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Defining Pathways towards African Ecological Futures

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Abstract: Africa has experienced unprecedented growth across a range of development indices for decades. However, this growth is often at the expense of Africa's biodiversity and ecosystems, jeopardizing the livelihoods of millions of people depending on the goods and services provided by nature, with broader consequences for achieving the United Nations Sustainable Development Goals. Encouragingly, Africa can still take a more sustainable path. Here, we synthesize the key learnings from the African Ecological Futures project. We report results from a participatory scenario planning process around four collectively-owned scenarios and narratives for the evolution of Africa's ecological resource base over the next 50 years. These scenarios provided a lens to review pressures on the natural environment, through the drivers, pressures, state, impacts, and responses (DPSIR) framework. Based on the outcomes from each of these steps, we discuss opportunities to reorient Africa's development trajectories towards a sustainable path. These opportunities fall under the broad categories of "effective natural resource governance", "strategic planning capabilities", "investment safeguards and frameworks", and "new partnership models". Underpinning all these opportunities are "data, management information, and decision support frameworks". This work can help inform collaborative action by a broad set of actors with an interest in ensuring a sustainable ecological future for Africa.

Keywords: sustainable development; social–ecological systems; biodiversity; participatory scenario planning; governance; strategic planning; investment; decision support frameworks; green infrastructure; Africa

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1. Introduction

Africa's natural capital is immense-from the forests and minerals of the Congo, the diamonds of western and southern Africa, the water towers in Guinea, to the wildlife-packed savannahs and coral reefs of East Africa [1]. Perhaps the most unique aspect of Africa's natural capital is its biodiversity. The continent contains the world's most diverse and abundant megafaunal populations, which have been largely exterminated elsewhere in the world [2,3]. At the same time, African people rely heavily on the services that natural ecosystems provide such as clean water, firewood, protein from fisheries and wildlife, building materials, and revenue from wildlife-based tourism. Many economies

continue to be dominated by agricultural production, either for export as in the case of cocoa production from Ghana, coffee and tea from Kenya, citrus fruits from Morocco, or wine from South Africa or for national consumption in subsistence economies. Tourism and other natural resource dependent sectors such as forestry and energy production add to this dependency on the continent's strong natural resource base. Hence, nature and natural resources remain the foundation for Africa's current and future development. It is therefore concerning that the continent's current development trajectory is undermining its ecosystems, as evidenced by declines in wildlife populations and habitats, and degrading freshwater systems, land, and other critical parts of ecosystems [1,4,5].

Despite strong economic advances, in particular over the past decade [6,7], Africa can still improve on many development indicators. For example, less than 40% of the continent's population has access to electricity, and internet usage is at 28.2% in Africa as compared to Europe, who are the highest users at 82.5% [8]. Many landlocked countries lack railways and remain reliant on inefficient trucking freight transport, while only a third of the rural population has access to roads (e.g., especially in West Africa) [6]. Moreover, only 11% of African urban dwellers have access to sewer connections and 59% to piped water, down from 67% in 2003 [9]. Furthermore, the number of people living in poverty in Africa is still increasing [10], a sign of inequality in wealth distribution.

Africa's rapid economic development, population growth, and associated needs for access to natural resources, in particular where a large section of poverty-driven population remains highly dependent on such resources for their livelihoods and survival, comes at a cost to the continent's rich natural capital. Deforestation rates are increasing, particularly in nations with dry forests [11], wildlife populations are declining and becoming more isolated [4], and marine and freshwater fish stocks are plummeting [12–14]. Mega infrastructure projects are penetrating previously remote areas, catalyzing the unsustainable exploitation of natural resources, to feed growing local needs and the ever-increasing demands of the global economic system [15]. The consequent decrease in ecosystem resilience further aggravates the impacts of climate change, which is predicted to drive approximately 68 million to 132 million into poverty by 2030—mostly in sub-Saharan Africa [16]. If this largely unstrategic and ecologically blind development continues, it will threaten the future development and prosperity of the continent, with particularly severe impacts on many of the most marginalised, vulnerable people who depend on natural resources for their livelihoods [17].

Africa's human population is projected to double by 2050 to 2.5 billion people, and then double or triple again by 2100 [18,19]. Africa is also one of the fastest urbanising regions and its burgeoning middle classes will grow from 355 million in 2010 to 1.1 billion in 2060 [20]. This rapid population expansion, urbanisation and the growing middle class indicates a need to vastly increase investments in infrastructure (e.g., for health, education, transport, energy, housing), and increase demands for food production, energy, water and other resources [21]. Finding a way to economically develop while maintaining the integrity of the environment which people depend on is therefore one of the great challenges faced by the continent.

However, Africa still has an opportunity to determine its own development trajectory, and chart new pathways to sustainability. Most African nations have in place national development plans and have committed to global targets such as the United Nations Sustainable Development Goals (SDGs) [22], the Convention on Biological Diversity's Strategic Plan [23], and the UNFCCC Paris Climate Agreement [24] (Figure 1). Additionally, all countries come together under the African Union, a multilateral governance platform promoting continental unity and cooperation. One of the key pillars of the African Union's ambitious Agenda 2063 is "environmentally sustainable and climate resilient economies and communities" [25]. Although not ubiquitous, the ambition is clear. To achieve it, Africa must look forward and plan accordingly.

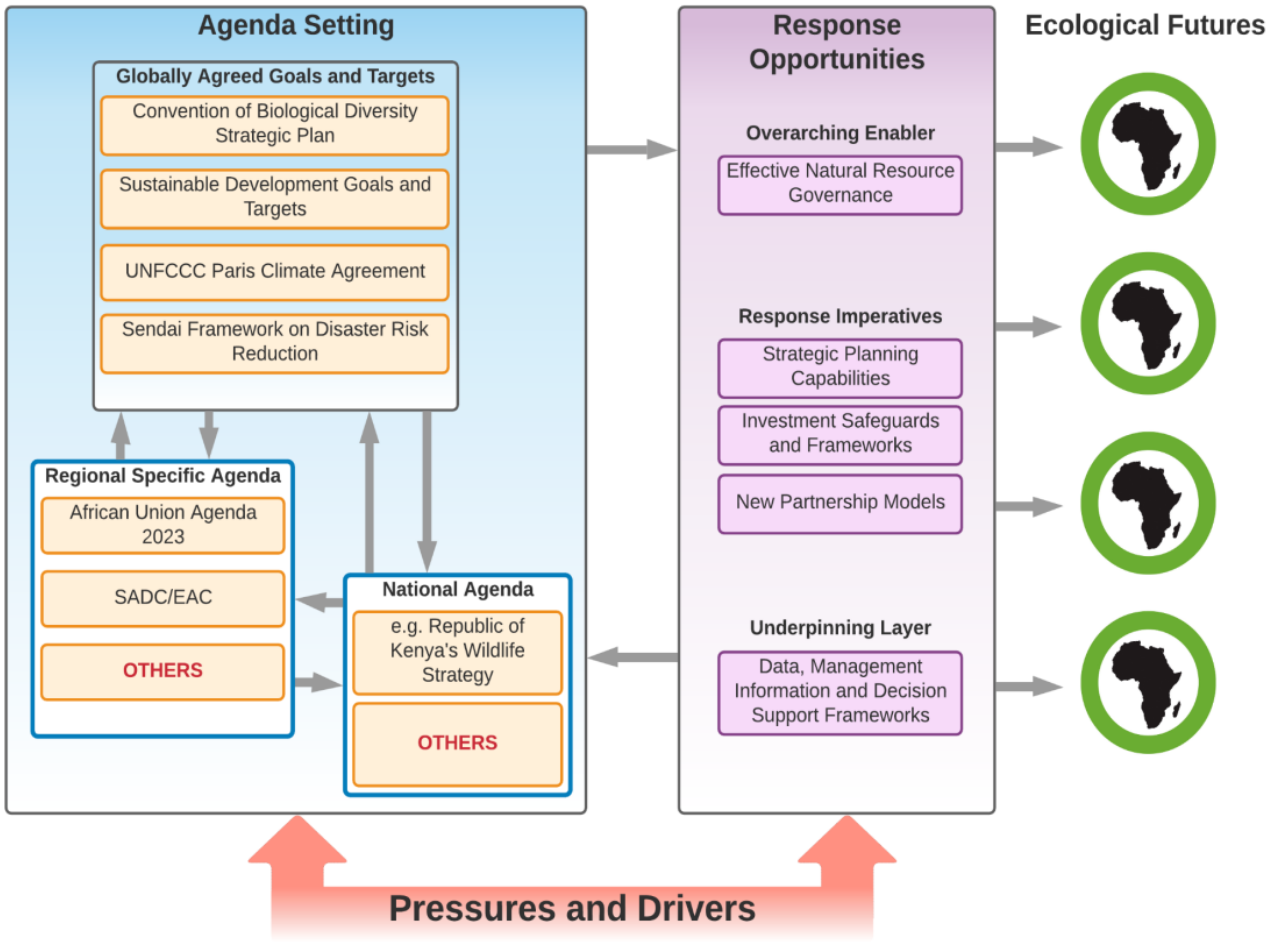

Figure 1. Agenda setting can drive response opportunities and define Africa's Ecological Futures.

"Futures thinking" involves taking a future-oriented approach to strategic planning [26], backed by an understanding of the developmental and social–ecological history. The term "futures" covers a range of techniques for understanding and anticipating, rather than trying to predict the future. It is usually pluralised since many different futures are possible. The aim of futures thinking is to create pathways towards ambitious long-term goals, and it is regarded as an effective technique to inform decision making that balances long-term planning with present action. One approach of futures thinking is scenario planning-which present plausible descriptions about how the future may develop, based on a coherent, internally consistent set of assumptions (or logic) about key relationships and their driving forces [27,28]. When developed in a participatory manner, the process includes a diverse array of relevant stakeholder views, which can improve the feasibility, validity, uptake, and concreteness of scenarios [29–31].

Increasing the capacity for futures thinking and generating scenarios that galvanise transformative change are recognised as important endeavours for achieving sustainability worldwide. However, in Africa the availability of necessary expertise to apply futures thinking is low, and scenario analyses in the environmental field have been underutilised [32]. Moreover, developing a coherent set of scenarios for the continent is challenging, considering the rich cultural diversity, vast geographic heterogeneity which no doubt, hosts many different, and sometimes conflicting visions of the future.

