11.4 per cent against a global average of 7.1 per cent.

Figure 2.1. Oil production and GDP per capita



Note: Production is valued by barrel per day

African economic performance is commensurate with its rapidly expanding population, which is estimated to reach approximately 1.4 billion in 2023. Prior to the COVID–19 pandemic, the total African economy was growing at an impressive 4.5 per cent per year, owing to its rapid population growth of 2.7 per cent, a pace second only to Asia. This growth has enabled a substantial proportion of the continent's population to increase their income. This is illustrated by the large number of countries that have graduated from the low-income country categorisation during the study period. As of 2021, Africa is comprised of 23 low-income countries, 23 lower-middle-income countries, 7 upper-middle-income countries, and 1 high-income country (see table A1 in the Appendix to this report).

Improved living conditions, persistent inequality and poverty

Investment in Africa is improving living conditions, however key challenges including gender inequality, income disparities and poverty persist. Investment in African produced and human capital increased during the study period, primarily from government interventions and FDI from historical partners, usually European countries, as well as new partners such as China. This resulted, on average, in improvements in living conditions as expressed by income, life expectancy and average years of formal schooling measures for females and males. The HDI, developed by the United Nations Development Programme (UNDP), is an aggregated index of these enumerated measures and shows that the continent experienced the fastest HDI improvements worldwide between 1990 and 2014 (UNDP 2016).

Despite the benefits of economic growth on the continent a number of concerns continue, among them inequality and poverty. UNDP (2016) uncovered striking gender disparities across nearly every African country, spanning both income and non-income dimensions, which diminished average human development on the continent, particularly among females. In addition, higher economic growth was linked to higher poverty and unemployment rates in several countries (The African Capacity Building Foundation 2017), primarily caused by the division of labour between the agricultural sector, and the manufacturing and services sectors. Farming activities provide livelihoods for the largest share of the African population, a sector with low profitability relative to other sectors. The few who earn livelihoods in these other sectors benefit from higher returns on investment and income. This labour division results in structural inequalities across much of the continent. In recognition of these challenges, a range of efforts to improve the agricultural sector are being implemented by the public and private sectors across the continent.

Agriculture in Africa: more investment is needed

Agriculture is central to the African economy, and approximately 60 per cent of the total population are smallholder farmers. Over the last 30 years, improvements to this sector were made by governments, through cooperation across nations for lower tariffs on goods, subsidies on fertilizers and pesticides, and improved access to irrigation practices and mechanisation. As a result, African agricultural production increased by 11 per cent from 2011 to 2016, and the productivity of African farmers has improved by 1.6 times over the past 30 years (AGRA 2020).

However, these subsidies have not resulted in sector growth on par with global averages in volume or value. Constraints to this growth include the small scale of farms – 80 per cent of African farms are smaller than two hectares (NEPAD 2013) – low formal education, limited knowledge or uptake of modern agricultural practices, and low income of farmers. There is considerable opportunity to address land availability, labour resource improvement, and the use of technology in the African agricultural sector.

In addition, gender inequality in resource allocation exacerbates these constraints. Women produce as much as 70 per cent of African food, and research demonstrates that female farmers are as productive as men when they have equal access to resources (Quisumbing and Pandolfelli 2010). Despite this, women continue to experience discrimination in the agricultural sector (FAO 2020), including through insecure property rights and lower access

to credit and training programs. These restrictions cause gender-related productivity differentials and low overall productivity (Quisumbing and Pandolfelli 2010). However, many programs that aim to increase agricultural productivity on the continent via higher investment and sharing of technologies do not adequately address this gender dimension. It is vital for decision makers to engage in the reform of relevant laws and regulations and promote leadership roles for women to address this structural challenge on the continent.

The environmental impact of agriculture is another key challenge for Africa. For instance, small fires associated with agricultural field preparation have reduce natural land area and soil yields, and increased air pollutant emissions (Hickman *et al.* 2021). Furthermore, land degradation resulting from economic activities remains a serious concern (Laurance *et al.* 2015). Costs related to natural land degradation result in increased food prices due to rising soil infertility, food and water insecurity, and malnutrition. Estimates suggest that approximately 28 per cent of the population in sub–Saharan Africa (SSA) reside in areas that have experienced land degradation since the 1980s (Nkonya *et al.* 2016). Within these figures, 26 per cent of valuable forestland and 12 per cent of cropland experienced land degradation between 1982 and 2006.

Impact of the COVID–19 pandemic on African economies

The COVID–19 pandemic created a global economic crisis and slowed previous economic progress made in Africa. The African Development Bank (AfDB) estimates that, on average, real GDP contracted by 2.1 per cent in 2020 on the continent. African nations that are tourism-dependent, oil-exporting and other resources intensive (e.g., resources coming from agricultural activities) experienced the largest GDP contraction. In these country groupings, GDP declined by an estimated 11.5 per cent, 1.5 per cent and 4.7 per cent, respectively. This economic contraction was caused by lockdowns enforced by all governments, capital outflows owing to higher interest rates in the developed world, and lower development assistance. African governments offered various stimulus packages to counter the economic downturn caused by the COVID–19 crisis, which reached as much as 10.4 per cent of GDP in South Africa. Estimates suggest that fiscal deficits doubled to 8.4 per cent of GDP in 2020 due to government actions against the crisis. This will pose an important challenge in the medium- and long-term, as African debt-to-GDP ratio is estimated to have increased from 10 to 15 per cent during the pandemic. As a result, African public and private sectors must find solutions to manage higher risk premiums caused by higher sovereign debt, decreases in their primary fiscal balance, and decreases in their economic activities (AfDB 2020). This context will limit governments' actions to support their economies and to assist private sector investment towards sustainable development. These limitations will require African economic actors to carefully target their investments towards economic recovery and sustainable development.

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03 African natural capital

African natural capital: an overview

Africa spreads over 30 million square kilometres and is host to diverse and unique ecosystems that constitute enormous natural wealth. This wealth stems from environments such as the Congo Basin, home to the world's second-largest tropical forest, which covers over two million square kilometres and accounts for one quarter of the world's remaining tropical forest. The forests of the Congo Basin provide services for worldwide carbon sinks and air purification. For local communities, the Basin provides food and materials, hydrological functions for the supply of clean water, homes and spiritual value (Cuni–Sanchez *et al.* 2019; Shapiro *et al.* 2021). Similarly, the unique African savannah, which extends over five million square kilometres is another key source of natural wealth. It supports extensive pastoralist activities and diverse fauna and flora. These two ecosystems are among many in the diverse natural wealth of Africa that play a vital role in sustaining the population and economy of the continent and the world.

Anthropogenic pressures on African natural capital

A narrow focus on short- and medium-term economic activities are threatening African ecosystems, which are under increasing anthropogenic pressure. Environmental degradation is increasing due to poor land management practices including intensive use of agricultural land, poor irrigation practices, overgrazing by livestock, small-scale mining activities, overfishing and large-scale economic activities. Increasing desertification is of particular concern on the continent. Between 1950 and 2015, the Sahara Desert expanded by 8 per cent (Liu and Xue 2020). Research indicates that this expansion was due to the impacts of climate change, in addition to extensive overgrazing, deforestation, and poor land management practices by local farmers to increase their short-term income (Liu and Xue 2020).

In addition, large-scale development projects threaten natural capital availability on the continent, and often fail to incorporate a long-term view in their implementation. For instance, development corridors, which are large-scale expansions and construction of infrastructure, such as roads and railroads, are designed to increase agricultural production and economic activities. However, there is evidence that the design of certain corridors provides fewer benefits relative to their cost as they do not incorporate the cost of environmental externalities into their conception (Laurance *et al.* 2015). In Africa, 33 planned or existing corridors were estimated to bisect over 400 existing protected areas. Furthermore, many existing projects have negative environmental impacts including pollution, acid rain, acid mine drainage and soil infertility.

Over time, the unmitigated depletion of African natural resources will limit the potential for current and future development. This depletion also yields worrying gendered implications in rural areas, where women and girls frequently bear the responsibility for collecting clean water, wood fuel or forest products. Degraded ecosystems and the impacts of climate change often force women and girls to travel further to find these necessities at the expense of undertaking income-generating activities or education and increases their risk of exposure to violence.

Investment and management of Africa's renewable natural capital

Rural communities in Africa are most affected and vulnerable to the impacts of environmental degradation. While awareness of these current and future challenges may be high among such communities, their low income frequently precludes them from engaging in sustainable practices (Sarkodie 2018). Moreover, when they do engage in actions to restore their environment, they are often too marginal to make a substantial impact (see box 1). There is an urgent need for government action and cooperation to prevent and restore land degradation at the national and continental scale.

Box 1. The man who stopped the desert

Smallholder farmers are frequently aware of the impacts of environmental degradation and actively seek to address their causes. In Burkina Faso, the farmer Yacouba Sawadogo also known as "the man who stopped the desert", received the alternative Nobel Prize and the honour of Global Dryland Champions from the United Nations Convention to Combat Desertification (UNCCD) for his fight against the encroaching desert. He witnessed the desertification of his country and village for over forty years and its impact on farming and pastoralist activities. He employed an artisanal irrigation method known as the Zaï technique to reverse this trend. The Zaï technique uses termite mounds as natural sources of canalisation to improve rainfall retention in the ground. Within ten years, his efforts transformed what was once undesirable, barren and degraded land into 0.4 square kilometres of forest with more than 60 species of trees.[1] However, this individual effort is still insignificant compared to the advance of the Sahara Desert, which is estimated to affect more than 500,000 square kilometres annually. More support is needed from governments and donors to scale up such innovations.

During the study period, several African governments implemented large-scale, national sustainable land management (SLM) projects to address desertification and for the restoration of lands. SLM is a knowledge-based approach that integrates land, water, biodiversity and environmental management to meet rising food and fibre demands, while sustaining livelihoods and the environment (World Bank 2006). The willingness of African governments to conserve their ecosystems is highlighted by their high ratification rate (90 per cent) to the Convention on Biological Diversity. Furthermore, with only 6 per cent of cultivated lands in Africa currently irrigated, governments have implemented large-scale agricultural water management policies to improve agricultural yield and prevent soil erosion. For example, African Water Vision 2025 is a pan-African initiative of the African Union that aims to achieve sustainable water resource management and use on the continent (Nkonya *et al.* 2016).

However, critical challenges prevent the success of actions for the restoration of the African environment. Governments' actions to restrict environmental degradation in Africa are limited. For example, public expenditure on agriculture, forestry, wildlife and fisheries in SSA is approximately 4 per cent of governments' budgets in this region, yet environment-related sectors of activity account for approximately 25 per cent of the region's GDP (Nkonya *et al.* 2016).

In addition, African governments are reliant on development assistance through platforms such as the Green Climate Fund (GCF), which accounted for the largest share of forest investment in most SSA countries in 2016. Hence, the growing negative view of external donors among the African population (Renou 2002; Mngomezulu 2019) External shocks may interrupt the consistency of these funding sources and impact the efficacy of environmental policies on the continent.

1 https://events.globallandscapesforum.org/speaker/yacouba-sawadogo/

African governments must manage these challenges to stop the deterioration of the continent's ecosystems. Several programs in Africa were created around investment in natural capital to overcome this problem. The Great Green Wall (GGW) and the African Forest Landscape Restoration Initiative (AFR100) are among the largest such initiatives (see the description of the GGW initiative in box 2), however, they are still in their infancy.

Moving beyond indices such as return on investment (ROI) can help to spur investment in the environment. Previous initiatives to raise awareness of environmental protection struggled in their application. They used indices like ROI that do not portray the current situations of countries. For instance, research emphasises how vital it is to invest in African greeneries to increase political and public acceptance of this practice (Mirzabaev *et al.* 2022). In the case of GGW, it is estimated that African societies will benefit from this program as every US$ 1 invested in land restoration can yield between US$ 1.1 and USD$ 4.4 in the future. However, these figures do not reveal how critical these investments are, given the contemporary situations of nations, and cannot stimulate appropriate policy within the desired margin of action. Even if they may not be profitable, investments to protect natural lands should be given priority in at least two scenarios: (1) when the economic activities of a large share of the population dramatically depend on natural capital; and (2) when the natural capital is at the brinks of extinction.

These two scenarios apply in Africa. First, the majority of the African population are reliant on environmental assets for their livelihoods through income generated from environmental assets (AGRA 2020). However, environmental degradation caused by anthropogenic activities continues to be pursued because these activities provide high ROI to their investors (Laurance *et al.* 2015). The destruction of this wealth via economic activities is reflected in soil degradation and overfishing. Second, the continent hosts unique fauna and flora species that are endangered. The list of endangered species enumerated on the continent is among the highest in the world (IUCN 2023).

Therefore, investments in the African ecosystem are crucial, and priority should be given to those that are essential. It is vital to emphasize the importance of investing in the African ecosystem, including investments by the Global North via channels such as the GCF and other funding mechanisms, which specifically take into account gender equality and human rights, as these are essential ingredients for environmental sustainability. Popular statistical metrics such as the GDP or ROI do not reveal this level of concern. The IWI can play this role.

Box 2. The Great Green Wall: vision of a sustainable future

In the Sahel region, the rate of land degradation and desertification is among the highest in the world, due to water scarcity, irregular precipitation and proximity to the expanding Sahara Desert. In 2007, 11 countries – Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, Sudan, Eritrea, Ethiopia and Djibouti – cooperated to address this threat through an African-led initiative, known as the Great Green Wall (GGW).

The GGW applies an integrated ecosystem management approach. It aims to create a mosaic of different land use, production systems and conservation measures in the Sahel to stop the advance of the Sahara Desert. It includes sustainable dryland management, restoration and regeneration of natural vegetation, and water retention systems (UNCCD 2020). The initiative includes a range of stakeholders such as national governments, international organisations, the private sector, women's groups, and civil society, who work together under pan-African coordination to halt land degradation. The initiative's actions are approved through nationally determined government plans, and are implemented by local farmers, land users, municipalities, and local governments. These stakeholders will be trained as rangers, nature guards, producers, and sellers of non-timber forest products, with a specific focus on ensuring the participation of women and youth. By 2030, stakeholders involved in the GGW aim to restore 1 million square kilometres of degraded land in the Sahel, sequester 250 million tons of carbon and create 10 million jobs in rural areas.

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04 Estimating African Inclusive Wealth

The need for an African Inclusive Wealth estimate

Valuing African natural capital is vital to ensuring its protection. Valuing wealth composition and its variation over time is essential for the promotion of sustainable economic growth and the identification of necessary investments in Africa. However, essential constituents of the continent's wealth are unvalued owing to a narrow definition of assets and a focus on roads, buildings and other human-manufactured assets. Produced capital is not representative of the assets that enable African economic activities, and yet it attracts the scrutiny of government monitoring efforts. For Africa, it is the economic activities related to agriculture, forestry, wildlife and fisheries (i.e., natural capital) that generate approximately 25 per cent of the continent's GDP and employ more than 60 per cent of its population. Moreover, natural capital contributes to higher incomes, particularly in the instance of African countries that exploit fossil fuels. In addition, the rapidly growing population in Africa and its predominantly younger demographic point to the immense human capital value on the continent. Natural and human capital valuations are vital to inform African leaders and decision makers with the data to sustainably manage these resources.

The Inclusive Wealth Index estimation technique

The IWI provides a comprehensive framework for assessing the multidimensional nature of wealth in Africa. Produced capital refers to factors such as infrastructure, transport and roads. Human capital represents the ability of countries' citizens to be productive given their size, age, and gender composition and is measured by years of school attainment and the accompanying skills and knowledge acquired. The current report does not include health metrics in its estimation of human capital, owing to the lack of available health statistics. Finally, natural capital is composed of renewable and non-renewable resources. Renewable natural capital refers to wealth stemming from resources pertaining to cropland, pastureland and forests, which regenerate in the short- and medium-term without any human intervention. Non-renewable natural capital refers to wealth from fossil fuels and mineral deposits. These assets cannot regenerate on their own.

In a mathematical form, IW can be expressed as follows:

$$Wealth = P_{pc} \times PC + P_{hc} \times HC + P_{nc} \times NC$$

while the changes in wealth are captured by assessing variations in capital assets over time:

$$\Delta Wealth = P_{pc} \times \Delta PC + P_{hc} \times \Delta HC + P_{nc} \times \Delta NC$$

In these equations, PC, HC, and NC represent the stocks of produced, human and natural capital of each country, respectively. The symbol Δ denotes their variations in time. P_{pc}, P_{hc}, and P_{nc} stand for the marginal contributions of the different capital types to the total social welfare (i.e., IWI). Changes in wealth are derived from variations in capital availabilities but not price, as reflected by Equation (2).

To estimate the produced capital wealth ($P_{pc} \times PC$) and the human capital wealth ($P_{hc} \times HC$) per country per year, the report uses data from Human Development Data Center and applies the IWI calculation method (Managi and Kumar 2018). Estimations of the natural capital wealth focus on valuing renewable capital (agricultural and pastoral lands, forest land valuation, and fisheries) and non-renewable capital (considering reserves of coal, oil, gas, bauxite, copper, gold, iron, lead, nickel, phosphate, silver, tin and zinc). Prices of ecosystems are collected from previous studies' estimates (de Groot *et al.* 2012), while prices of the non-renewable capital wealth come from the Energy Information Administration (EIA). All prices are adjusted for purchasing power parity, expressed in 2011 US$. The estimation strategy and assumptions used to estimate IW follow previous IWR standards and are provided in detail in the Appendix of this report.

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05 The state of African Inclusive Wealth

Inclusive Wealth trends in Africa

A significant proportion of African wealth originates from natural capital (see figure 5.1). In 2019, the average IW of African countries was US$ 500.2 billion, comprised of 54 per cent human capital, 35 per cent renewable natural capital, 9 per cent non-renewable natural capital and 2 per cent produced capital. In 2019, 76 per cent of this natural capital was renewable, as illustrated in figure 5.2.

This report contains limitations in its estimations of certain mineral reserves – such as gold and cobalt of which Africa is the largest global producer – in several states due to data unavailability (see box 3 on the disclosure of reserves of mineral resources in Africa). Consequently, this report's valuations of African natural capital, that are among its biggest sources of wealth, are likely undervalued. This stands in stark contrast with the high monitoring to which African produced capital is subject by governments and international institutions, despite this capital type representing a marginal source of wealth on the continent.

Figure 5.1. Total Inclusive Wealth in Africa (1992–2019)

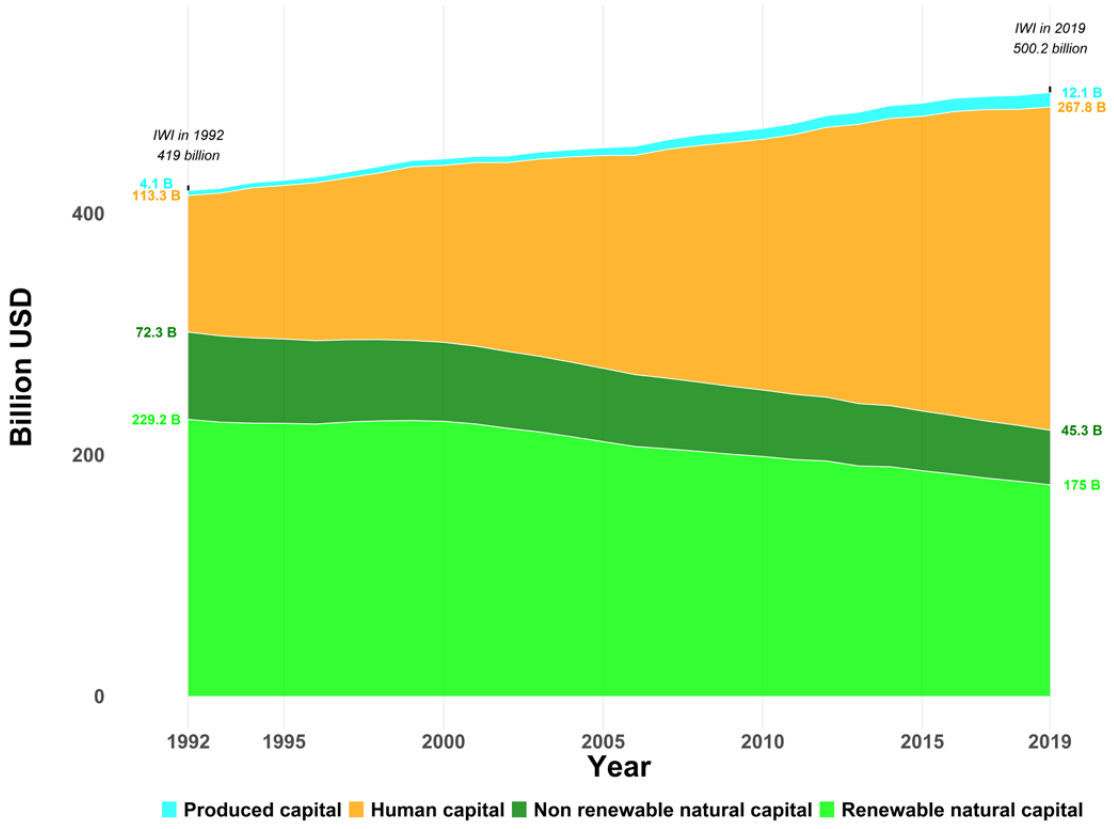
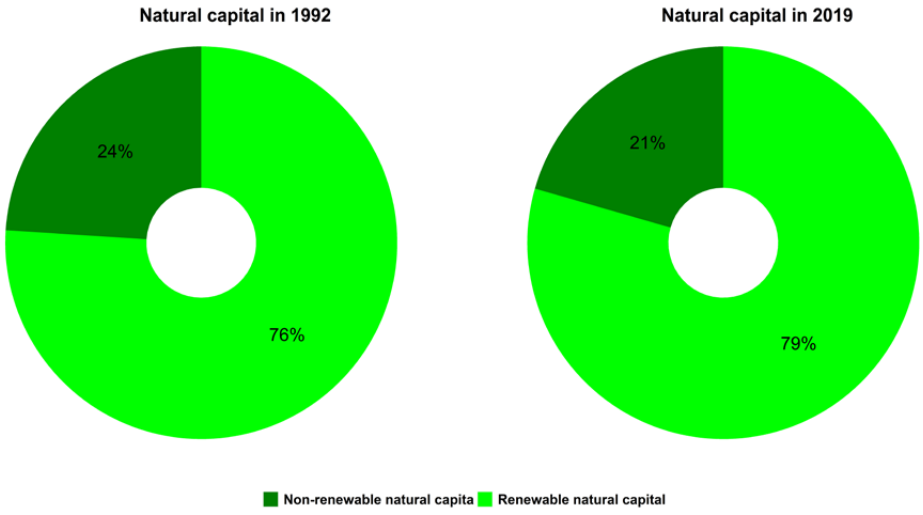


Figure 5.2. Composition of natural capital in Africa



Box 3. Opacity of the mining industry in Africa

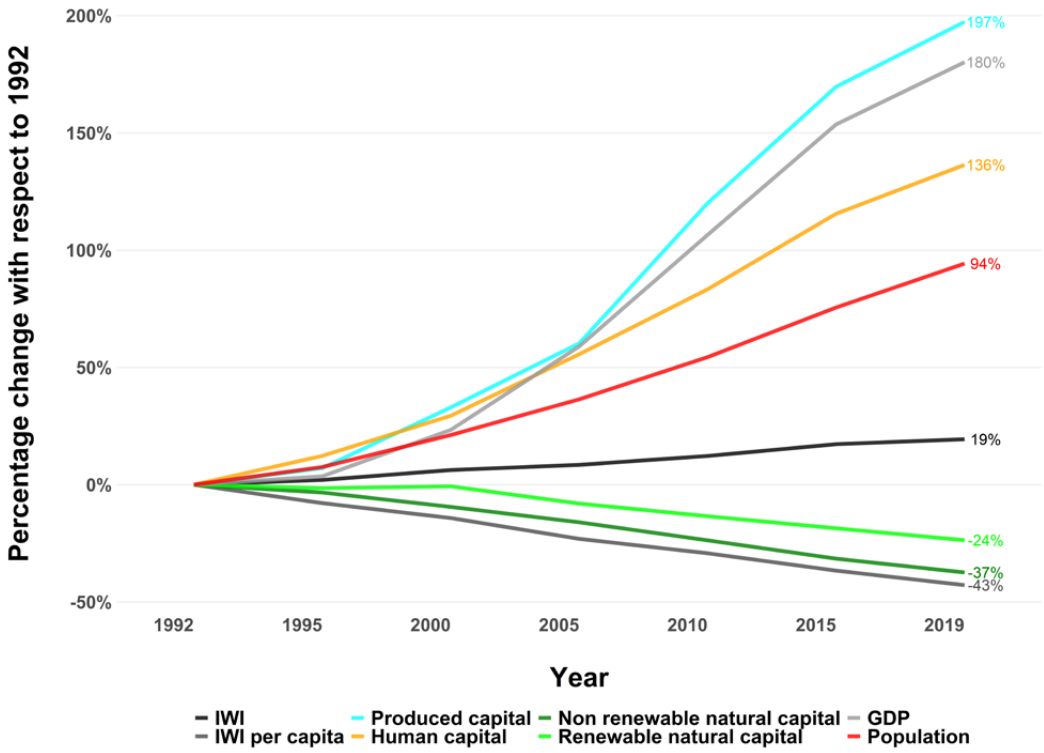
Economic growth in several African countries is driven by revenues from mineral sales such as diamond, cobalt and gold. However, yearly production data from these industries by country are seldom available. In addition, when data is available, its reliability is fraught with controversy due to corruption, exploitation by wealthier countries, and illegal and artisanal mining activities, which blur the estimations of total revenues from the African mineral industry. African governments often remain with little surplus from these revenues, and their benefits have limited impact on rising poverty levels among marginal populations, particularly women. Several African governments and international organisations are seeking to address this lack of data in cooperation with local actors. See, for instance, the World Mining Data 2021, the United States Geological Survey (USGS), or websites of ministries pertaining to natural resources in each African country.