The African Ecological Futures (AEF) planning project, a joint initiative between the African Development Bank (AfDB) and the Worldwide Fund for Nature (WWF) that took place between 2013 and 2015, is an example of how participatory scenario planning can benefit the continent. The process involved a series of analytical studies combined with

workshops with policy makers and development partners with skill sets ranging from conservation and ecology to economics and international development. The outcomes of these workshops were four expert-developed and collectively-owned scenarios for the evolution of Africa's ecological resource base over the next 50 years (2015–2065).

In this paper, we synthesize the key learnings from the African Ecological Futures project, complemented by recent data and information on subsequent developments and trends since the release of this foundational piece of work. We (i) analyse the drivers, pressures and impacts of Africa's development trajectory on its environment; (ii) describe scenarios and response opportunities to define Africa's ecological future; and (iii) explore two case studies (see Boxes 1 and 2), which demonstrate important leverage points. Our hope is that our results provide information to support stakeholders committed to putting Africa on a sustainable development trajectory now, to guarantee an ecological society in the future. Recognising a continental set of scenarios may not be applicable to every national context, our ambition is that these scenarios be adapted to specific national and local contexts.

2. Approach and Methods

The approach taken for the African Ecological Futures process included three main steps. Firstly, the scientific basis for the African Ecological Futures process was provided by an in-depth analysis of six main sectors that are likely to shape Africa's development: energy, water, agriculture, extractives, trade and investment, and infrastructure. Analytical papers on each of these six areas, commissioned by WWF and AfDB through consultancies and internal experts, assessed the main challenges and potential development pathways that Africa could follow over the next 50 years. Each of these papers included an exploration of policy and development directions and their implications, as well as potential points of intervention for ensuring a sustainable, ecologically secure pathway of growth.

Secondly, these analyses were used to inform two scenario planning workshops in 2014 and 2015. The scenarios were constructed around two axes: (i) the level of centralisation versus decentralisation of decision making; and (ii) global orientation (i.e., global production and trade) or African orientation (i.e., intra-African production and trade) (Figure 2). These axes represent two broad-level dimensions of Africa's policy and development trajectory, underlying the biggest trends in Africa's development pathway. During the workshops, stakeholders undertook an exploratory analysis of possible scenarios, constituted along these two axes, to explore a wide range of potential futures across policy, management and planning domains. A deliberate attempt was made to avoid more desirable (best-case) or less desirable (worst-case) [19].

The first workshop in Cape Town, South Africa brought together 41 experts (both from within WWF and external) from across the continent. The workshop had two main functions: (i) to review and validate the six sector papers; and (ii) to apply the findings of these analyses to the participatory scenario planning exercise by reflecting on the implications of the different axes of development. The workshop resulted in a shared understanding of key drivers and pressures central to Africa's growth that have profound implications for the continent's ecological resources, and the parameters that could enable preferred outcomes for ecologically sustainable growth in Africa. A second workshop was held at the 15th African Ministerial Conference on the Environment (AMCEN) in Cairo, Egypt, and brought together partners at the forefront of development and environment challenges across Africa, including representatives from the African Development Bank, Albertine Rift Conservation Society (ARCOS), Birdlife International, the International Union for Conservation of Nature (IUCN), the New Partnership for Africa's Development (NEPAD), the United Nations Economic Commission for Africa (UNECA), and the United Nations Environment Programme (UNEP), as well as government representatives. This second workshop resulted in (i) a shared understanding among development partners of the dynamics and uncertainties that will determine Africa's ecological future; (ii) a series of scenario narratives that can assist decision makers in identifying areas of risk and opportu-

nities for growth; and (iii) a general understanding of how decision makers and partners can influence development trajectories and manage emerging risks.

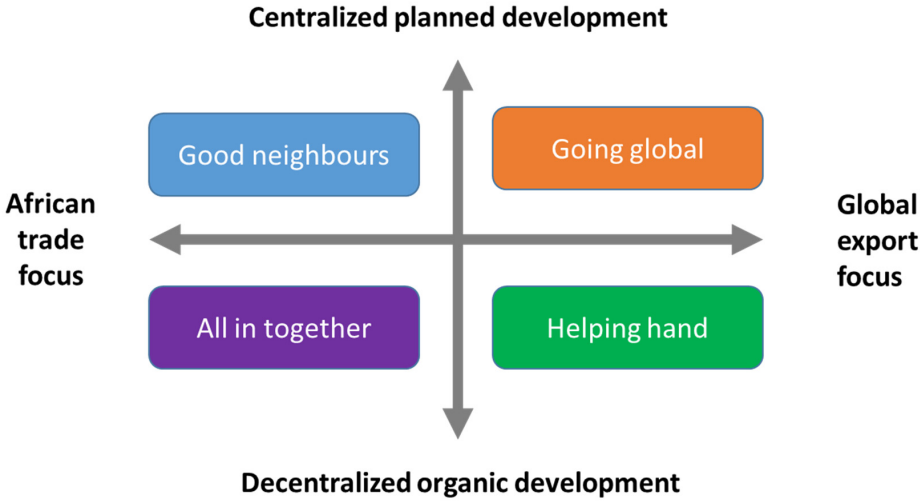

Figure 2. Scenarios developed during the African Ecological Futures process.

As a third step, the findings from the analysis and the participatory scenario planning workshops were used to construct an overall African Ecological Futures report, as a basis for continued dialogue with governments and development partners across Africa. For the purpose of this paper, the findings of this process are summarised in the form of an overview of the scenario narratives, an overall analysis of development trends and their consequences, based on the drivers, pressures, state, impacts, and responses (DPSIR) framework [33], as well as an overview of the key leverage points and response opportunities for securing Africa's ecological future. Furthermore, between 2015 and 2021, a number of more concrete case studies were undertaken as part of the follow-up process, to further analyse development trends and opportunities in a number of key sectors. The details of these case studies are not the subject of this paper, but summaries are presented for illustrative purposes (Boxes 1 and 2).

3. Results

3.1. Scenario Narratives

Four storylines or narratives—i.e., qualitative description of future developments—were developed to reflect distinct trajectories for Africa and African nations:

1. "Going global" where resource- rich regions take a planned, export-driven path to developing extractive and agricultural commodities, based on centralised decision making and connected economic infrastructure;
2. "Helping hands" where resource rich areas are the focus of extractive economic activities driven by local actors developing local resources for export through decentralised decision making and supported by local (off grid) infrastructure;
3. "All in together" where densely populated areas with renewable resources develop local agricultural industries through participatory decision making and local co-operative schemes driven by local actors; and
4. "Good neighbours" where the future is characterised by a strong drive for African-based development to increase intra-regional trade, where countries begin to take a coherent domestic view with regards to their production and consumption, and large regional infrastructure investments are needed.

The scenarios were primarily intended to instigate discussion on how different local and sectoral contexts influence the development pathways of countries and the continent, and the consequences thereof for the environment. In this regard, there is no 'ideal' scenario, nor is there the intention that these scenarios are fully reflective of reality. In fact, the four

scenarios are not necessarily mutually exclusive for any country or region and different areas within any country may simultaneously exhibit different scenarios for different sectors.

3.2. Analysis of Development Trends: Where Development Meets the Environment

Here, we discuss the broad drivers of change on the continent, how these manifest on the ground as pressures or 'threats' to the environment, and what impact they are having now, and may have in the future, on Africa's natural resource base and people.

3.2.1. Drivers of Change

A broad set of complex, interconnected, and multi-scalar drivers have and will continue to drive these environmental changes (Figure 3). We discuss these drivers, the pressure they apply to the environment, and the impacts they are having.

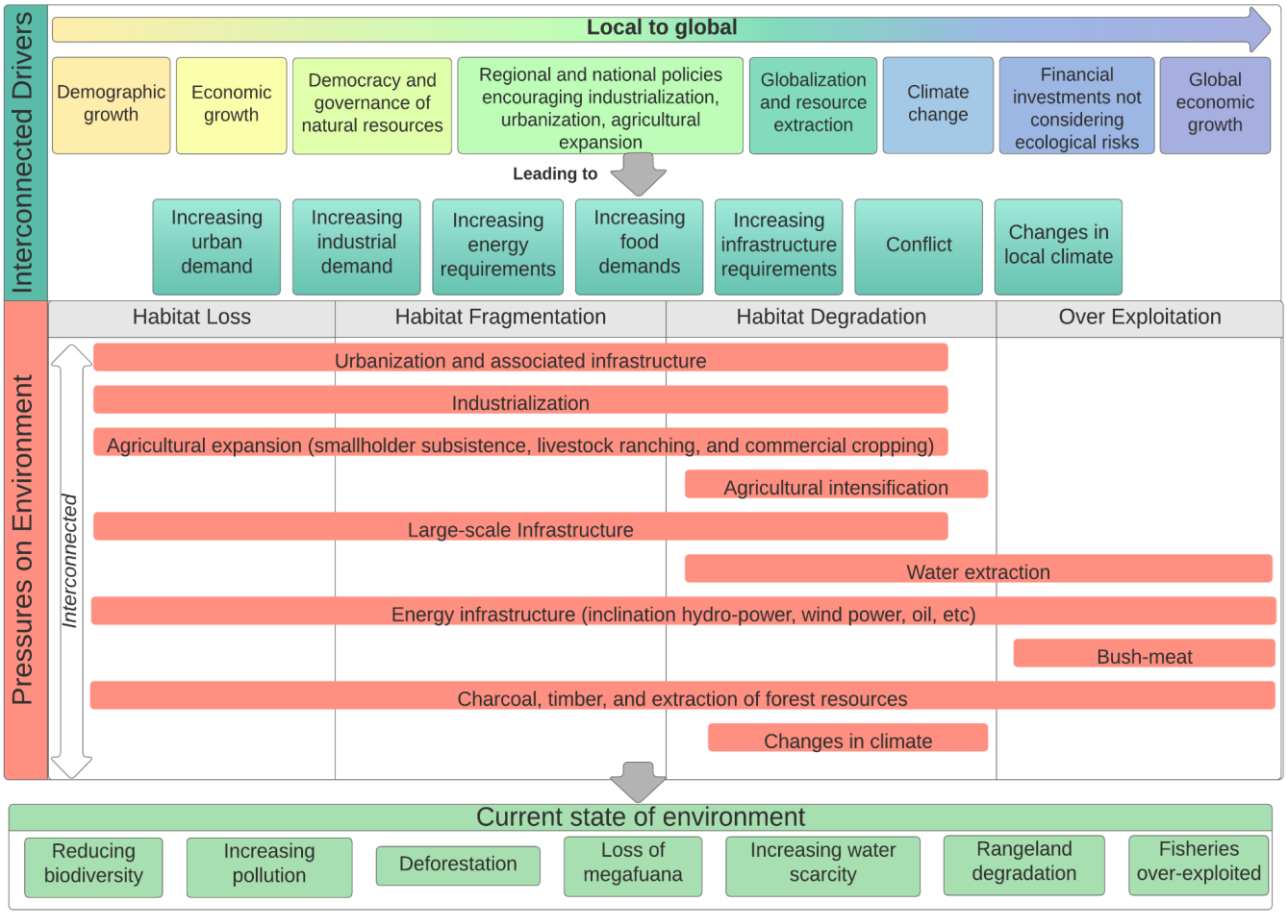

Figure 3. Conceptual model of drivers, pressures and impacts on the environment, as highlighted by stakeholders in the African Ecological Futures workshops. The drivers show a top tier of higher-level influences, with many of these interconnected and occurring at multiple scales from local to global. The second-tier highlights some of the common direct pressures that these create, leading to pressures on the environment, including over-exploitation, habitat loss, fragmentation, and degradation. These pressures lead to the current state of the environment.