However, IW estimations require more than a production estimate. The most pertinent data for IW calculation is related to reserves of mineral resources, as this is the economic base that enables resource production. Data on reserves of mineral resources is rarely provided by governments, the mining industry and international organisations. To address this issue, this report relies on the extensive work of the USGS, which estimates data of reserves of hundreds of mineral resources and precious metals. However, the USGS only attempts to provide reserves data for the top ten producers in the world for each mineral. Using gold as an example, USGS provides information for Ghana, Burkina Faso, South Africa, Sudan, and the United Republic of Tanzania. Among these nations, only gold reserves in Ghana and South Africa are disclosed. However, the World Mining Data 2021 reveals that at least 31 African countries are gold producers. Gold is central to the economies of these 31countries, even where production may not be comparable to global levels. Due to a lack of alternative data, the report uses available mineral data from USGS and assumes that states with no estimates do not have mineral resources. Addressing the unique challenges of accessing data on African mineral reserves requires leaders and policymakers on the continent to improve the transparency and monitoring of the sector. Doing so can only assist governments to better manage their valuable stock of non-renewable natural capital in the present and future.

African nations follow a weak sustainable development path

Variations of IW and the growth rate of the different capital types over time can be an index of progress toward sustainability and enable the identification of the capital types that require assistance to achieve sustainable development. Africa made substantial progress towards sustainable development during the study period, increasing its IW from US$ 419 billion in 1992 to US$ 500.2 billion in 2019. Figure 5.3 shows that this represents a 19 per cent increase in wealth over 27 years, which corresponds to a 0.7 per cent average annual growth.

Figure 5.3. **Change in aggregated Inclusive Wealth Index (1992–2019) (percentage)**



Between 1992 and 2019, the increase in IW was driven by gains in human and produced capital. During this period, produced capital grew from US$ 4.1 billion to US$ 12.1 billion, representing an impressive 197 per cent increase (7.29 per cent annual growth). During the same period, human capital grew by 136 per cent (5 per cent annual growth), from US$ 113.3 billion to US$ 267.8 billion. Importantly, improvements in gender disparities contributed to this rapid human capital growth, as indicated in table 5.2, which shows that female human capital rose by 5.6 per cent annually, while male human capital grew by 4.6 per cent. Although female human capital is only valued at US$ 48 billion relative to the male human capital value of US$ 64 billion, the higher female human capital growth rate points to efforts on the continent to close the gender gap. These efforts are also reflected in the education statistics during the study period where, on average, female workers acquired 0.6 years of education while male workers acquired 0.4 years.

Table 1. **Human capital growth, by gender**

Assets	Value in 1992	Value in 2019	Total growth (%)	Average annual growth (%)
Female average years in school attainment	5.8	9.6	66.5	2.5
Male average years in school attainment	7.2	10.1	40.4	1.5
Average years in school attainment for all	6.5	9.9	53.4	2.0
Difference between female and male years in school attainment	−1.4	−0.4	26.1	1.0
Female human capital (in US$ billion)	48.6	122.5	151.9	5.6
Male human capital (in US$ billion)	64.7	145.3	124.7	4.6
Total human capital (in US$ billion)	113.3	267.8	136.4	5.1
Difference between female and male human capital (US$ billion)	−16.1	−22.9	27.2	1.0

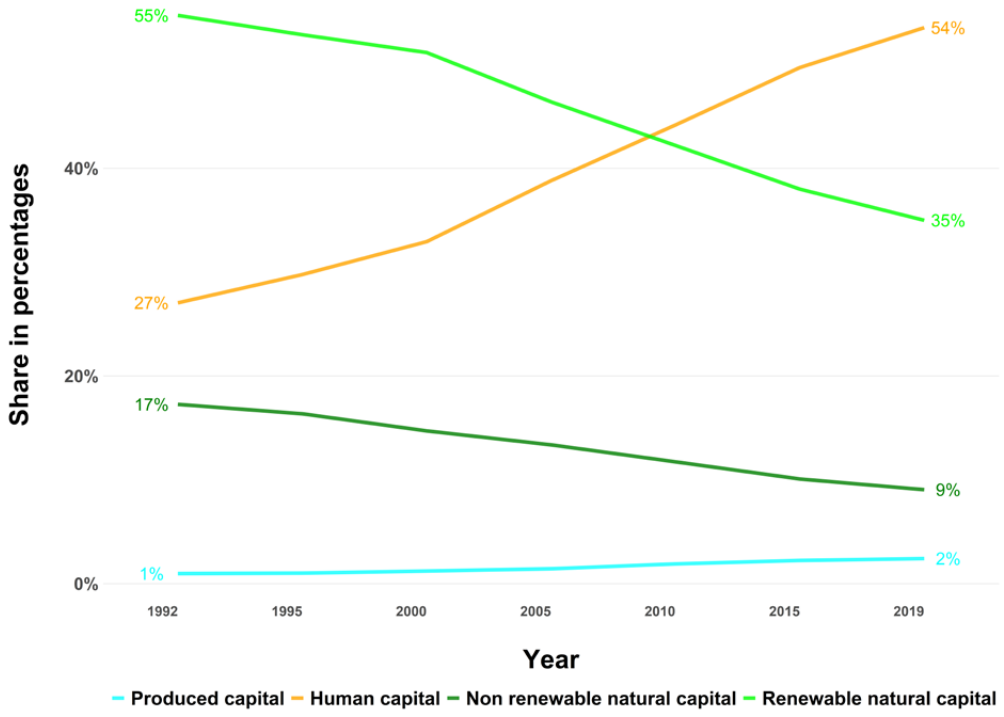
Although human and produced capital increased during the study period, all natural capital decreased. Non-renewable natural capital decreased 24 per cent, from US$ 72.3 billion to US$ 45.3 billion, and renewable natural capital decreased 34 per cent from US$ 229.2 billion to US$ 175 billion. These results indicate that African countries follow a weak sustainable development path, whereby total IW increases but natural capital decreases over time. Both renewable and non-renewable capital require better management to achieve strong sustainable development (see box 4 for differences between strong and weak sustainable development paths).

Box 4. Strong and weak sustainable development path

IW variation can act as an index of weak or strong sustainability. For instance, economic agents in societies may choose to exploit local oil deposits (i.e., natural capital) to either invest in local infrastructure (i.e., produced capital) or level of education (i.e., human capital). Individuals may also choose to consume part of the revenues of this oil extraction by purchasing provisions or goods. In this framework, a negative variation in IWI indicates an unsustainable development path as the oil reserves used to generate the produced or human capital are worth more than the new forms of capital created. However, if the variation in IWI were to be positive, it would be an instance of weak sustainable development because, despite the overall increase in IWI, one source of capital is decreasing in the process. Finally, this example cannot exhibit a case of strong sustainable development, wherein all three types of capital are non-decreasing over time. This framework reveals that the holistic nature of the IWI provides a crucial tool for achieving the multidimensional goals of the SDGs, as they address a concept directly related to the betterment of people, nature and infrastructure.

The proportion of natural capital in the IW composition of Africa is decreasing due to the mismanagement of this asset. Changes in the average wealth composition of countries can be caused by increases in the worth of certain types of capital relative to others. In 1992, African wealth was composed of 55 per cent renewable natural capital, 27 per cent human capital, 17 per cent non-renewable natural capital, and 1 per cent produced capital. In 2019, this composition comprised 54 per cent human capital, 35 per cent renewable natural capital, 9 per cent non-renewable natural capital, and 3 per cent produced capital. These figures indicate a slow pace of industrialisation in Africa, and a growing population that is on average richer and more educated (see figure 5.4).

Figure 5.4. Proportion of different capital types in Africa (1992–2019)



High levels of fossil fuel production in Africa during the study period did not significantly reduce reserve levels. The non-renewable component of African natural capital decreased only marginally between 1992 and 2019. This result points to the high value of African non-renewable natural resources. However, this should not be interpreted as an opportunity to create further economic growth from the export revenues of mining activities. Developed countries – the main consumers of these resources – are progressively shifting their primary energy sources away from fossil fuels towards renewable sources such as solar, thermic and wind power. Consequently, commodity prices in the mining industry may decrease in the future, and so too will the value of this capital. In addition, this report only accounts for wealth from select fossil fuels, and other mining activities within African nations that do not disclose information on their capital reserves may be unsustainable.

In 2019, the second most valuable source of wealth in Africa was renewable natural capital from agricultural and pastoral lands, fisheries, wood, and non-wood forest services. Although this decreased slightly over the study period, its contribution to the total wealth of the continent changed significantly. The economic activities of a significant proportion of Africans are dependent on the availability of renewable natural capital. Consequently, the decline in renewable natural capital over the study period threatens the sustainability of population growth on the continent. This decrease also indicates an underuse of the labour force in the conservation of natural capital, specifically among females, owing to structural constraints.

Country-level variations in Inclusive Wealth

Across African nations, IW varies between US$ 16.7 billion in Cabo Verde to US$ 4,648 billion in South Africa. The overall wealth of Africa is concentrated among a few wealthy nations while the majority of countries have relatively low amounts of wealth. Figure 5.5 maps the geographic distribution of the continent's wealth and shows that southern and northern countries are wealthiest. The wealthiest African nations are South Africa and Egypt (see figure 5.6). South African IW exceeds US$ $4.5 trillion, and Egyptian IW approximates US$ 1.7 trillion. These figures are considerably higher than the average IW per country on the continent, which is estimated at approximately US$ 355.6 billion. Only seven countries in Africa have IW greater than US$ 1 trillion as follows: South Africa, Egypt, the Democratic Republic of the Congo (DRC), Algeria, Angola, Nigeria and Gabon. Except for their large area, these states share limited similarities in geography and culture. Additionally, the nature of the assets in these wealthy countries is also diverse.

In South Africa, the richest country in Africa, wealth consists of the highest value natural capital in Africa and an educated population that earns a substantial average income. In comparison, Egyptian wealth, the second highest on the continent, mainly stems from a large population and an average income that is higher than the continent's average.

Conversely, Cabo Verde, Lesotho, Djibouti and Gambia are the least wealthy states in increasing order of IW. Each of these countries had a national IW below US$ 30 billion in 2019. These nations have a low amount of wealth because of their comparatively small national areas. These results reflect a continental pattern whereby the smaller the national area, the lesser the country's IW.

Figure 5.5. **Total Inclusive Wealth Index, by region (2019)**

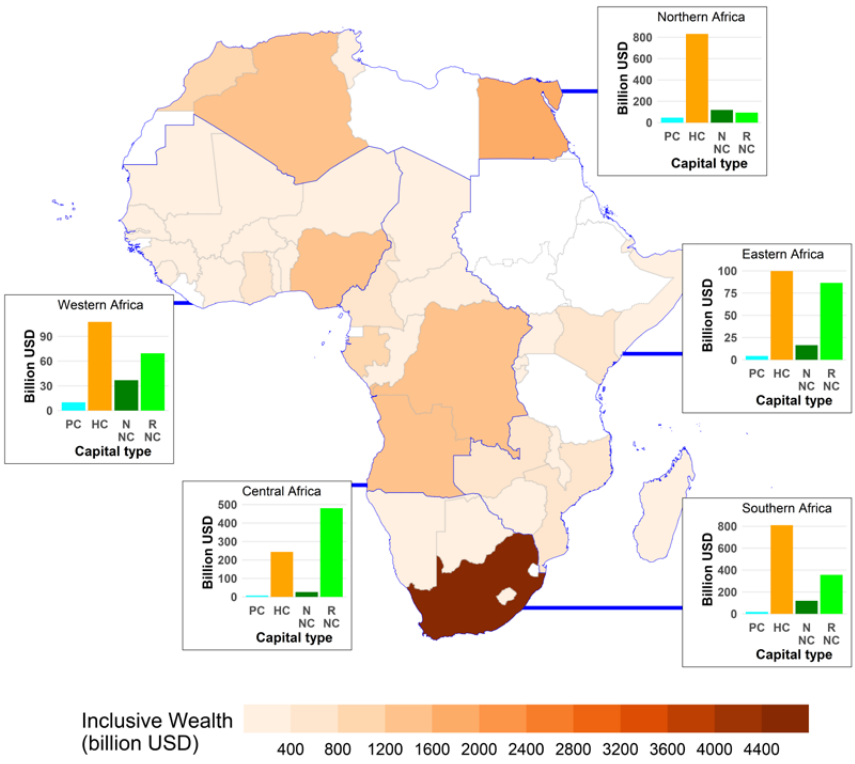
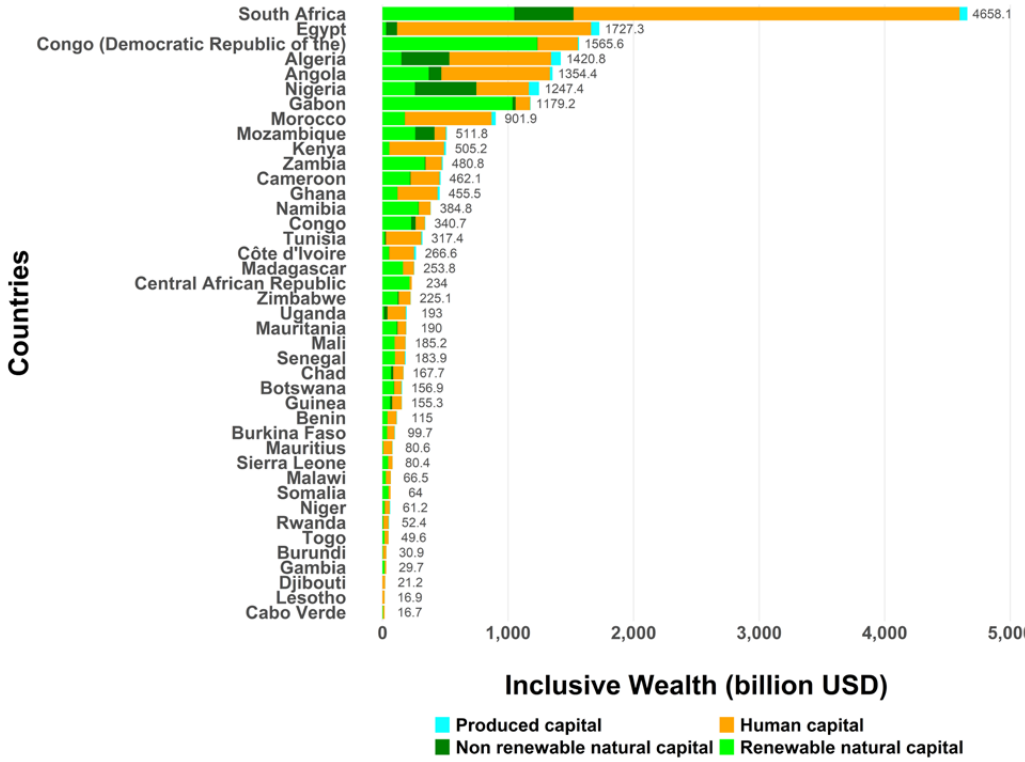


Figure 5.6. **Change in aggregated Inclusive Wealth Index, by country (1992–2019)**



Using the UN regional division of Africa into Northern, Southern, Western, Eastern and Central Africa, the data indicate that Western African countries have the lowest wealth. On average, the primary source of capital for Western African states is human capital, which is approximately US$ 90 billion per country. Renewable and non-renewable natural capital are estimated at approximately US$ 65 billion and US$ 30 billion respectively. Wealth composition in Western Africa contrasts with that in Central African countries, where the primary source of IW is renewable natural capital worth more than US$ 400 billion per country on average. Human capital in Central Africa is half of its natural renewable capital with approximate average value of US$ 200 billion.

In 2019, the human capital wealth composition in Eastern and Western Africa were similar, with each region's human capital valued, on average, at US$ 100 billion. However, these two regions differed in the composition of their natural capital, which mainly stemmed from renewable assets in Eastern African countries and non-renewable capital in Western Africa. In 2019, renewable natural capital in Eastern Africa was worth US$ 75 billion, while non-renewable assets were valued at less than US$ 25 billion.

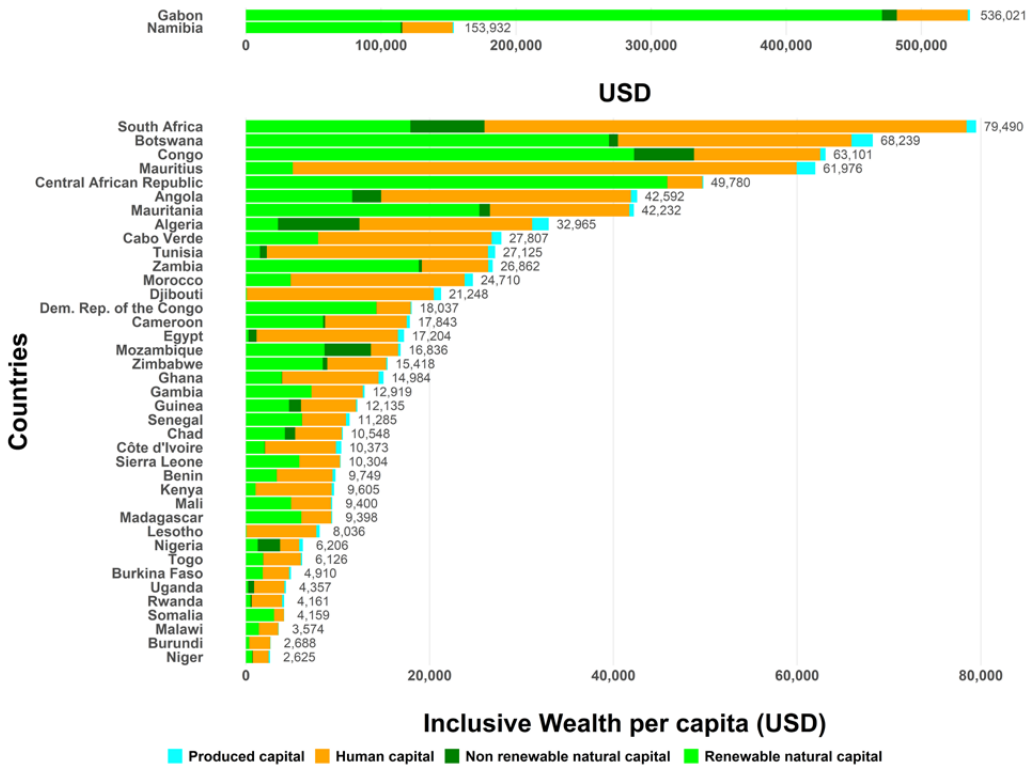
Finally, wealth compositions in Northern and Southern African countries are highly similar. These groups of countries possess human capital with an approximate value of US$ 800 billion and renewable natural capital with an approximate value of US$ 100 billion. However, in Southern Africa, renewable capital is worth around US$ 380 billion per country. In contrast, the renewable natural capital of countries in Northern Africa is worth less than US$ 100 billion on average.

Overall, the only similarity across regions of the continent is the low value of produced capital, which suggests that the continent requires a higher rate of industrialization.

Wealth per capita is highest in Central African countries

On a per-capita basis, wealth is the highest in Central African countries and large nations as detailed in figure 5.7. The wealthiest countries are Gabon and Namibia, with an IW of approximately US$ 536,000 to US$ 154,000 per capita. IW per capita of other African countries does not exceed US$ 100,000. The least wealthy countries are Niger, Burundi and Malawi, with a wealth per capita lower than US$ 4,000. Finally, the average IW per capita across all nations is US$ 36,853.

Figure 5.7. Inclusive Wealth per capita, by country



GDP is significantly correlated with wealth

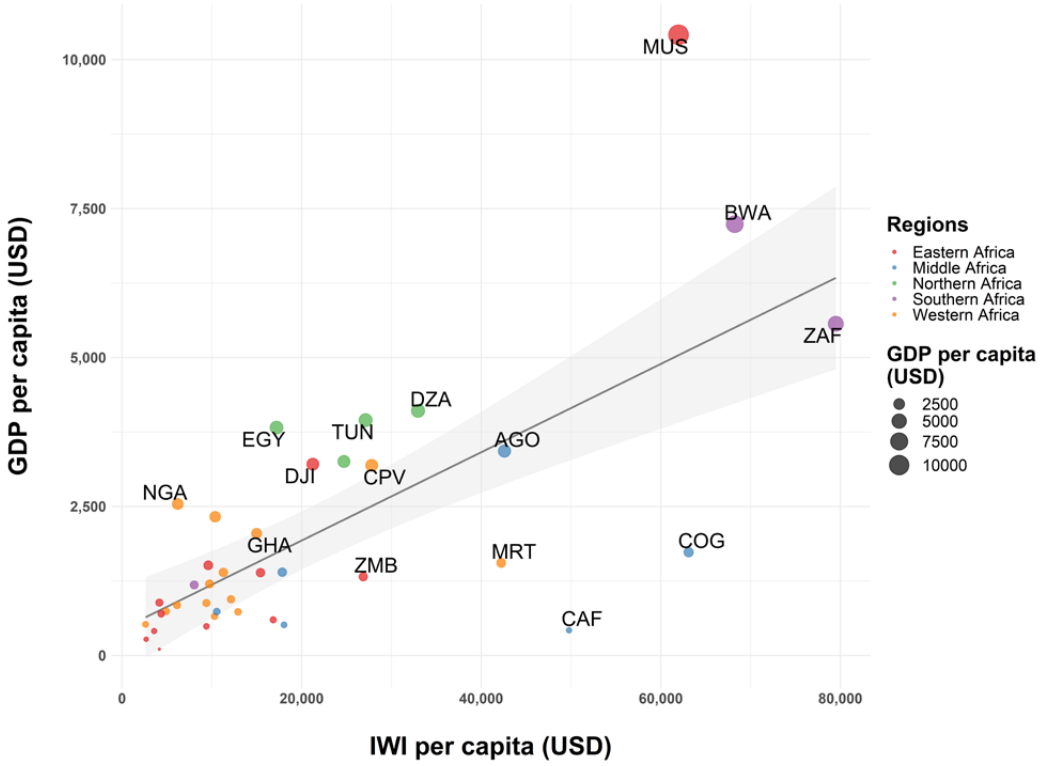
The relationship between IW and GDP is significantly positive (see figure 5.8). Estimates suggest that, on average, an African country with an IW of US$ 1 trillion has around US$ 100 billion in GDP. The relationship between wealth and GDP in Africa can be bi-directional. Countries with high GDP can invest more in their capital. Alternatively, countries with higher wealth can produce more and, as a consequence, have higher GDP. The initial reason underlying the relationship between GDP and IW for each state cannot be identified from this data.