Local and regional development factors: Africa's growth story is already one of the defining global narratives of the 20th and 21st century. Demographic change, changing lifestyles, and economic growth are key factors that drive growing pressures on the environment. By 2100, Africa is expected to have grown to between 3 and 4 billion people, while its middle class is projected to triple by 2060 to 1.1 billion [34]. GDP growth rates, which averaged 5% between 2000 and 2010 [35], are expected to continue. Despite a new

set of challenges associated with growing inequality [36], the share of Africans living on less than US$1.90 a day has fallen substantially—from 54% in 1990 to 41% in 2015. That said, the actual number of poor people in Africa has increased from 278 to 413 million in the same period due to population growth [37]. Consequently, between 1961 and 2008, Africa's ecological footprint (i.e., the quantity of nature required to sustain a person) doubled—partly due to its rapidly growing population and middle class [1]. Although individuals' ecological footprint is still relatively small [38], this will likely increase due to greater demand for and consumption of goods and services, such as energy, housing, food, water, land use, and infrastructure.

National governance factors: Changes in national security and democratic civil society engagement will intensify environmental pressure. Countries without rigid democratic processes or with wide-spread conflict tend to have weaker natural resource governance [39,40]. Poor governance and an unstable political environment, in particular accompanied by a shrinking democratic space for civil society, can be major bottlenecks for sustainable development. Civil society organisations are key to strong governance institutions–using polycentric governance approaches that rely on participative approaches that build from the local level. Advocacy efforts can result in transformative change in the behaviour of business, governments, and consumers [41].

Global and external factors: Factors beyond the continent will also increase pressure on the African environment. Increasing food requirements globally will put pressure on Africa's arable lands, which represents roughly 60% of all globally uncultivated arable land. It is projected that global cropland will increased by 26%, or 3.35 million km^2, between 2010 and 2050—particularly throughout sub-Saharan Africa [42]. Furthermore, global shocks (e.g., oil commodity price downturns) will have downstream impacts on African nations, inducing changes to national priorities and policies, and altering local demand for natural resources. For example, the COVID-19 pandemic has increased pressure on the natural environment through reduced funding for conservation and restrictions on the operations of conservation agencies [4]. As the continent experiences rapid development, foreign direct investment inflows into Africa have significantly increased in the last decade, albeit contracting during the COVID-19 pandemic [18]. Investors' values and safeguards will influence whether potentially environmentally damaging development projects can access capital and licensing. Climate change induced impacts—such as droughts, flooding, storm surges, wildfires and receding glaciers—will put additional pressure on natural resources, and likely exacerbate the impact of other drivers [43].

3.2.2. Pressures on the Environment

Drivers of change manifest as interlinked pressures that ultimately impact the environment. These impacts occur in four broad but related categories: habitat conversion, habitat fragmentation, habitat degradation, and overexploitation of resources (Figure 3). Complete habitat conversion means an entire natural ecosystem with its biodiversity and ecosystem services is converted to a human land use. As habitat is converted, remaining intact patches become fragmented, which is particularly problematic for large migratory mammals, but also has profound implications for the survival of species in the context of climate change [44]. Degradation (e.g., through pollution, overgrazing, or deforestation) results in reduced habitat quality for biodiversity and impaired ecosystem services. Overexploitation, also called overharvesting, refers to harvesting a renewable resource to the point of diminishing returns (e.g., illegal and unregulated bushmeat trade, or overfishing) [45]. The pressures, that cause these four categories of impact include:

1. Urbanisation and industrialisation: Africa's urban areas have expanded at 5% per year for the last 20 years, and by 2050, 1.2 billion people will live in cities [46]. Urban expansion will result in the conversion of intact habitat that currently supports biodiversity and ecosystem services, either directly to urban areas, or indirectly, to provide the food, water, energy and other material that cities demand [47–49]. Some of this may be planned rezoning, while much will include illegal, unplanned encroachment into

urban green infrastructure and surrounding landscapes from unplanned peri-urban or informal settlements [50]. Urbanisation also requires supporting infrastructure such as roads and power lines, which will also have environmental impacts. Furthermore, unless sanitation and regulatory controls on industry are enforced, remaining habitats in or near urban areas will become polluted and degraded.

2. Agricultural expansion and/or intensification: Agricultural land conversion is among the largest global contributors to habitat loss, species extinction, and a major emitter of greenhouse gases [42,51]. Under current scenarios of agricultural production, vast areas of habitat across the continent will have to be cleared and farmed to meet the food requirements of a richer, larger population. Under a business-as-usual scenario it is predicted that vertebrate species in Africa will lose ~14.4% of their habitat on average by 2050 through land conversion [42]. In particular, increasing agricultural production threatens the most marginal land, causing the deterioration of soil and water resources. Pollution is also likely to increase due to intensified and untargeted use of fertilisers, herbicides, and pesticides, in part related to growing pesticide resistance, the use of hybrid seed and less fallowing and crop rotation [52].
3. Large-scale infrastructure: Thirty-three planned or existing transportation corridors exist across the continent that if completed, will total over 53,000 km in length [14]. The corridors involve large-scale expansion and construction of infrastructure such as roads, railroads, pipelines, and port facilities. These will open up extensive areas of land to new environmental pressures, and cause widespread fragmentation of ecosystems [53]. This is particularly concerning for projects that pass through important areas for biodiversity and wildlife, including the Southern Agricultural Growth Corridors (SAGCOT), the Lamu Southern Sudan Transport Corridor (LAPSSET), and many others [54].
4. Water extraction: Already, many freshwater basins and associated terrestrial ecosystems that rely on them are negatively impacted by industrial overexploitation, particularly irrigation. In most African countries, less than 50% of the population has access to improved sanitation facilities (30% in sub-Saharan Africa) and less than 75% have access to improved drinking water sources. Climate change will further exacerbate all aspects of water insecurity [55]. Increased volumes of water will be required, along with appropriate infrastructure, to feed a growing population [56–58].
5. Energy infrastructure: As many as 580 million Africans do not have access to electricity, and 900 million do not have clean cooking energy. Thus, substantial increases in electricity generation and transmission are required [59,60]. Even where renewable energy systems are created, there will likely be some level of environmental impact from energy development. For instance, hydropower dams are projected to increase by more than 23% by 2040 [59,61] and could lead to loss of habitats through damming. A growth in wind power turbines could causes collisions of birds and bats [62,63]. The impacts of global energy demands will exacerbate these issues, degrading habitats such as in Murchison Falls National Park, Uganda [64], and catalysing further investment in large scale infrastructure projects [65,66].
6. Bushmeat and overfishing: Large scale bushmeat overexploitation has led to defaunation of Africa's tropical forests [67], and much of its savannahs. Likewise, overfishing of both freshwater and marine species is driving some species to near extinction [68]. The ecological, nutritional, economic, and intrinsic values of wildlife are all at risk of being lost because present policies and practices cannot reconcile different values, nor manage resources sustainably. In some countries, changes in wealth or violent conflicts may increase the consumption of bushmeat [69–71].
7. Charcoal, timber, and extraction of forest and mineral resources: Sixty-five percent of the world's charcoal is produced in sub-Saharan Africa, mainly by smallholders [72], driven in particular by increasing demands from growing urban areas [11]. Furthermore, industrial logging has been the biggest driver of degradation within forested areas in Central Africa. While the growth of the African middle class is likely

to reduce domestic charcoal use over time, there is a risk that international export markets will remain [73]. Moreover, increased timber demand will likely continue to drive clearing of tropical, savannah, and coastal forests and woodlands. Mineral extraction, including materials such as cobalt used for solar photovoltaic batteries, sand for cement, aluminum, as well as diamonds, gold, natural gas, bauxite, iron ore, among other commodities will release toxic minerals with health impacts on local populations [74].

8. Changing climate: The short- and long-term impacts of climate change continue to unravel, with large scale negative impacts in urban and rural areas [43]. For instance, it is expected that 75–250 million people in the 2020s, and 350–600 million people by the 2050s, will be exposed to increased water stress as a result of changes in the frequency and intensity of extreme events [55,75]. Climate change will also impact livestock forage production, impacting the livelihoods of over 180 million people in rangelands [76]. Global predictions for biodiversity loss suggest that African biodiversity will lose considerable habitat with climate change [32,77].

3.3. Intervention Opportunities

The drivers of change identified during the African Ecological futures process revealed fundamental risk areas for the environment. The participatory scenarios planning workshop, subsequently, provided an opportunity to interrogate these challenges and risks under different conditions (scenarios) as well as to identify key leverage points and response opportunities (Figure 1). This process resulted in a number of recommended, cross-cutting approaches, as summarised below.

3.3.1. Effective Natural Resource Governance

Most response opportunities come under the overarching umbrella of 'effective natural resource governance'. This includes the legislation, regulations and informal rules. Over the last century, natural resource governance in Africa has been dominated by top-down models of state control [78,79], which are a largely ineffective but commonplace colonial artefact. However, over the past 50 years, concerted efforts have been made across Africa to devolve natural resource governance [80–82]. While coming with its own challenges, this process enables benefits to reach landowners and citizens, and if managed well, increases the legitimacy of natural resource governance efforts [83–85].