Figure 5.8. Change in aggregated African Inclusive Wealth Index and GDP (1992–2019)

Notably, four countries have a relationship between GDP and IW that differ from others: Egypt, Nigeria, Gabon and DRC. Egypt and Nigeria have a correlation between GDP and IW higher than the sample average. However, Gabon and DRC have a correlation below average. These four nations are all relatively wealthy and differ from each other based on the nature of their capital. Egypt and Nigeria are both endowed with natural capital, but their main source of wealth is their large population. This productive base is readily available and in use in their economy. However, the wealth of Gabon and DRC is comprised chiefly of non-renewable natural resources. Intensive use of these resources may increase GDP but result in rapid depletion of their IW. Although the case of Gabon and DRC may resemble an under-utilisation of assets for economic production, it may be conducive to higher equality. For instance, individuals benefiting the most from non-renewable natural capital are low-income earners via agricultural activities and ecosystem services.

Figure 5.9 indicates that the relationship between IW and GDP on a per capita basis is also strong. However, this correlation reveals some distinctive patterns between continental regions. Northern African countries have proportionally higher GDP per capita performance relative to their IW per capita. This is also the case in some Southern African countries that seem to outperform other countries in their output production relative to their overall wealth. Central African countries are far less well off than the African average. Their main source of wealth is non-renewable natural capital.

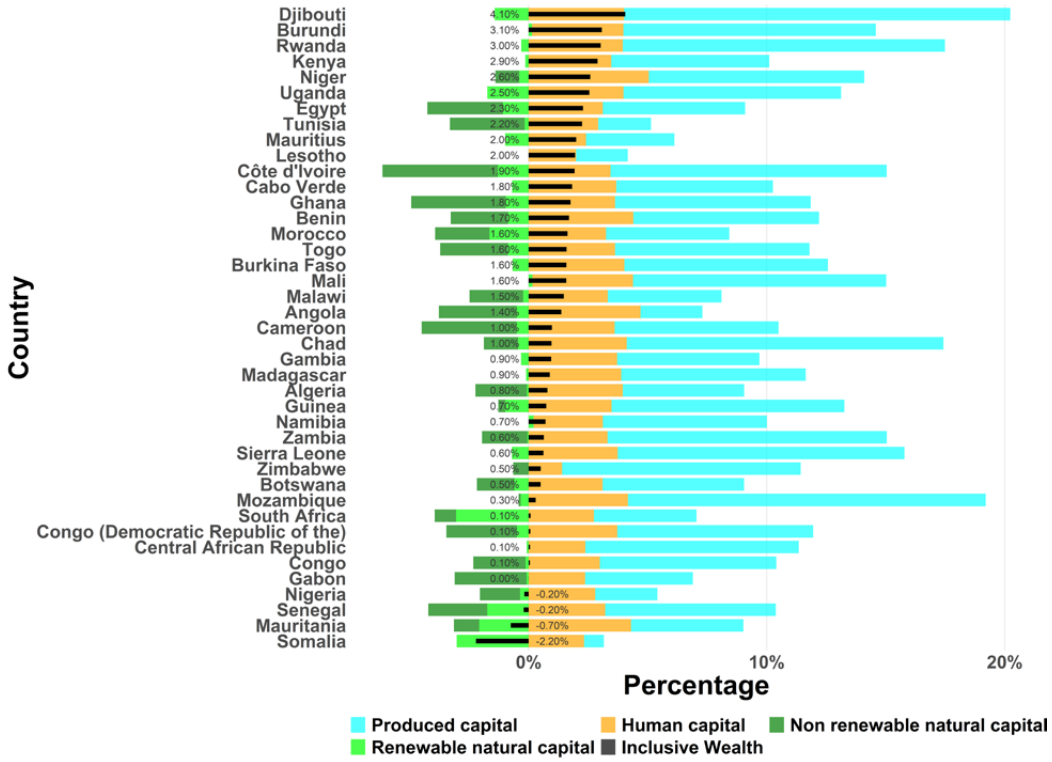
Figure 5.9. GDP per capita and Inclusive Wealth Index per capita



Note: Gabon and Namibia are excluded from this graph because their IWI per capita values are too large and thereby act as outliers for the regression line in the figure. The majority of African countries follow a sustainable development path but with mismanagement of natural capital.

The sustainability performance across countries is informed by changes in wealth over time. Figure 5.10 shows that, on average, African countries are moving in a positive direction based on this index. Djibouti had the highest such IW increase between 1992 and 2019, with an average of 4.1 per cent growth per year, followed by Burundi (3.1 per cent) and Rwanda (3 per cent). These three countries are each geographically small relative to the rest of the continent. However, like all other African countries, their relatively faster growth in wealth per capita mainly stemmed from investment in human and produced capital. Investment in these sources of wealth is driven by high monitoring by governments and international institutions.

Figure 5.10. **Inclusive Wealth Index growth, by percentage and country (1992–2019)**



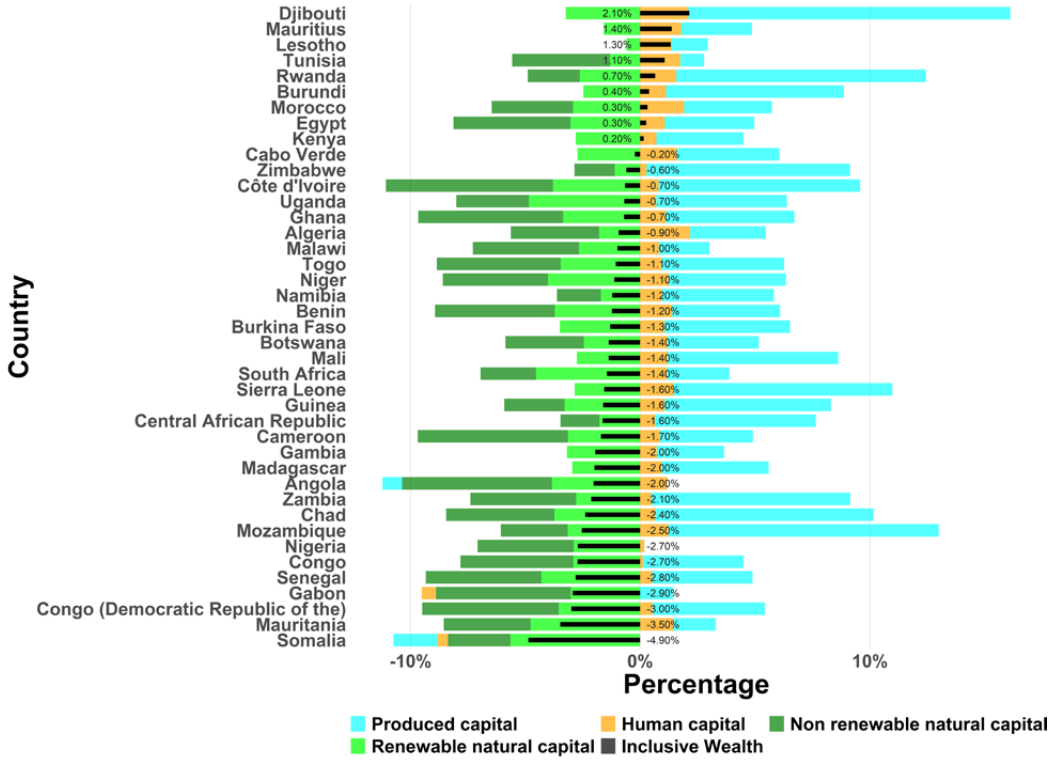
Conversely, Nigeria, Senegal, Mauritania and Somalia experienced a decrease in wealth. Decreases in wealth in Senegal, Nigeria, and Mauritania are marginal, at below 0.7 per cent per year, and are due to exploitation of natural resources, the benefits of which are not invested in creating more wealth for local citizens. However, the decrease in wealth in Somalia is more critical and is estimated to be around 2.2 per cent per year. This decrease can be attributed to the ongoing civil war that began in 1991, and which limits the government's capacity to assist investment in the country. Interestingly, human and produced capital still increased in Somalia.

Overall, renewable natural capital decreased in 39 out of 41 African countries. The most sizable decrease was estimated in Mauritius at 0.7 per cent. African countries are taking steps to increase transparency and accountability in the management of their natural resources via global processes such as the UN Global Compact, the Kimberly Process and the Extractives Industry Transparency Initiatives (EITI) (half of African governments are members of EITI). The overall poor African performance in natural capital reveals that these endeavours have not yet achieved their aims.

Variation of wealth per capita reveals that a large part of investment in the continent comes from demographic growth. Population growth in Africa is among the fastest in the world. When assessed through the lens of sustainability, this demographic expansion highlights a different picture of the continent. For a country to be sustainable, it must provide greater investment in wealth than the average growth rate of the population, so as to ensure greater wealth per capita over time.

Figure 5.11 shows that IW per capita in Africa increased in only 9 out of 41 countries between 1992 and 2019. For the majority of countries, the growth of IW per capita is negative because demographic growth outpaces the natural capital investment rate. This lower availability of natural capital per capita contrasted with the positive human and produced capital growth per capita for most countries. Among African countries, only Angola experienced negative growth in produced capital per capita, and only Gabon experienced negative growth in human capital per capita. These trends reflect the attention to investments in produced and human capital for economic development in the previous decades, and also indicate policy apathy regarding natural capital.

Figure 5.11. Inclusive Wealth Index per capita growth, by percentage and country (1992–2019)



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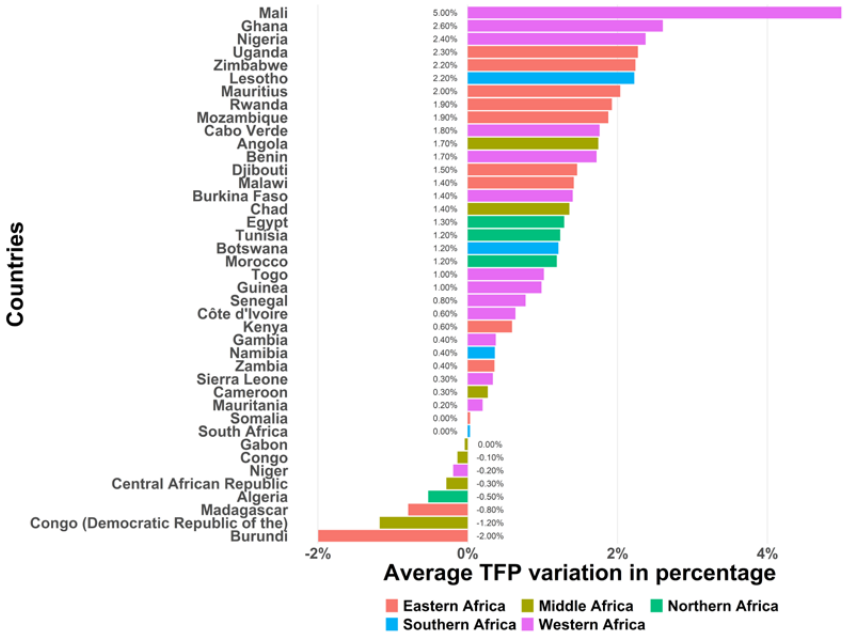
06 Consequences of unsustainable development in Africa

Current economic indices do not address externalities

Africa attracted significant investment between 1992 and 2019. Relative to 1992 levels, produced capital increased by 197 per cent, and human capital increased by 136 per cent during this period. However, growing investment in the continent did not extend to natural capital. During this same period, non-renewable natural capital decreased by 37 per cent, and renewable natural capital decreased by 24 per cent relative to their 1992 values. On an annual basis, this corresponds to a 7 per cent increase in produced capital, a 5 per cent increase in human capital, a 0.8 per cent decrease in renewable natural capital, and a 1.3 per cent decrease in non-renewable natural capital. These variations led to an overall increase of IW by 19 per cent over the 27-year period, corresponding to a 0.7 per cent growth yearly. During the same period, total productivity on the continent, augmented since GDP, increased by an impressive 180 per cent, or 6.6 per cent yearly.

The sizeable divergence in GDP and IW growth suggests the influence of two opposite processes operating on the continent. The first, that discrepancy in growth may indicate that African countries increased their productivity over time. As depicted in figure 6.1, the majority of African nations increased their total factor productivity (TFP), which is an index of innovation, enabling them to produce more with the same amount of wealth. The second, that the divergence between IW growth and GDP growth may suggest that the rate of investment in Africa is low and that large parts of the annual production are used for consumption. If such a rate of investment remains, GDP growth will likely decrease in the future.