Streamlined governance at multiple scales, from global commitments such as SDGs 16 and 17, through to national policy and local resource management can leverage capacity and empower people to sustainably manage natural resources. Clear roles and responsibilities will ensure that various actors understand their rights over and access to natural resources. This also ensures there is more accountability, inclusion, and justice [86–88]. Devolving natural resource management increases sustainability because landowners and citizens are more likely to resist or mitigate pressures if they receive proportionally greater benefits from their natural resources and feel a greater sense of participation in governance [50].

There are persuasive examples of this in water use, fisheries, rangelands, forest products, and wildlife resources. For instance, communities living around the Maasai Mara National Reserve, Kenya, receive devolved financial benefits from ecotourism, which create an incentive strong enough for them to use the land for biodiversity conservation and livestock grazing, and to resist the potentially more profitable but less sustainable alternative of converting the area to croplands [89,90]. Another example is in Namibia, where community conservancies and community forests have facilitated the significant devolution of natural resource management authority from central government to local resource users since 1996. Communities now have the rights to manage common pool resources and realise the benefits of the management through income from employment in tourism and conservation hunting, the sale of indigenous plant products and crafts, local small and medium enterprises, and in-kind benefits such as the distribution of harvested

game meat [91,92]. Associated to these efforts, elephant populations have been reported to have increased on communal land, from 7500 in 1995 to 22,800 in 2016 [93].

Voluntary standards and certification schemes on the sustainability of commodities, such as the Rainforest Alliance certification in Ghana, have shown to have beneficial outcomes in terms financial support, information and knowledge, technical assistance-conditioned by the presence of active farmer organisations and access to agricultural inputs and credit [94].

By strengthening institutions at various scales, including training and financial backing to ensure long term sustainability and reduce dependency on volunteerism, development agencies, among others, can play an important role in supporting African nations to shape their own social and ecological priorities. Likewise, social media and other new technologies (e.g., block chains, artificial intelligence) may play an important role in creating new opportunities to support participatory and effective governance [95,96].

3.3.2. Integrated Planning Capabilities

Strategic integrated planning facilitates judicious evidence-based decision making for coordinated land use management. Large scale social–ecological transformations, such as agricultural and infrastructure expansion, are inevitable in Africa's future. Currently, most development and land use planning does not sufficiently consider ecological impacts, is ad-hoc, and not coordinated across sectors [97]. There are immediate opportunities to address this through more integrated planning [98].

Understanding spatial and temporal ecological sensitivity, and the ways in which human activities can erode this, will allow decision makers to design and implement economic, industrial, agricultural, urban, and other forms of development in less environmentally damaging ways. Decision makers must have access to and use credible social and ecological data, account for long term ecological impacts of any actions, and deploy appropriate frameworks for assessing environmental impacts, rigorously following mitigation hierarchies to ensure "no net loss" of biodiversity and natural ecosystems [99]. Opportunities with developments that can be easily scaled up include (i) lengthening windows for public review, so costs and benefits of a development and any potential negative impacts are better discussed; and (ii) weighing up the social–ecological costs and benefits of several alternative development options rather than just one, which is the current norm. This is specifically relevant in the case of infrastructure development, which is often associated with undesirable social and environmental side effects (see Box 1). A good example of this is the "Aberdare road" project in Kenya, where an economic cost-benefit analysis identified several alternative options that benefited the economy and people more, while potentially impacting the environment less [100].

Integrated planning can be deployed across scales, including local, national and regional, as a tool to overcome ad-hoc and uncoordinated responses to ecological challenges, and pre-empt co-benefits and trade-offs, winners and losers in any scenario. For instance, considering that agriculture will undoubtedly expand across Africa (see Box 2) significant investment into sustainable intensification of both small and commercial producers to close yield gaps and conserve biodiversity will be crucial. Also, meeting this increased demand for food sustainably will require integrated spatial planning to maximise production and reduce land degradation. Cross-sectoral collaborations will need to plan for a land sparing-sharing continuum [101,102]. Approaches such as [103] principles for reconciling agriculture and conservation through a landscape approach can serve as useful guides [104]. An example of good practice is the Amboseli Ecosystem Management Plan in Kenya which integrates multiple land uses, including natural resource conservation and agriculture, for the greater good of all stakeholders. The plan has been gazetted by local stakeholders, county government, national government agencies and the Attorney General, following many of the guidelines outlined in the "effective natural resource governance" section above.

3.3.3. Investment Safeguards and Frameworks

Establishing appropriate investment safeguards can limit ecologically damaging projects. Firstly, this can be achieved through clear regulations which provide legislative recourse and create a disincentive for those transgressing codes of practice. Secondly, the adoption of voluntary codes and principles by major lending institutions can help establish clear and structured guidelines for assessing the social–ecological impacts of investments across their lifespan. For instance, the Equator Principles is a risk management framework established by the International Financial Corporation which provides a minimum standard for due diligence of risk and nature-related safeguards. Such national and international regulations can drive increased transparency, while reducing the capital available for those who do not meet performance criteria. In general, regulations have not been strategically or stringently applied in Africa to date, suggesting that simply following a code of practice is the first step (see also [28]).

Forming and applying regulations to maximise benefits and limit risks of Foreign Direct Investment and Overseas Development Assistance is also important given these investments represent such substantial proportions of the development expenditures of many African Nations. For example, in 2017 in the Republic of Congo, foreign investment accounted for 39.44% of GDP [105]. Regulatory frameworks should provide clear and enforceable standards for non-traditional and emerging market investors operating in Africa. Some lenders, for example, the European Union, have strict environmental regulations in their own jurisdictions, but these do not necessarily apply when they fund projects in Africa. For instance, the Export–Import Bank of China has provided more than USD149 billion to 1800 projects through the Belt and Road Initiative aiming to bolster a network of land and sea links with Southeast Asia, Central Asia, the Middle East, Europe, and Africa. China's lending has encountered criticism of being a "debt trap" which some believe will aggravate the financial vulnerability of developing countries with associated financial, geopolitical, and sovereignty risks [106]. Removing this double-standard would represent an immediate win for African sustainability, ensuring the achievement of Biodiversity Net Gain and Net Zero targets. The Forum on China-Africa Cooperation may provide an important opportunity for discussing solutions to these challenges.

In order to encourage the financial sector to evaluate and prioritise ecologically sound investments, enabling frameworks and tools which allow ecological concerns to be integrated in traditional financial risk assessments need to be established. By developing valuation methodologies that allow investors to respond to clear market signals, the value creation opportunities inherent in preserving and creating ecological and natural capital will emerge. In this regard, Natural Capital Accounting and Assessment is gaining rapid ground as an approach which brings ecological considerations to the forefront of policy, planning and decision making, particularly in the face of an uncertain future [107].

3.3.4. New Partnership Models

Many of the challenges of managing ecologically sensitive areas and assets are problems of collective action, while other examples show this can be overcome through effective institutional arrangements and partnerships [108]. To be more effective, there is a need for new partnership models that reconfigure the relationships between state, business, and civil society.

For instance, new institutional structures such as water user associations, which are increasingly being formalised across Africa, allow local communities to co-manage their own resources through polycentric governance with help from civil society, government and the private sector [109]. At a different scale, the "Nile Basin Initiative" is an example of a multi-country, multi-partner initiative that presents a platform facilitating discussions around the effective management of water and other resources in the Nile basin, promoting stability and sustainable resource governance [110].

Public–private partnerships are also likely to play an increasingly significant role in African sustainability. These can present important opportunities for domestic and

international businesses to act as responsible stewards of natural resources to increase profit, enhance their reputation and create jobs. To achieve this, businesses will need to develop new skills and capabilities to engage as partners with communities, government, and other businesses, and more actively contribute to shaping public procurement processes and enabling policies (see the World Bank's Public Private Partnership Knowledge Lab https://pppknowledgelab.org/data, accessed on 4 August 2021).

A good example is the Akassa Brass Community Development Scheme run by Equinor (a Norwegian company), for over 20 years, which owns several strategic oil assets in Nigeria's Niger Delta region. Although it is part of the often-maligned extractives sector, by delivering social investments and infrastructure projects, and by placing an emphasis on shared values, this scheme involving community forestry on customary land appears to have fostered harmonious relations with host communities, private investors, and governments [111].

3.3.5. Clear Data, Management Information, and Decision Support Tools

Underpinning all of these intervention opportunities should be clear data, information management and decision support frameworks, each of which is vital to decision making which reflects the value of Africa's ecosystems and societies. Traditional decision support tools such as cost–benefit analysis are often inadequate in their considerations of ecological costs and benefits. This is in part because there are political judgments based on pre-existing assumptions, and in part because they focus on monetising benefits over considerations of the intrinsic values of ecological assets [107].

There are a number of alternative tools, such as strategic environmental assessments (SEAs). SEAs can facilitate strategic foresight and suggest monitoring mechanisms, determine effect size and severity of an investment, consider how it can withstand future climate impacts, and alternative routing, indirect redundancies, or severed wildlife migratory routes [28].

Likewise, conservation planning tools that allow for spatial analyses that allocate land parcels for multiple land uses such as agriculture and conservation in a manner that economically optimises both land uses and achieves pre-defined objectives for each are also available [112]. For example, there are tools which analyse mutual interdependencies, as well as trade-offs between sectors. For instance, in Burkina Faso and Ghana, the MAXUS tool is used to examine the spatial connections between energy development and food security [113]. In the Rufiji River Basin, Tanzania, spatial modelling has assessed water energy food trade-offs across infrastructural development scenarios [114].

African governments have also put natural capital accounting into practice. For instance, the Government of Botswana used natural capital accounting to construct water accounts from 1993–2012. Results from this were incorporated into the National Development Plan 11, and were used to guide: the raw water abstraction strategy project, catchment management committees, the National Water Master Plan review, and the Botswana National Water Conservation and Water Demand Management Strategy [115,116].

Additionally, the United Nation's System of Environmental-Economic Accounts is an international framework working to incorporate nature into the System of National Accounts. It includes the Central Framework which deals with, for example, water, energy, and mineral accounts, and offers guidelines for the next generation of standards under development known as Ecosystem Accounting [117]. There are other tools, however: the Green Growth Knowledge Partnership recently published a report which reviewed 28 data platforms and tools that have the potential to be used in integrating natural capital approaches in policy and planning processes [118].

Further work is needed to consolidate existing approaches and develop novel decision support tools that appropriately account for ecological considerations, without being technically complex and costly (e.g., [118]). Additionally, all decision support tools rely on access to appropriate credible data, such as the location of ecologically sensitive areas, data on the threats posed by economic activities, and data on possible solutions. Although there

are efforts to enhance access to credible information, such as the conservation evidence project (www.conservationevidence.com, accessed on 4 August 2021), data sharing and availability is currently insufficient in many African countries [119–121]–emphasising the need for greater open access.

Box 1. Green Infrastructure, Green Cities.

Future estimates suggest that over 60% of the total population will reside in urban areas by 2060 [46]. The needs of these residents will need to be met. Given the magnitude and potential impacts of this task, investing in "green infrastructure" is an opportunity to improve sustainability.

Green infrastructure is a network of natural or man-made environmental features that deliver ecosystem services within the built environment [122]. Green infrastructure is not simply open green spaces, but include practices such as infiltration, evapotranspiration, rainwater harvesting, bioretention, preserving, and restoring natural landscape features such as forests, floodplains, wetlands, waterways, and their banks, as well as planting site-specific features such as trees, green roads, road verges, permeable sidewalks, and cisterns.

Green infrastructure can provide ecosystem services, including temperature regulation, augmenting water supply and improving water quality, while creating jobs, and mitigating and adapting to climate change, thereby avoiding significant costs. Indirectly, it also improves the aesthetic quality of cities, which can attract businesses, investment, and tourism and unlock financing mechanisms such as public–private partnerships, impact investment groups, and green funds. Green infrastructure can therefore contribute importantly towards achieving African Ecological Futures.

However, currently, there is a limited understanding of the distinction between different types of infrastructure and in particular the potential benefits associated with green and blue infrastructure, as opposed to conventional, grey infrastructure. Consequently, planning and policy processes in urban areas often do not consider green alternatives for infrastructure; instead, often choosing less suitable designs that may not provide all intended benefits. Factoring in green infrastructures in strategic planning processes and having the right investment safeguards and frameworks in place will ensure a balance between developing and safeguarding sensitive ecosystems.

There remain several barriers towards the large-scale application of green infrastructure, including: a limited understanding of green infrastructure and the economic, social and ecological benefits; and little technical guidance for how to implement green infrastructure in urban areas. Both strategic planning and investment are limited by lack of clear "data, management information and decision support frameworks". Quantifying the benefits of green infrastructure is not easy, and there is currently little Africa-specific data [123]. So, a robust evidence base for green infrastructure in Africa needs to be developed.

Box 2. Sustainable Agriculture.

Agriculture is the largest employer in Africa (including 175 million people in sub-Saharan Africa), and provides an important route to overcoming poverty [6]. Agriculture contributes 15% of Africa's GDP on average [124], 20% of merchandise exports [125], with crops constituting 85% of the total agricultural production value [124].

To meet growing demand for food (and other products), both extensification and intensification are required. These both can negatively affect ecosystems, especially considering that areas of high agricultural value are often also important for biodiversity conservation. Sustainable intensification, where agricultural yields are increased without adverse environmental impact and without the conversion of additional non-agricultural land, will be vital.

Sustainable intensification of agriculture in Africa is heavily dependent on 'effective natural resource governance' and 'integrated strategic planning'. It requires diverse and context-specific solutions which are tailored to both smallholders and large-scale commercial farming [126]. These may be in the form of advanced technologies (particularly for commercial farming), where there are also opportunities to learn from past failures [127]. There is also a need for solutions that include agro-ecological practices which address the immediate needs of smallholders [31], as well as globally agreed-on certification schemes which reward sustainable agricultural practices [128].

"Decision making frameworks" which support land policy development and implementation do exist, such as the AU/ECA/AfDB Land Policy Initiative [129,130]. However, there is scope for significant improvements, as well as developments of novel frameworks, that appropriately account for ecological considerations.

There is increasing investment into Africa's agricultural sector through Africa based farmer or private company investments, national public sector expenditure, foreign direct investment, and overseas development assistance. For instance, the number and scale of long-term leases or ownership of land in Africa by capital-rich private, government, or public–private sectors in particular, has increased dramatically over the past decade, motivated principally by the rise of commodity prices, food security, and biofuel production. Agricultural growth corridors, such as Tanzania's Southern Agricultural Growth corridor and Mozambique's Beira Agricultural Corridor, are aiming to dramatically expand land area under agriculture. However, significant challenges remain in ensuring these efforts work for local landowners and smallholders [131], as well as in reconciling the impacts of these agricultural corridors with areas that are deemed important for biodiversity conservation [132]. Therefore, 'safeguards on financial investment' in African agriculture are critical to limiting negative ecological impacts.

4. Conclusions

This work represents a synthesis of the findings of the African Ecological Futures project carried out between 2013 and 2015, while also integrating additional relevant scientific advances made since then. We reviewed the drivers, pressures, and impacts of Africa's development on its natural environment and described intervention opportunities that, if leveraged, could help define a continent-wide sustainable development trajectory. The aim of this work is to empower decision makers, investors, and implementers with information to support smart decisions now, to guarantee a sustainable, ecological future, ahead.

The scenarios process proved to be a valuable tool for analysing trade-offs and guiding discussions of what is an extremely complex system of interacting parameters that influence the potential development trajectories of Africa. By identifying a set of parameters that are more of a societal nature, as opposed to the more traditional "green" versus "brown" development scenarios, this analysis provides a framework for an open discussion about the core choices to be made by policy makers in Africa-including the dynamics and implications of external versus inward-looking development, and open versus closed societies.

This work further highlights the potential of participatory scenario planning and futures approaches for tackling the dynamic and evolving landscape of development challenges. While the process itself has proven effective, we recognize the limitations of an expert-based review and scenario development process. In particular, although efforts have been made to consider local stakeholders and the role of local governance in this work, we acknowledge that the recommendations presented are predominantly top-down and represent the views of 'experts' but not necessarily consensus from the

broader 'community'. For instance, alternative views from landowners, citizens and local communities could help better understand the complexity of nature-people interactions at local level. In future, we acknowledge that ecological futures and scenario planning must include the knowledge and wisdom of these other voices, including but not limited to: rural and urban land owners, communities, and citizens [107,133].

Furthermore, in the approach taken in this process, it should be noted that scenarios derived from the African Ecological Futures process should not be seen as the end-result of this process. Rather, the process and deliberations were intended to instigate further discussion on how different local and sectoral contexts influence the development pathways of countries, and the continent, and the consequences thereof for the environment. In this regard, it is also clear that different scenarios may apply to different local and sectoral contexts, and therefore, that the planning process should be adapted to such specific contexts in an iterative manner.

It should also be noted that the 'global shock' presented by the COVID-19 pandemic has shown that extremely rare events can have widespread and severe impacts that jeopardise the success of implementing response opportunities. These extreme events can alter the relationships and impacts of global drivers of environmental change, highlighting vulnerabilities and disrupting progress towards achieving the sustainable development goals [4,134]. Such events are difficult to predict, but a resilience-based approach can allow social–ecological systems with the flexibility to respond and adapt within a changing environment [135].

The analysis and perspectives we share above are specific to Africa, but the entire planet faces an uncertain social–ecological future. We must develop and implement processes and approaches for innovating, analysing and communicating alternative development trajectories and sustainable futures. For instance, the recently completed review on The Economics of Biodiversity [107] identified three potential pathways to sustainability: (i) ensure that our demands on nature do not exceed supply, and that we increase nature's supply relative to its current level; (ii) change our measures of economic success to help guide us on a more sustainable path; and (iii) transform our institutions and systems to enable and sustain these changes for future generations. Exploring the implications of these pathways in the context of a scenarios process will be critical to identifying actionable and evidence-based development interventions to guide policy decisions.

The overall imperative of development across the continent, coupled with increased access to information, new decision support and planning tools, emerging new technologies, and an increasing interest in nature and sustainability provide a unique opportunity to redefine the continent's future. In particular, national and regional decision makers can learn from the short term and extractive development pathways followed by industrialised nations which dramatically depleted their own and others' ecosystems, wiping out biodiversity, undermining resilience and imperilling the planet in their unbridled pursuit of economic growth. The challenge is a development pathway that is just and equitable so that no one is left behind while simultaneously delivering benefits to people and nature.

African citizens and leaders have the ability to control their own ecological destiny-but it requires shared vision, robust evidence, and a committed and coordinated response. An inclusive African Ecological Futures process that recognises both endogenous and exogenous drivers, threats, and opportunities is a critical first step towards realising dynamic new development pathways for the continent. However, we cannot walk these pathways alone. Our future is tied to the future of the planet and we must work together as a continent and as a global community to embrace new trajectories, new approaches, new technologies, and new values—that recognise and strengthen nature's critical role in economic development and human wellbeing—as part of a sustainable global future that addresses human-induced change and ensures the resilience and stability of the earth system overall.