Figure 6.1. Average growth of total factor productivity, by country



Increases in GDP per capita correlate with increases in poverty rates

In Africa, the increase in total IW wealth is driven by rapid demographic growth. Investment per capita on highly monitored assets in produced and human capital accounting systems were positive. However, the lack of accounting for natural capital in Africa is evidenced by the large disinvestment in this asset per capita. In 2019, individuals had significantly lower access to natural resources than they did in 1992. As a result, wealth per capita on the continent decreased by an average of 43 per cent during the study period. Decreases in IW per capita caused by lower availability of natural resources threaten African countries' current and future economic health. In 2019, countries with large proportions of natural capital were linked to lower economic performances (GDP per capita). This situation is highly apparent in Central African countries.

Average economic performance cannot inform two pressing issues facing Africa: the eradication of poverty and the unequal distribution of income across individuals within countries. Data on poverty, defined as the share of the population living with less than 3 dollars per day, and data on wealth and gender inequality as reflected by the Gini coefficient, both collected from the World Bank Group, are often used to assess trends on these issues. Although these data are not frequently collected, they enable the estimation of poverty and inequality growth when more than two estimates of these indices are available per country.

Figure 6.2 and figure 6.3 highlight that growth in GDP per capita is linked to higher poverty and inequality within nations. Although these correlations are modest, they concur with conceptual frameworks suggesting that few people benefit from the current model of economic growth in Africa. The positive correlations between poverty, inequality, and GDP per capita growth contrast with per capita IWI growth trends. Per capita IW growth has no statistically significant relationship with poverty growth or Gini coefficient growth.

Figure 6.2. Poverty and GDP per capita

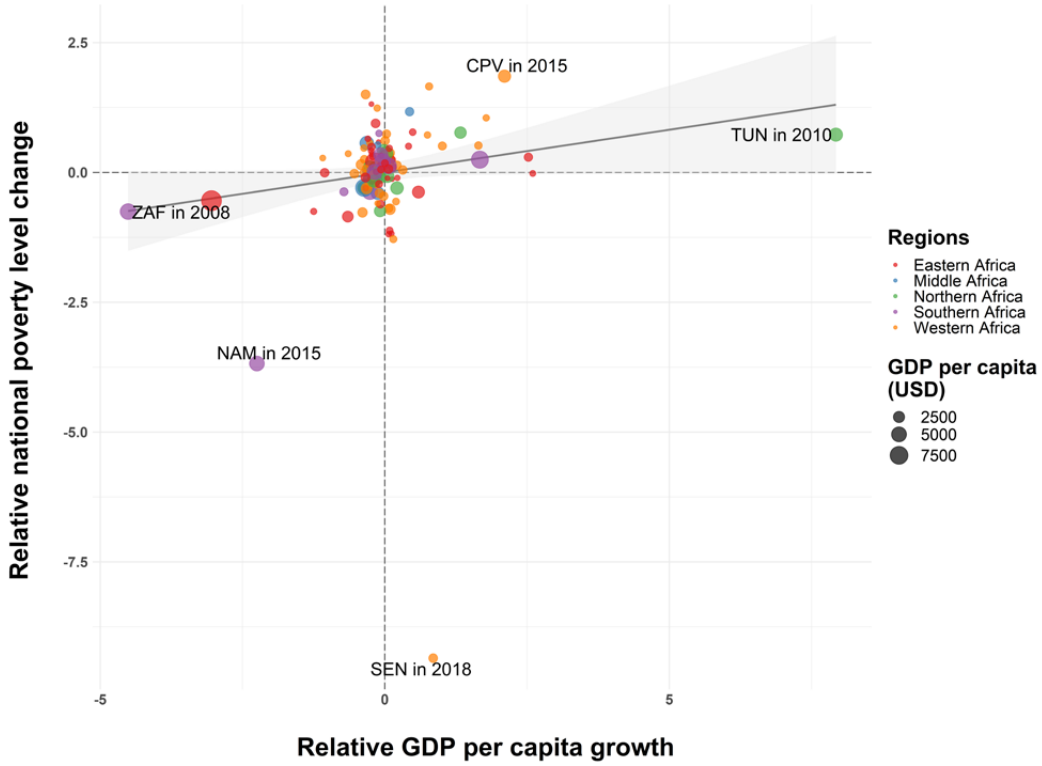
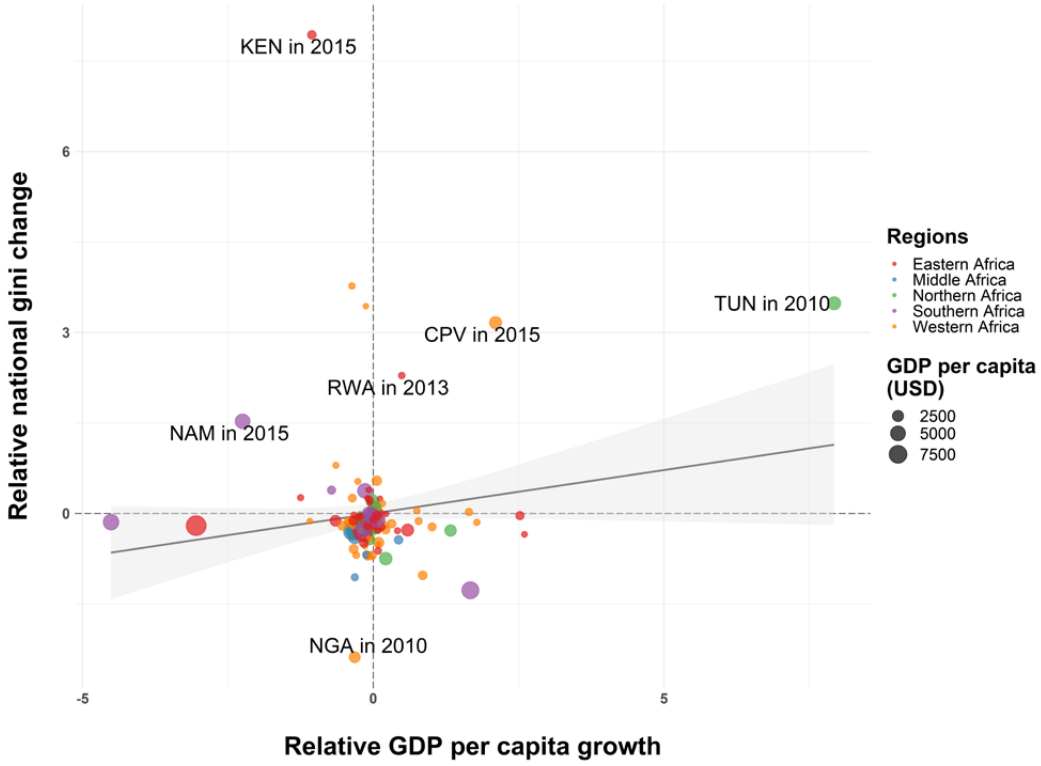


Figure 6.3. Inequality and GDP per capita



Note: National poverty/Gini Index data by country is de-meaned and then standardised with respect to the total sample of the country. Only years where poverty/Gini data are available are considered for this graph.

Figure 6.4 and figure 6.5 exhibit that the IWI more inclusively represents the current state of the total population and the economy than does GDP. GDP per capita and ROI cannot differentiate between the natures of capital and how Africans within countries interact with them. Therefore, it is necessary to monitor variations in IW per capita to devise policies that can better address poverty and inequality in Africa (see box 5 for a case of unequal wealth distribution within African countries).

Box 5. Inclusive Wealth at the subnational level

An analysis by Coulibaly and Managi (2023), demonstrates that national-level research conceals subnational sustainability inequities in Africa. There is a growing body of evidence of political power inequalities, investment rate disparities, and resource exploitation between areas around capital cities and other areas within them. Thus, previous research investigated the difference in IW across African subnational provinces in 2018 through the collection of novel information such as remote sensing. Estimates reveal significant differences in wealth and its composition within countries. They demonstrate that provinces with national capital cities have a consistently higher wealth per capita than other provinces within the same country. This inequality in wealth may act as an essential driver of demographic expansion in these provinces by enhancing migration. More importantly, this inequality pinpoints the lack of spatial inclusiveness within Africa in terms of sustainable development.

The absence of correlation between IW growth, poverty and the Gini index also suggests that investment in the productive base of African countries does not target issues of poverty and gender inequality reduction. To address this, public policy should incorporate these issues to ensure more equitable development on the continent.

Figure 6.4. Poverty and Inclusive Wealth per capita

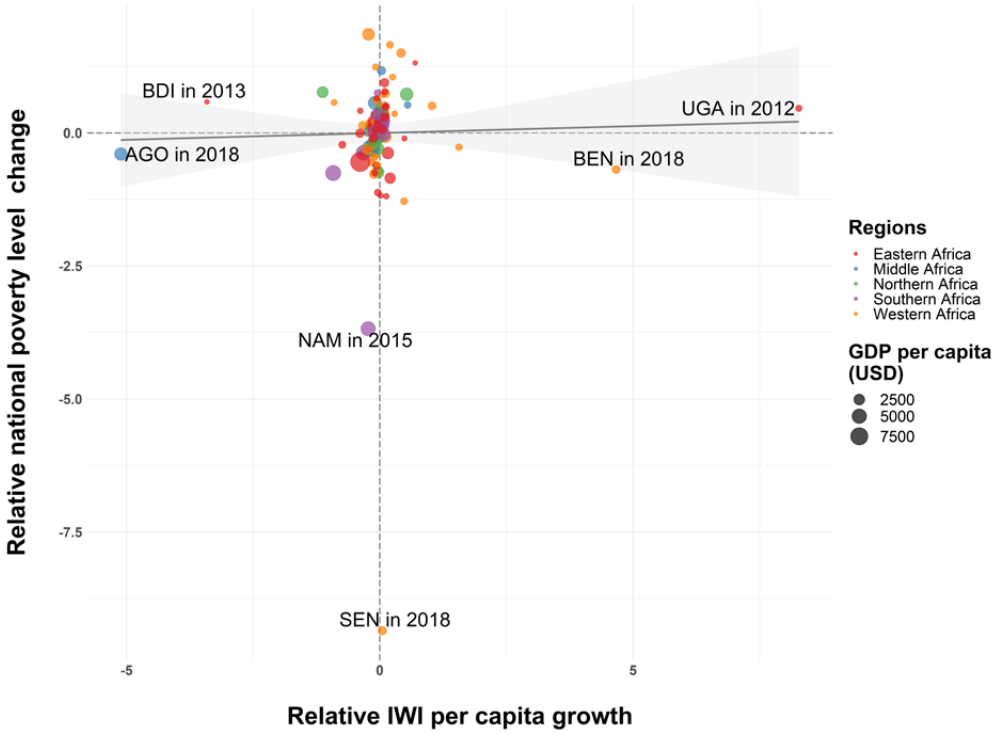
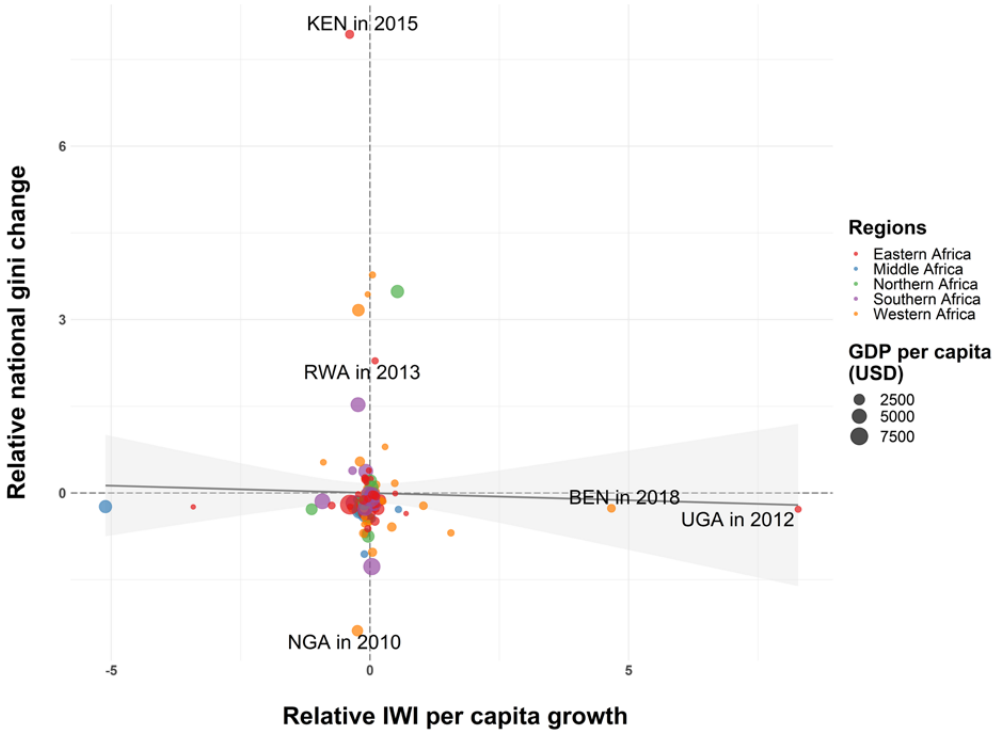