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References

1. AfDB and WWF. African Ecological Footprint Report: Green Infrastructure for Africa's Ecological Security; Gland, Switzerland. 2012. Available online: https://www.afdb.org/sites/default/files/documents/projects-and-operations/africa_ecological_footprint_report_-_green_infrastructure_for_africas_ecological_security.pdf (accessed on 24 May 2021).
2. Ripple, W.J.; Newsome, T.M.; Wolf, C.; Dirzo, R.; Everatt, K.T.; Galetti, M.; Hayward, M.W.; Kerley, G.I.H.; Levi, T.; Lindsey, P.A.; et al. Collapse of the world's largest herbivores. *Sci. Adv.* **2015**, *1*, e1400103. [CrossRef]
3. Wolf, C.; Ripple, W.J. Prey depletion as a threat to the world's large carnivores. *R. Soc. Open Sci.* **2016**, *3*, 160252. [CrossRef]
4. Lindsey, P.; Allan, J.; Brehony, P.; Dickman, A.; Robson, A.; Begg, C.; Bhammar, H.; Blanken, L.; Breuer, T.; Fitzgerald, K.; et al. Conserving Africa's wildlife and wildlands through the COVID-19 crisis and beyond. *Nat. Ecol. Evol.* **2020**, *4*, 1300–1310. [CrossRef]
5. Owen-Smith, N. Megafaunal Extinctions: The Conservation Message from 11,000 Years B.P. *Conserv. Biol.* **1989**, *3*, 405–412. [CrossRef] [PubMed]
6. AfDB Tracking Africa's Progress in Figures; Tunis, 2014. Available online: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Tracking_Africa%E2%80%99s_Progress_in_Figures.pdf (accessed on 24 May 2021).
7. AfDB African Economic Outlook 2021; Côte d'Ivoire. Available online: https://www.afdb.org/en/knowledge/publications/african-economic-outlook (accessed on 4 June 2021).
8. ITU (International Telecommunications Union). *Measuring Digital Development: Facts and Figures 2019*; Geneva, Switzerland, 2019. Available online: https://news.itu.int/measuring-digital-development-facts-figures-2019/ (accessed on 5 November 2019).
9. Eberhard, R. *Access to Water and Sanitation in Sub-Saharan Africa*; Berlin, Germany, 2019. Available online: https://www.oecd.org/water/GIZ_2018_Access_Study_Part%20II_Narrative%20Report_Briefing_document.pdf (accessed on 24 May 2021).
10. Schoch, M.; Lakner, C. The Number of Poor People Continues to Rise in Sub-Saharan Africa, Despite a Slow Decline in the Poverty Rate. 2020. UNDP. Available online: https://blogs.worldbank.org/opendata/number-poor-people-continues-rise-sub-saharan-africa-despite-slow-decline-poverty-rate (accessed on 24 May 2021).
11. Rudel, T.K. The national determinants of deforestation in sub-Saharan Africa. *Philos. Trans. R. Soc. B Biol. Sci.* **2013**, *368*, 20120405. [CrossRef] [PubMed]
12. Belhabib, D.; Cheung, W.W.L.; Kroodsma, D.; Lam, V.W.Y.; Underwood, P.J.; Virdin, J. Catching industrial fishing incursions into inshore waters of Africa from space. *Fish Fish.* **2020**, *21*, 379–392. [CrossRef]
13. Asche, F.; Garlock, T.M.; Akpalu, W.; Amaechina, E.C.; Botta, R.; Chukwuone, N.A.; Eggert, H.; Hutchings, K.; Lokina, R.; Tibesigwa, B.; et al. Fisheries performance in Africa: An analysis based on data from 14 countries. *Mar. Policy* **2021**, *125*, 104263. [CrossRef]
14. Archer, E.; Dziba, L.; Mulongoy, K.J.; Maoela, M.A.; Walters, M. *Regional Assessment Report on Biodiversity and Ecosystem Services for Africa*; IPBES: Bonn, Germany, 2018. [CrossRef]
15. Laurance, W.F.; Sloan, S.; Weng, L.; Sayer, J.A. Estimating the Environmental Costs of Africa's Massive "development Corridors". *Curr. Biol.* **2015**, *25*, 3202–3208. [CrossRef]
16. Hallegatte, S.; Walsh, B. Available online: https://blogs.worldbank.org/climatechange/covid-climate-change-and-poverty-avoiding-worst-impacts (accessed on 24 May 2021).

17. Erdoğan, S.; Çakar, N.D.; Ulucak, R.; Danish; Kassouri, Y. The role of natural resources abundance and dependence in achieving environmental sustainability: Evidence from resource-based economies. *Sustain. Dev.* **2021**, *29*, 143–154. [CrossRef]
18. UNCTAD. Handbook of Statistics 2020—Population. Available online: https://unctad.org/webflyer/handbook-statistics-2020 (accessed on 24 May 2021).
19. UNICEF Home Page. Available online: https://www.unicef.org/press-releases/dividend-or-disaster-unicefs-new-report-population-growth-africa (accessed on 24 May 2021).
20. AfDB; WWF. African Ecological Futures 2015. Available online: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/xwwf_african_futures_report_english-lo-rez.pdf (accessed on 24 May 2021).
21. Moomaw, W.; Griffin, K.K.; Lomax, J. The Critical Role of Global Food Consumption Patterns in Achieving Sustainable Food Systems and Food for All. Available online: https://wedocs.unep.org/bitstream/handle/20.500.11822/25186/Food_Consumption_Patterns.pdf?sequence=1&isAllowed=y (accessed on 24 May 2021).
22. UN. Sustainable Development Goals. Available online: https://sustainabledevelopment.un.org/post2015/summit (accessed on 24 May 2021).
23. CBD. Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets "Living in Harmony with Nature". Available online: https://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf (accessed on 24 May 2021).
24. UNFCCC. Paris Agreement. Available online: https://unfccc.int/sites/default/files/english_paris_agreement.pdf. (accessed on 24 May 2021).
25. African Union Goals & Priority Areas of Agenda 2063. Available online: https://au.int/en/agenda2063/goals (accessed on 24 May 2021).
26. Sardar, Z. The Namesake: Futures; futures studies; futurology; futuristic; foresight—What's in a name? *Futures* **2010**, *42*, 177–184. [CrossRef]
27. van Vuuren, D.P.; Kok, M.T.J.; Girod, B.; Lucas, P.L.; de Vries, B. Scenarios in Global Environmental Assessments: Key characteristics and lessons for future use. *Glob. Environ. Chang.* **2012**, *22*, 884–895. [CrossRef]
28. Thorn, J.P.R.; Klein, J.A.; Steger, C.; Hopping, K.A.; Capitani, C.; Tucker, C.M.; Reid, R.S.; Marchant, R.A. Scenario archetypes reveal risks and opportunities for global mountain futures. *Glob. Environ. Chang.* **2021**, *69*, 102291. [CrossRef]
29. Vervoort, J.M.; Thornton, P.K.; Kristjanson, P.; Förch, W.; Ericksen, P.J.; Kok, K.; Ingram, J.S.I.; Herrero, M.; Palazzo, A.; Helfgott, A.E.S.; et al. Challenges to scenario-guided adaptive action on food security under climate change. *Glob. Environ. Chang.* **2014**, *28*, 383–394. [CrossRef]
30. Lavorel, S.; Colloff, M.J.; Locatelli, B.; Gorddard, R.; Prober, S.M.; Gabillet, M.; Devaux, C.; Laforgue, D.; Peyrache-Gadeau, V. Mustering the power of ecosystems for adaptation to climate change. *Environ. Sci. Policy* **2019**, *92*, 87–97. [CrossRef]
31. Thorn, J.P.R.; Klein, J.A.; Steger, C.; Hopping, K.A.; Capitani, C.; Tucker, C.M.; Nolin, A.W.; Reid, R.S.; Seidl, R.; Chitale, V.S.; et al. A systematic review of participatory scenario planning to envision mountain social–ecological systems futures. *Ecol. Soc.* **2020**, *25*, 1–55. [CrossRef]
32. IPCC; Rivera, A.; Bravo, C.; Buob, G. Summary for Policymakers. In *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*; IPCC: Geneva, Switzerland, 2019; ISBN 9789291691548.
33. Rounsevell, M.D.A.; Dawson, T.P.; Harrison, P.A. A conceptual framework to assess the effects of environmental change on ecosystem services. *Biodivers. Conserv.* **2010**, *19*, 2823–2842. [CrossRef]
34. Ezeh, A.; Kissling, F.; Singer, P. Why sub-Saharan Africa might exceed its projected population size by 2100. *Lancet* **2020**, *396*, 1131–1133. [CrossRef]
35. AfDB. African Development Report. Available online: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/African_Development_Report_2012.pdf. (accessed on 24 May 2021).
36. Calvin, K.; Bond-Lamberty, B.; Clarke, L.; Edmonds, J.; Eom, J.; Hartin, C.; Kim, S.; Kyle, P.; Link, R.; Moss, R.; et al. The SSP4: A world of deepening inequality. *Glob. Environ. Chang.* **2017**, *42*, 284–296. [CrossRef]
37. Beegle, K.; Christiaensen, L. *Accelerating Poverty Reduction in Africa*; World Bank: Washington, DC, USA, 2019.
38. Zakari, R.; Zolfagharian, S.; Nourbakhsh, M.; Zin, R.M.; Gheisari, M. Ecological footprint of different nations. In Proceedings of the WCSE 2012—International Workshop on Computer Science and Engineering. *IJET* **2012**, *4*, 464–467.
39. USIP. Natural Resources, Conflict, and Conflict Resolution. Available online: https://www.usip.org/publications/2007/09/natural-resources-conflict-and-conflict-resolution (accessed on 24 May 2021).
40. Maphosa, S.B. Natural Resources and Conflict: Unlocking the Economic Dimension of Peace-Building in Africa. Africa Institute of South Africa (AISA). Available online: https://www.africaportal.org/publications/natural-resources-and-conflict-unlocking-the-economic-dimension-of-peace-building-in-africa/ (accessed on 24 May 2021).
41. The Economist Intelligence Unit. Democracy Index 2020: In Sickness and in Health? Available online: https://www.eiu.com/n/campaigns/democracy-index-2020/ (accessed on 24 May 2021).
42. Williams, D.R.; Clark, M.; Buchanan, G.M.; Ficetola, G.F.; Rondinini, C.; Tilman, D. Proactive conservation to prevent habitat losses to agricultural expansion. *Nat. Sustain.* **2020**, *4*, 314–322. [CrossRef]
43. IPCC. Global Warming of 1.5 °C An IPCC Special Report on the Impacts of Global Warming of 1.5 °C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change. Available online: https://www.ipcc.ch/sr15/ (accessed on 24 May 2021).

44. Frishkoff, L.O.; Karp, D.S.; Flanders, J.R.; Zook, J.; Hadly, E.A.; Daily, G.C.; M'gonigle, L.K. Climate change and habitat conversion favour the same species. *Ecol. Lett.* **2016**, *19*, 1081–1090. [CrossRef]
45. Freedman, B. Chapter 12~Resources and Sustainable Development. Available online: https://ecampusontario.pressbooks.pub/environmentalscience/chapter/chapter-12-resources-and-sustainable-development/ (accessed on 24 May 2021).
46. UNECA. A Regional Approach to Leveraging Urbanization for Africa's Structural Transformation. Available online: https://www.uneca.org/regional-approach-leveraging-urbanization-africa%E2%80%99s-structural-transformation (accessed on 24 May 2021).
47. Effiong, E.L. Urbanization and Environmental Quality in Africa. Available online: https://mpra.ub.uni-muenchen.de/73224/1/MPRA_paper_73224.pdf (accessed on 24 May 2021).
48. Güneralp, B.; Lwasa, S.; Masundire, H.; Parnell, S.; Seto, K.C. Urbanization in Africa: Challenges and opportunities for conservation. *Environ. Res. Lett.* **2018**, *13*, 015002. [CrossRef]
49. Goyal, R.; Sy, A. Available online: https://www.brookings.edu/blog/africa-in-focus/2015/12/02/mobilizing-africas-rapid-urbanization-for-sustainable-climate-change/ (accessed on 24 May 2021).
50. Thorn, J.P.R.; Biancardi Aleu, R.; Wijesinghe, A.; Mdongwe, M.; Marchant, R.A.; Shackleton, S. Barriers and enablers to mainstreaming green infrastructure for climate adaptation in peri-urban settlements in Namibia and Tanzania. *Landsc. Urban Plan*. in press.
51. Ehrlich, P.R.; Ehrlich, A.H. Can a collapse of global civilization be avoided? *Proc. R. Soc. B Biol. Sci.* **2013**, *280*, 20122845. [CrossRef] [PubMed]
52. Thorn, J.P.R. Adaptation "from below" to changes in species distribution, habitat and climate in agro-ecosystems in the Terai Plains of Nepal. *Ambio* **2019**, *48*, 1482–1497. [CrossRef]
53. Kleinschroth, F.; Laporte, N.; Laurance, W.F.; Goetz, S.J.; Ghazoul, J. Road expansion and persistence in forests of the Congo Basin. *Nat. Sustain.* **2019**, *2*, 628–634. [CrossRef]
54. Juffe-Bignoli, D.; Bull, J.; Burgess, N.; Thorn, J.P.R.; Tam, C.; Hobbs, J. Development corridors, their impacts on biodiversity, and impact mitigation best practice: A global review. *Front. Ecol. Evolution.* **2021**, *9*, 683949. [CrossRef]
55. Diop, S.; Scheren, P.; Niang, A. *Climate Change and Water Resources in Africa*; Springer International Publishing: Berlin/Heidelberg, Germany, 2021.
56. Jacobsen, M.; Webster, M.; Vairavamoorthy, K. *The Future of Water in African Cities: Why Waste Water?* The World Bank: Washington, DC, USA, 2012.
57. Hassan Rashid, M.A.U.; Manzoor, M.M.; Mukhtar, S. Urbanization and its effects on water resources: An exploratory analysis. *Asian J. Water Environ. Pollut.* **2018**, *15*, 67–74. [CrossRef]
58. McGrane, S.J. Impacts of urbanisation on hydrological and water quality dynamics, and urban water management: A review. *Hydrol. Sci. J.* **2016**, *61*, 2295–2311. [CrossRef]
59. International Energy Agency. Africa Energy Outlook 2019: World Energy Outlook Special Report. Available online: https://www.iea.org/reports/africa-energy-outlook-2019 (accessed on 24 May 2021).
60. International Energy Agency Access to electricity—SDG7: Data and Projections—Analysis. Available online: https://www.iea.org/reports/sdg7-data-and-projections/access-to-electricity (accessed on 24 May 2021).
61. IRENA. Africa 2030: Roadmap for a Renewable Energy Future. Available online: https://irena.org/publications/2015/Oct/Africa-2030-Roadmap-for-a-Renewable-Energy-Future (accessed on 24 May 2021).
62. Katzner, T.E.; Nelson, D.M.; Diffendorfer, J.E.; Duerr, A.E.; Campbell, C.J.; Leslie, D.; Vander Zanden, H.B.; Yee, J.L.; Sur, M.; Huso, M.M.P.; et al. Wind energy: An ecological challenge. *Science* **2019**, *366*, 1206–1207.
63. Rehbein, J.A.; Watson, J.E.M.; Lane, J.L.; Sonter, L.J.; Venter, O.; Atkinson, S.C.; Allan, J.R. Renewable energy development threatens many globally important biodiversity areas. *Glob. Chang. Biol.* **2020**, *26*, 3040–3051. [CrossRef]
64. MacKenzie, C.A.; Fuda, R.K.; Ryan, S.J.; Hartter, J. Drilling through Conservation Policy: Oil Exploration in Murchison Falls Protected Area, Uganda. *Conserv. Soc.* **2017**, *15*, 322–333.
65. ESF Consultants Lokichar to Lamu Crude Oil Pipeline: Environmental and Social Impact Assessment. Available online: https://naturaljustice.org/wp-content/uploads/2021/01/Annex-I-A1-09Oct2019_Scoping-Report-and-TOR.pdf (accessed on 24 May 2021).
66. IEA World Energy Outlook 2015—Analysis. Available online: https://www.iea.org/reports/world-energy-outlook-2015 (accessed on 24 May 2021).
67. Fa, J.E.; Peres, C.A.; Meeuwig, J. Bushmeat Exploitation in Tropical Forests: An Intercontinental Comparison. *Conserv. Biol.* **2002**, *16*, 232–237. [CrossRef]
68. Yan, H.F.; Kyne, P.M.; Jabado, R.W.; Leeney, R.H.; Davidson, L.N.K.; Derrick, D.H.; Finucci, B.; Freckleton, R.P.; Fordham, S.V.; Dulvy, N.K. Overfishing and habitat loss drives range contraction of iconic marine fishes to near extinction. *Sci. Adv.* **2021**, *7*, 6026. [CrossRef] [PubMed]
69. De Merode, E.; Smith, K.H.; Homewood, K.; Pettifor, R.; Rowcliffe, M.; Cowlishaw, G. The impact of armed conflict on protected-area efficacy in Central Africa. *Biol. Lett.* **2007**, *3*, 299–301. [CrossRef]
70. Nackoney, J.; Molinario, G.; Potapov, P.; Turubanova, S.; Hansen, M.C.; Furuichi, T. Impacts of civil conflict on primary forest habitat in northern Democratic Republic of the Congo, 1990–2010. *Biol. Conserv.* **2014**, *170*, 321–328. [CrossRef]
71. Cawthorn, D.M.; Hoffman, L.C. The bushmeat and food security nexus: A global account of the contributions, conundrums and ethical collisions. *Food Res. Int.* **2015**, *76*, 906–925. [CrossRef]

72. Mensah, K.E.; Damnyag, L.; Kwabena, N.S. Analysis of charcoal production with recent developments in Sub-Sahara Africa: A review. *Afr. Geogr. Rev.* **2020**. [CrossRef]
73. Dos Santos, S.; Adams, E.A.; Neville, G.; Wada, Y.; de Sherbinin, A.; Mullin Bernhardt, E.; Adamo, S.B. Urban growth and water access in sub-Saharan Africa: Progress, challenges, and emerging research directions. *Sci. Total Environ.* **2017**, *607–608*, 497–508. [CrossRef]
74. Edwards, D.P.; Sloan, S.; Weng, L.; Dirks, P.; Sayer, J.; Laurance, W.F. Mining and the African environment. *Conserv. Lett.* **2014**, *7*, 302–311. [CrossRef]
75. Arnell, N.W. Climate change and global water resources: SRES emissions and socio-economic scenarios. *Glob. Environ. Chang.* **2004**, *14*, 31–52. [CrossRef]
76. Boone, R.B.; Conant, R.T.; Sircely, J.; Thornton, P.K.; Herrero, M. Climate change impacts on selected global rangeland ecosystem services. *Glob. Chang. Biol.* **2018**, *24*, 1382–1393. [CrossRef]
77. Newbold, T. Future effects of climate and land-use change on terrestrial vertebrate community diversity under different scenarios. *Proc. R. Soc. London B Biol. Sci.* **2018**, *285*. [CrossRef]
78. Brockington, D. *Fortress Conservation: The Preservation of the Mkomazi Game Reserve, Tanzania*; Indiana University Press: Bloomington, IN, USA, 2002.
79. Scott, J.C. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*; Yale University Press: New Haven, CT, USA, 1998.
80. IUCN Parks for Life: Report on the IVth World Congress on National Parks and Protected Areas. Available online: https://portals.iucn.org/library/sites/library/files/documents/1993-007.pdf (accessed on 24 May 2021).
81. Hulme, D.; Murphree, M. Communities, wildlife and the new conversation in Africa. *J. Int. Dev.* **1999**, *11*, 277–285. [CrossRef]
82. Adams, W.M.; Hulme, D. If community conservation is the answer in Africa, what is the Question? *Oryx* **2001**, *35*, 193–200. [CrossRef]
83. Folke, C.; Hahn, T.; Olsson, P.; Norberg, J. Adaptive Governance of Social–ecological Systems. *Annu. Rev. Environ. Resour.* **2005**, *30*, 441–473. [CrossRef]
84. Lemos, M.C.; Agrawal, A. Environmental governance. *Annu. Rev. Environ. Resour.* **2006**, *31*, 297–325. [CrossRef]
85. Persha, L.; Agrawal, A.; Chhatre, A. Social and ecological synergy: Local rulemaking, forest livelihoods, and biodiversity conservation. *Science* **2011**, *331*, 1606–1608. [CrossRef]
86. Lockwood, M.; Davidson, J.; Curtis, A.; Stratford, E.; Griffith, R. Governance principles for natural resource management. *Soc. Nat. Resour.* **2010**, *23*, 986–1001. [CrossRef]
87. Chene, M. Natural Resource Management Transparency and Governance: A Literature Review Focusing on Extractive Industries. Available online: https://www.u4.no/publications/natural-resource-management-transparency-and-governance (accessed on 24 May 2021).
88. CEESP; IUCN. IUCN Natural Resource Governance Framework (NRGF). Available online: https://www.iucn.org/commissions/commission-environmental-economic-and-social-policy/our-work/knowledge-baskets/natural-resource-governance (accessed on 24 May 2021).
89. Okech, R.; Bob, U. Sustainable Ecotourism Management in Kenya. *Ethiop. J. Environ. Stud. Manag.* **2009**, *2*. [CrossRef]
90. Juma, L.O.; Khademi-Vidra, A. Community-based tourism and sustainable development of rural regions in Kenya; Perceptions of the citizenry. *Sustainability* **2019**, *11*, 4733. [CrossRef]
91. White, P.A.; Belant, J.L. Provisioning of game meat to rural communities as a benefit of sport hunting in Zambia. *PLoS ONE* **2015**, *10*, e0117237. [CrossRef]
92. Community Conservation Namibia Sustainable Wildlife Utilisation. Available online: https://communityconservationnamibia.com/support-to-conservation/natural-resource-management/sustainable-wildlife-utilisation (accessed on 24 May 2021).
93. Thouless, C.; Dublin, H.T.; Blanc, J.; Skinner, D.; Daniel, T.; Taylor, R.; Bouche, P. African Elephant Status Report 2016. Available online: https://portals.iucn.org/library/sites/library/files/documents/SSC-OP-060_A.pdf (accessed on 24 May 2021).
94. Astrid Fenger, N.; Skovmand Bosselmann, A.; Asare, R.; de Neergaard, A. The impact of certification on the natural and financial capitals of Ghanaian cocoa farmers. *Agroecol. Sustain. Food Syst.* **2017**, *41*, 143–166. [CrossRef]
95. Browne, E. Social Media and Governance. Available online: https://www.comminit.com/content/social-media-and-governance (accessed on 24 May 2021).
96. Svidronova, M.M.; Kascakova, A.; Vrbicanova, V. Can Social Media be a Tool for Participatory Governance in Slovak Municipalities? *NISPAcee J. Public Adm. Policy* **2018**, *11*, 81–101. [CrossRef]
97. Laurance, W.F.; Peletier-Jellema, A.; Geenen, B.; Koster, H.; Verweij, P.; Van Dijck, P.; Lovejoy, T.E.; Schleicher, J.; Van Kuijk, M. Reducing the global environmental impacts of rapid infrastructure expansion. *Curr. Biol.* **2015**, *25*, R259–R262. [CrossRef]
98. Abuya, D.; Oyugi, M.O.; Oyaro, E. Management of the Effects of Land Use Changes on Urban Infrastructure Capacity: A Case Study of Ruaka Town, Kiambu County, Kenya. *J. Geogr. Inf. Syst.* **2019**, *8*, 158–190.
99. Arlidge, W.N.S.; Bull, J.W.; Addison, P.F.E.; Burgass, M.J.; Gianuca, D.; Gorham, T.M.; Jacob, C.D.S.; Shumway, N.; Sinclair, S.P.; Watson, J.E.M.; et al. A Global Mitigation Hierarchy for Nature Conservation. *Bioscience* **2018**, *68*, 336–347. [CrossRef]
100. Tyrell, P.; Allan, J. Evaluating the Socio-Economic Potential of Road Development Projects Around the Aberdare Range. A Report for Rhino Ark. 2020. Available online: https://pure.uva.nl/ws/files/51204676/TyrellAllan_2020_Evaluating_the_economic_potential_of_road_development_projects_around_the_Aberdare_range.pdf (accessed on 24 May 2021).