Figure 6.5. Inequality and Inclusive Wealth per capita

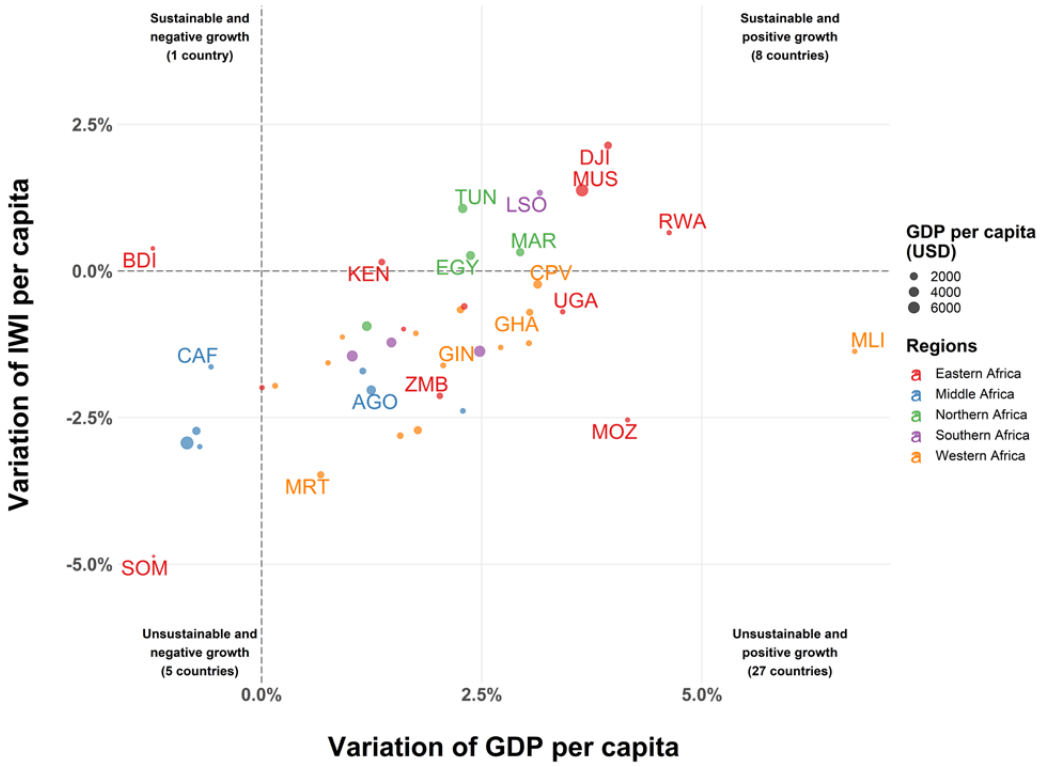


African economic and sustainable growth are not aligned

The current economic path of African countries is primarily dictated by the growth index they use for their policy and investment choices. Over the period of study, 36 out of 41 countries increased their GDP per capita. Those countries that experienced negative GDP per capita growth between 1992 and 2019 experienced global pressure and received international assistance to increase this growth. This is the case for the Central African Republic, Somalia and DRC, where civil conflict reduced productivity per capita. During the same period, only nine countries on the continent, predominantly north African nations, increased their IW per capita. The unsustainability of wealth per capita on the continent illustrates the lack of attention directed to this issue by policymakers.

Countries with higher GDP per capita growth are more likely to experience long-run wealth growth. This relationship is exhibited in figure 6.6. However, GDP growth appears to precede IWI growth given that countries with low or negative GDP growth do not experience positive long-run IWI growth. This evidence suggests that African countries prioritize growth in GDP per capita over IW per capita in their development strategies.

Figure 6.6. Variation in Inclusive Wealth Index per capita (1992–2019)



There are three major exceptions to this trend – in Mali, Mozambique and Burundi. Mali and Mozambique averaged more than 4 per cent of GDP per capita (among the fastest growing in Africa), but still experienced a decrease in IW per capita. This is due to their rapid demographic growth coupled with a constant depletion of their natural capital. Mali also faces the advance of the Sahara Desert. Burundi is the only country that contracted economically but grew sustainably. Between 1992 and 2019, Burundi experienced an average economic contraction, which highlights the consequences of its 1991 civil war that decimated 25 per cent of the country's productivity. Although produced capital was destroyed during the war, migration and decreasing anthropogenic pressures on natural capital for profit increased the wealth availability per citizen. The Burundian case does not represent an ideal example of sustainability.

Natural capital depletion is the primary hindrance to economic growth in Africa

The analysis of African economic growth in this report reveals worrying trends that may negatively impact its future development. Almost all countries experienced a decrease in IW per capita during the study period, and the economic growth of all countries was to the detriment of natural capital. Countries with the highest fossil fuel exploitation have higher GDP per capita on average. However, these resources can be rapidly depleted if they are not managed effectively. It is vital that African leaders and decision makers redirect current development strategies to pursue more sustainable economic growth that can continue in the future.

Given that decreases in IW growth are not linked to higher poverty rates in nations, corrections in policy design are required. The IW per capita should be used as an indicator to ensure that most individuals, those whose lives depend on the availability of natural capital, can benefit from economic growth in the present and the future.

Current African efforts towards natural capital growth

Although African governments have engaged in a range of efforts to limit the degradation of natural capital, to date they have had limited effectiveness. This is the case for the Great Green Wall (GGW) initiative, which was devised to combat the Sahara Desert's advance and increase the Sahel region's natural capital, and which had no noticeable effects from 1992 to 2019. The GGW initiative involves 11 African countries, of which nine are included in this report. These countries are Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, Ethiopia and Djibouti. As of 2019, these countries made little progress towards GGW program goals, as detailed in table 2. This is also reflected by their weak increase in renewable natural capital, with the highest significant increase in Mali of 0.1 per cent per year. Renewable natural capital even decreased in Mauritania by 0.04 per cent and in Chad by 0.03 per cent. As a result, the IW growth of these countries is similar to other African nations. The average IW growth in GGW participating countries ranges from 2.6 per cent to −0.2 per cent per year. The low achievement rate in the GGW program as of 2019 indicates that political instability and external obstacles (such as armed conflict) hinder progress beyond policy interventions. There is therefore a vital need to address issues at this level to ensure sustainable development on the continent.

Table 2. Great Green Wall, area restored

Country	Achievement of the area restored (km2)	The goal of restoration (km2)	The success rate (%)	Public fund (US$ millions)	External finance (US$ millions)
Ethiopia	20,060	132,000	15.2	0.4	1.6
Senegal	1,190	8000	14.9	18.3	–
Eritrea	5,010	124,000	4.0	–	–
Sudan	880	23,000	3.8	0	19.7
Niger	8,090	473,000	1.7	7.8	70
Burkina Faso	530	133,000	0.4	1.4	31
Chad	160	30,000	0.5	4.8	0.7
Mali	60	444,000	0.0	3.3	23.5
Nigeria	30	174,000	0.0	0.4	1.6
Djibouti	1.3	3,400	0.0	4.8	0.7
Mauritania	35	16,500	0.2	9.2	1.4

Source: (UNCCD 2020)

07

The way forward and recommendations

Natural capital is the largest source of African wealth and is vital to ensuring a sustainable development path for the continent, now and in the future. However, rapid economic and population growth on the continent has come at the expense of African precious natural resources. The data and analysis presented in this report have highlighted the need for improved monitoring and investment in these natural assets. This will ensure the current livelihoods and economic activities of local communities and enable economic growth for future generations.

The continued decline in natural capital and its renewable and non-renewable components may be attributable to inadequate accounting. The absence of efforts to value natural wealth is the reason for the lack of inclusiveness in African nations' accounting systems. The use of fossil fuels for economic activities depletes non-renewable natural capital, however the continuous decline in renewable natural capital observed between 1992 and 2019 is preventable. If renewable natural capital is managed well, the effects of consumption or depletion can be reversed, especially in the case of land-based degradation.

At the micro-level, people require land restoration and are already taking initiatives against land degradation. However, their small-scale actions and often their lack of knowledge of modern SLM cannot address this issue. This is why efforts such as the GGW program that aim to restore lands for the betterment of local populations and halt the advancing Sahara Desert can play a paramount role on the continent. In addition, discrimination against women in the agricultural sector must be addressed to leverage their enormous labour force potential for the conservation of natural capital. Women produce 70 per cent of African food and must be included in leadership roles for the conservation of natural capital.

Recommendations

To sustain current and future African economic growth, policymakers must identify investment strategies that prioritise natural capital. The economic impacts of the COVID-19 pandemic, including a reduction in available public funding, will require careful allocation of this investment. Although the continent holds enormous potential for sustainable growth and natural capital growth, this can only be achieved if leaders and decision makers enable the meaningful participation and leadership of women, and rural and low-income communities. Policy development for natural capital growth should include data collection on gender and income disparities. In particular, the data collected should pertain to access by these groups to credit and to programs for conserving and restoring the stock of African natural resources. Funding must focus on these populations to ensure the most efficient use of resources for African countries to make progress towards sustainable development.

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Appendix 1.
Methodology for estimations of the IWI

Human capital

The estimation of human capital postulates that this capital is a function of educational attainment (Edu) and the cumulative sum of future employment compensation over time. In this report, future compensations are actualized with an interest rate (ρ) fixed at 8.5 per cent. The mathematical representation of the valuation of human capital is:

$$HCW_{ij} = e^{(A_{ij} \cdot \rho)} \cdot P_{ij\,15-60} \cdot \int_0^{J_i} \bar{r}_i \cdot e^{-\delta \cdot j}\, dj$$

where HCW_{ij} stands for the human capital wealth of the country i at year j. The estimation of human capital is composed of three terms $e^{(A_{ij} \cdot \rho)}$, P_{ij15+}, and $\int_0^{J_i} \bar{r}_i \cdot e^{-\delta \cdot j}\, dj$. The term $e^{(A_{ij} \cdot \rho)}$ represents the benefit of education to human capital. The component A_{it} of this term is the average years of school attainment, defined as the average years of formal education, and ρ represents the average return of education on future wages, set to 8.5% (Managi and Kumar 2018; UNU–IHDP and UNEP 2014).

The term $P_{ij\,15-60}$ represents the total working population. It is assumed to be the population older than age 15 and younger than age 60. People younger than age 15 or older than age 60 are assumed to be substantially less productive than others because they are either at school or are too old, respectively. Hence, $P_{ij\,15-60}$ maybe grossly referred to as the human capital stock and $e^{(A_{ij} \cdot \rho)}$ is the value of education for this population.

The term $\int_0^{J_i} \bar{r}_i \cdot e^{-\delta \cdot j}$ represents the shadow price of human capital. This shadow price is the discounted sum of income an individual may expect to earn in his lifetime (T_i). It is composed of the average income in the country i, $\bar{r}_i$, multiplied by the discount rate of future earnings, $e^{-\delta \cdot j}$) (with δ set to an interest rate of 8.5%) (Managi and Kumar 2018). The effective working lifetime, J_i, is set to an average retirement age substracted from 15 years. Setting an average retirement age to 60, J_i can be defined as follows:

$$J_i = \begin{cases} 60 - 15 \; if \; \text{average life expectancy} > 60 \\ \text{average life expectancy} - 15 \; if \; \text{average life expectancy} \leq 60 \end{cases}$$

Including life expectancy in the human capital computation allows a reasonable accounting of the benefits of health in each region. Finally, using gender-specific statistics on education and population, the report can estimate female and male human capital. Nevertheless, this differentiation assumes that females and males have no pay gap for similar competencies. Although this assumption is at odds with reality, no data enables a clear description of the salary gap between females and males in Africa.