101. Ricciardi, V.; Mehrabi, Z.; Wittman, H.; James, D.; Ramankutty, N. Higher yields and more biodiversity on smaller farms. *Nat. Sustain.* **2021**, 1–7. [CrossRef]
102. Kremen, C.; Merenlender, A.M. Landscapes that work for biodiversity and people. *Science* **2018**, *362*, eaau6020. [CrossRef] [PubMed]
103. Sayer, J.; Sunderland, T.; Ghazoul, J.; Pfund, J.L.; Sheil, D.; Meijaard, E.; Venter, M.; Boedhihartono, A.K.; Day, M.; Garcia, C.; et al. Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proc. Natl. Acad. Sci. USA* **2013**, *110*, 8349–8356. [CrossRef]
104. Arts, B.; Buizer, M.; Horlings, L.; Ingram, V.; Van Oosten, C.; Opdam, P. Landscape Approaches: A State-of-the-Art Review. Available online: https://www.annualreviews.org/doi/abs/10.1146/annurev-environ-102016-060932 (accessed on 24 May 2021).
105. World Bank Foreign Direct Investment, Net Inflows (% of GDP)—Republic of Congo. Available online: https://data.worldbank.org/indicator/BX.KLT.DINV.WD.GD.ZS?locations=CG (accessed on 24 May 2021).
106. Reuters China's EximBank Provides More Than $149 Bln for Belt and Road Projects. Available online: https://www.reuters.com/article/china-bank-beltandroad/chinas-eximbank-provides-more-than-149-bln-for-belt-and-road-projects-idUSL3N2202TI (accessed on 24 May 2021).
107. Dasgupta, P. *The Economics of Biodiversity: The Dasgupta Review*; HM Treasury: London, UK, 2021; ISBN 9781911680307.
108. Ostrom, E. *Governing the Commons: The Evolution of Institutions for Collective Action*; Cambridge University Press: New York, NY, USA, 1990.
109. Bruns, B. Polycentric solutions for groundwater governance in Sub-Saharan Africa: Encouraging institutional artisanship in an extended ladder of participation. *Water* **2021**, *13*, 630. [CrossRef]
110. Nile Basin Initiative Nile Basin Initiative—About. Available online: https://www.rusumoproject.org/index.php/en/109-about-the-sub-basin-2/217-learn-about-the-nile-basin-initiative (accessed on 24 May 2021).
111. Joab-Peterside, S. Green Governance: The Case of Akassa Community Forests Management and Development Plan. Available online: http://geog.berkeley.edu/ProjectsResources/ND%20Website/NigerDelta/WP/19-Joab-Peterside.pdf (accessed on 24 May 2021).
112. Grantham, H.S.; Shapiro, A.; Bonfils, D.; Gond, V.; Goldman, E.; Maisels, F.; Plumptre, A.J.; Rayden, T.; Robinson, J.G.; Strindberg, S.; et al. Spatial priorities for conserving the most intact biodiverse forests within Central Africa. *Environ. Res. Lett.* **2020**, *15*, 940–945. [CrossRef]
113. Burger, R.E.A.; Abraham, E. Maximizing water–food–energy nexus synergies at basin scale. In *Advances in Science, Technology and Innovation*; Springer Nature: Berlin/Heidelberg, Germany, 2020; pp. 67–70.
114. Geressu, R.; Siderius, C.; Harou, J.J.; Kashaigili, J.; Pettinotti, L.; Conway, D. Assessing River Basin Development Given Water-Energy-Food-Environment Interdependencies. *Earth's Futur.* **2020**, *8*, e2019EF001464. [CrossRef]
115. IISD Botswana Natural Capital Accounting for Water Supports SDG 6 Monitoring. Available online: http://sdg.iisd.org/news/botswana-natural-capital-accounting-for-water-supports-sdg-6-monitoring/ (accessed on 24 May 2021).
116. Lange, G.-M.; Wodon, Q.; Carey, K. *Building a Sustainable Future: The Changing Wealth of Nations 2018*; World Bank Group: Washington, DC, USA, 2018.
117. SEEA Ecosystem Accounting | System of Environmental Economic Accounting. Available online: https://unstats.un.org/unsd/envaccounting/seearev/eea_final_en.pdf (accessed on 24 May 2021).
118. GGKP Measuring Nature' s Contribution to Economic Development towards a Framework of Indicators for National Natural Capital Reporting. Available online: https://www.greengrowthknowledge.org/research/measuring-nature%E2%80%99s-contribution-economic-development-towards-framework-indicators-national (accessed on 24 May 2021).
119. CBD. South Africa Declaration. Available online: https://www.cbd.int/idb/image/2015/celebrations/sa-declaration.pdf (accessed on 24 May 2021).
120. IISD Africa Rising Conference: Biodiversity Data for Sustainable Development. Available online: http://sdg.iisd.org/news/africa-rising-conference-focuses-on-biodiversity-data-for-sustainable-development/ (accessed on 24 May 2021).
121. Stephenson, P.J.; Bowles-Newark, N.; Regan, E.; Stanwell-Smith, D.; Diagana, M.; Höft, R.; Abarchi, H.; Abrahamse, T.; Akello, C.; Allison, H. Unblocking the flow of biodiversity data for decision-making in Africa. *Biol. Conserv.* **2017**, *213*, 335–340. [CrossRef]
122. Gulati, M.; Scholtz, L. The Case for Investment in Green Infrastructure in African Cities. Available online: https://africa.panda.org/?31761/The-case-for-investment-in-green-infrastructure-in-African-cities (accessed on 24 May 2021).
123. Thorn, J.P.R.; Biancardi Aleu, R.; Wijesinghe, A.; Mdongwe, M.; Marchant, R.A.; Shackleton, S. Mainstreaming Green Infrastructure for Climate Adaptation in Peri-urban Settlements in Namibia and Tanzania. *Landsc. Urban. Plan.*. In review.
124. OECD/FAO. OECD-FAO Agricultural Outlook 2016–2025. Available online: http://www.fao.org/3/I5778E/I5778E.pdf (accessed on 24 May 2021).
125. FAO. *Statistical Yearbook: Africa*; Statistics Division: Rome, Italy, 2014.
126. Adenle, A.A.; Wedig, K.; Azadi, H. Sustainable agriculture and food security in Africa: The role of innovative technologies and international organizations. *Technol. Soc.* **2019**, *58*, 101143. [CrossRef]
127. Dano, E.C. *Unmasking the New Green Revolution in Africa. Motives, Players and Dynamics*; Third World Network: Penang, Malaysia, 2007.
128. Pegasys. African Ecological Futures Phase 1: Agricultural Report. Available online: https://wedocs.unep.org/bitstream/handle/20.500.11822/20554/African_Ecological_Futures_Synthesis_Paper.pdf (accessed on 24 May 2021).

129. UNECA African Land Policy Centre—About. Available online: https://www.uneca.org/african-land-policy-centre (accessed on 24 May 2021).
130. AU-ECA-AfDB Consortium. Land Policy in Africa: A Framework to Strengthen Land Rights, Enhance Productivity and Secure Livelihoods. Available online: https://www.afdb.org/en/documents/document/framework-and-guidelines-on-land-policy-in-africa-27129 (accessed on 24 May 2021).
131. Watts, N. *Investing for Impact: Finance and Farming in the Southern Highlands of Tanzania*; University of Cambridge: Cambridge, UK, 2018.
132. Cisneros-Araujo, P.; Ramirez-Lopez, M.; Juffe-Bignoli, D.; Fensholt, R.; Muro, J.; Mateo-Sánchez, M.C.; Burgess, N.D. Remote sensing of wildlife connectivity networks and priority locations for conservation in the Southern Agricultural Growth Corridor (SAGCOT) in Tanzania. *Remote Sens. Ecol. Conserv.* **2021**. [CrossRef]
133. Ford, J.D.; Cameron, L.; Rubis, J.; Maillet, M.; Nakashima, D.; Willox, A.C.; Pearce, T. Including indigenous knowledge and experience in IPCC assessment reports. *Nat. Clim. Chang.* **2016**, *6*, 349–353. [CrossRef]
134. OECD. OECD Regional Outlook 2021: Addressing COVID-19 and Moving to Net Zero Greenhouse Gas Emissions. Available online: https://www.oecd.org/publications/oecd-regional-outlook-2021-17017efe-en.htm (accessed on 24 May 2021).
135. Folke, C. Resilience (Republished). *Ecol. Soc.* **2016**, *21*, 1–30. [CrossRef]