Produced capital

The produced capital is estimated using the perpetual inventory method (PIM) by setting an initial capital estimate. It suggests that produced capital in year j is equivalent to the value of capital in $j-1$ plus the new investment on capital minus depreciation of capital between j and $j-1$. However, this method requires the valuation of the initial capital K_0 of each country.

The initial capital K_0 in each economy is estimated in a year where it is assumed that the economy is in a steady state – that is the capital-output ratio is constant in the long term. This steady state refers to a period where there is an assumed long-term equilibrium of the economy. This assumption implies that the capital-output ratio can be expressed as follows:

$$k = \frac{I/y}{(\delta + \gamma)}$$

where k is the capital-output ratio, I is investment; y is the output of the economy; γ is the steady-state growth rate of the economy; δ is the depreciation rate of the capital. Consistent with previous IWRs, γ is estimated as a weighted average growth rate of the economy under study, while δ is assumed to be 4 per cent across countries and time (Managi and Kumar 2018).

For each country, this ratio is then multiplied by output (GDP_{i0}) to estimate K_{i0}, the initial capital. The analysis uses values in 1970 as initial capital estimates. Following the estimation of the initial capital, PIM can be applied as described here:

$$K_{ij} = (1 - \delta)^j K_{i0} + \sum_{t=1}^{J} I_{ij} (1 - \delta)^{j-t}$$

Finally, regarding the lifetimes of produced capital assets, the report assumes an indefinite depreciation period.

Renewable natural capital

Renewable natural capital corresponds to wealth from cropland, pastureland, and forest resources. Each asset contributing renewable natural capital is estimated by multiplying its physical yearly available amount with its corresponding shadow price.

Cropland

The Food and Agriculture Organization of the United Nations (FAO) collects a large amount of cropland data. This analysis uses values from 159 crops. Then, the cropland area in hectares is valued using the net present value (NPV) of future rental flows as shadow price. This method is consistent with others including Lange *et al.* (2018) and Managi and Kumar (2018). The rental flow or average rental price per hectare of the crop k at the year j for the country i can be represented by the following equation:

$$RPA_{ij} = \frac{1}{A} \sum_{k=1}^{159} R_{ik} P_{ijk} Q_{ijk}$$

where Q_{ijk}, P_{ijk}, and R_{ik} are the quantity of production, the price per amount, and the rental rate of crop k, respectively. The term A is the total area harvested. A mapping of FAO crop classification with respective sectoral rental rates provided by Narayanan (2008) is applied to estimate the rental rate by crop group. The NPV is estimated with the values of rental flows as follows:

$$NPV_{ij} = \sum_{j=1}^{\infty} \frac{RPA_{ij}}{(1+r)^j}$$

where r stands for the discounted rate set to 5 per cent, t is the planning horizon of crop production assumed to go up to infinity and NPV_{ij} represents the net present value for country i at year t. The analysis uses the average NPV per country of the period of study as shadow price to value cropland as depicted here:

$$\overline{NPV_i} = \frac{1}{27}\sum_{j=1}^{27} NPV_{ij}$$

The number 27 is the number of years considered in the study spanning between 1992 and 2019. This average value of NPV ensures that changes in cropland wealth are only caused by changes in cropland stock, that is, the area of cropland. Thus, one can express cropland wealth in the year j for the country i as WC_{ij} that is calculated as:

$$WC_{ij} = NPV_i \cdot CLA_{ij}$$

where CLA_{ij} is the total area of cropland in country i at year j.

Pastureland

The same conceptual framework used to evaluate cropland value is applied to estimate pastureland wealth. The wealth from pastureland is the product of the multiplication of pastureland areas with the average NPV of these lands. However, although data for production, prices, and rental rates of pastureland are available, linking the average rental price of pastureland to specific areas is highly complex (unlike cropland). Therefore, the current estimate assumes that rents per hectare in pastureland are equal to those of cropland. This assumption allows the estimation of the total pastureland wealth as follows:

$$WP_{ij} = \overline{NPV_i} \cdot PLA_{ij}$$

where WP_{ij} is the total wealth of pastureland and PLA_{ij} is the toral areas of pastureland of the country i, at year t. The assumed net present value of pastureland is represented by $\overline{NPV_i}$.

Forest resources

The value of forest accounts estimated in this report reflect naturally regenerated forests. Therefore, it excludes cultivated forests that are accounted for in produced capital. Cultivated forests are considered produced capital because they require a labour force and are thus not naturally generated. The forest resources have two components: wood and non-wood products.

Wood forest products

First, we estimated the volume of wood commercially available. This consists in multiplying the total forest area by timber density per area and the per centage of total volume that is commercially available. This data is collected from Forest Resources Assessment (FAO 2010, FAO 2006, FAO 2001, and FAO 1995). Since data are available for 1995, 2000, 2005, and 2010, linear interpolations are applied to estimate values in years with missing data.

The basis of the shadow price of wood uses stumpage value. Stumpage price is estimated by performing a weighted average price of industrial round wood and fuelwood for each country whose data are collected from FAO. These annual estimated values are then converted from current to constant prices using country-specific GDP deflators. This conversion removes the effect of inflation from these estimates. Subsequently, the report uses information on the regional rental rates for timber estimated by Bolt *et al.* (2002). Such rates are assumed to be constant over time. Finally, the proxy value for the shadow price of timber is derived from the average price over the entire study period (1992–2019). In short, wealth from wood (WW_{ij}) from country i at year j can be expressed as follows:

$$WW_{ij} = \overline{Price_i} \cdot Rental\ rate \cdot CSW_{ij}$$

with $\overline{Price_i}$ denoting the average price of wood in country i and CSW_{ij} representing the commercially available stock of wood in country i at year t.

Non-wood forest production

Forests carry additional wealth through the value of the ecosystem services (ES) they provide. This report assesses forests' ES by valuing their expected flows of ecological services over time at their marginal contribution to economic welfare (IWR 2014). This equation presents this valuation technique:

$$ESW_{ij} = \int_{j}^{\infty} P_j \cdot (Q_{ij} \cdot r_j) \cdot e^{-\delta \cdot j} . dj$$

where ESW_{ij} is the ecosystem service wealth and Q_{ij} is the total forest area in the country i at year j. Then, P_j is the marginal contribution of the ES flows to inter-temporal economic welfare, and r_j is the fraction of the forest which is accessed by individuals to obtain benefits per year j. P_j and r_j are assumed to be the same for all countries because of the lack of country-specific estimates. This report uses the Ecosystem Services Valuation Database (ESVD), by Van der Ploeg *et al.* (2010) to value the marginal contribution of forest per ha (P_j). Since the ESVD presents information for these two types of forests, the report weights the corresponding values by the share of each forest type in the country's total forest to arrive at the final value of the benefits per hectare and year.

Non-renewable natural capital

Fossil fuels

Reserves of natural gas and oil are collected from the U.S. Energy Information Administration (2013) for the year 2010. Coal reserves are obtained from the same source but for the year 2008. The procedure described by the following equation is used to estimate stocks for other years:

$$Stock_{ij-1} = Stock_{ij} + Production_{ij}$$

This procedure suggests that in country i, the stock of a natural asset ($Stock_{ij}$) in the year preceding j is superior to the stock in $j-1$ by the amount of asset production ($Production_{ij}$) that occurred during the calendar year j. Country-specific production data are collected from U.S. Energy Information Administration (https://www.eia.gov/). This technique allows the estimation of oil, and gas coal reserves from 1992 to 2019.

As for the shadow prices, raw prices of coal, natural gas, and oil are collected from the BP Statistical Review of World Energy (BP 2013). The BP Statistical Review reports several prices per fossil fuel. Thus, calculations are performed by averaging prices from four sources to proxy the average price of coal worldwide: the United States, northwestern Europe, Japan coking and Japan steam. The transnational price of natural gas is an average of prices of the European Union, the United Kingdom, the United States, Japan, and Canada. The price of oil corresponds to the average from the information of Dubai, Brent, Nigerian Forcados, and West Texas Intermediate grades. These estimated prices are then adjusted for inflation using the U.S. GDP deflator. In addition to these prices, rental rates from Narayanan *et al.* (2012) for oil, coal, and gas are collected to complete the estimation of the shadow price. The collection of these data enables estimations of fossil fuel capital as follows:

$$WFF_{kij} = Stock_{kij} \cdot \overline{Price_k} \cdot rental\ rate_k$$

where WFF_{kij} is the wealth from fossil fuel k in country i at year j; and $\overline{Price_k}$ is the average price of the fossil fuel k.

Metals and minerals

The procedure of estimation of metal and mineral resources is identical to fossil fuels wealth. However, the data on metal and natural resources are much rarer than those on fossil fuels. The reserves data of metal and minerals used in this report stem from U.S. Geological Survey published in their Mineral Commodity Summaries or Minerals Yearbooks (U.S. Geological Survey 2013a). However, U.S. Geological Survey publishes only data from countries holding one of the top 10 reserves worldwide. This is a significant limitation for this analysis since several African countries' economies are based on mineral resources.

This report focuses on bauxite, copper, gold, iron, lead, nickel, phosphate, silver, tin and zinc values. Other materials are excluded because of the lack of data and the prohibitively difficult task of valuing all types of resources on the continent. Following the procedure described in fossil fuels wealth estimation, the mineral and metal capital can be estimated as follows:

$$WMM_{kij} = Stock_{kij} \cdot \overline{Price_k} \cdot rental\ rate_k$$

where WMM_{kij} is the wealth from the mineral or metal k in country i at year j; and ($\overline{Price_k}$) is the average price of the mineral/metal k.

The sum of the wealth of fossil fuels (WFF_{kij}) and wealth of precious minerals and metals (WMM_{kij}) corresponds to the non-renewable natural capital.

Appendix 2.
African countries by region and income group

Table A1. African countries by region and income group

Country	Region	Level of Income
Algeria	Northern	Lower-middle
Angola	Central	Lower-middle
Benin	Western	Lower-middle
Botswana	Southern	Upper-middle
Burkina Faso	Western	Low
Burundi	Eastern	Low
Cabo Verde	Western	Lower-middle
Cameroon	Central	Lower-middle
Central African Republic	Central	Low
Chad	Central	Low
Comoros	*Eastern*	*Lower-middle*
Democratic Republic of the Congo	Central	Low
Congo	Central	Lower-middle
Côte d'Ivoire	Western	Lower-middle
Djibouti	Eastern	Lower-middle
Egypt	Northern	Lower-middle
Equatorial Guinea	*Central*	*Upper-middle*
Eritrea	*Eastern*	*Low*
Eswatini	*Southern*	*Lower-middle*
Ethiopia	*Eastern*	*Low*
Gabon	Central	Upper-middle
Ghana	Western	Lower-middle
Guinea	Western	Low
Guinea–Bissau	*Western*	*Low*
Kenya	Eastern	Lower-middle
Lesotho	Southern	Lower-middle
Liberia	*Western*	*Low*
Libya	*Northern*	*Upper-middle*
Madagascar	Eastern	Low

Malawi	Eastern	Low
Mali	Western	Low
Mauritania	Western	Lower-middle
Mauritius	Eastern	Upper-middle
Morocco	Northern	Lower-middle
Mozambique	Eastern	Low
Namibia	Southern	Upper-middle
Niger	Western	Low
Nigeria	Western	Lower-middle
Rwanda	Eastern	Low
São Tomé and Principe	*Central*	*Lower-middle*
Senegal	Western	Lower-middle
Seychelles	*Eastern*	*High*
Sierra Leone	Western	Low
Somalia	Eastern	Low
South Africa	Southern	Upper-middle
South Sudan	*Eastern*	*Low*
Sudan	*Eastern*	*Low*
United Republic of Tanzania	*Eastern*	*Lower-middle*
Gambia	Western	Low
Togo	Western	Low
Tunisia	Northern	Lower-middle
Uganda	Eastern	Low
Zambia	Eastern	Lower-middle
Zimbabwe	Eastern	Lower-middle
Countries included in this report: 41		
Countries involved in the Great Green Wall initiative: 11		

Note: Countries involved in the Great Green Wall initiative are reported in bold and countries excluded from the analyses in this report are ported in italic. Low-income countries have an income per capita of US$ 1,045 or less; lower-middle-income economies have an income per capita varying from US$ 1,046 to US$ 4,095; upper-middle-income economies have an income per capita varying from US$ 4,096 to US$ 12,695; and high-income economies have an income per capita of US$ 12,696 or more.

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