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NATURE IN SOUTH AFRICA'S TRANSITION TO SUSTAINABILITY: A STOCKTAKE

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About this publication

This policy paper reviews the valuation, protection and management of nature in South Africa. It forms part of a series of papers aimed at providing a barometer of South Africa's transition to sustainable development. It is a component of a global initiative spearheaded by the Green Economy Coalition (GEC).

The GEC is the largest global alliance of organisations working on a green economy. The membership spans Asia, Africa, South America, North America and Europe and represents a wide range of interests including the poorest, the environment, business, the United Nations, research and government. Despite its diversity, the coalition is committed to accelerating the transition to green and fair economies. In South Africa, Trade & Industrial Policy Strategies (TIPS) and the African Centre for a Green Economy (African Centre) are active members of the coalition.

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Key findings

- Nature is diverse and complex, as such the country has made significant strides on some aspects while in others it is not performing well.
- The impact of economic activities, particularly extractive industries, on the environment is significant. Negative impacts include pollution, destruction of nature, health impacts, and displacement of human settlements. Some of these are historical, multi-scale and transcend generations, with socio-environmental costs that far outweigh the economic benefits that would have been derived.
- The country has made significant progress in initiating and implementing efforts to enhance the understanding and valuation of nature through Natural Capital Accounting (NCA).
- The development of policies is commendable; however, there are challenges with their implementation and coherence. There are conflicting interests and an overlap of roles among key players which can be a hindrance in some cases.
- The protection of nature and ecosystems is a priority area for the government, as evidenced by the increased designation of conservation and protected areas. However, a serious constraint relates to policing and enforcement in those areas, with poaching still being a big threat.

Key recommendations

- **Improving data and information systems:** Every stakeholder that produces relevant data and information should endeavour to promote ease of access, use, interpretation and understanding.
- **Enhancing Natural Capital Accounting:** While efforts are already underway to employ NCA, it is vital to ensure that the NCA concept is widely adopted across all sectors.
- **Strengthening the governance framework:** The coherence and implementation of the various policies and supporting instruments need to be further strengthened. Strong monitoring and compliance enforcement is required. The integration of nature considerations into the operations of corporates should be driven by a sincere desire to achieve sustainability.
- **Enforcement in designated areas:** There should be continued efforts to fight corruption that fuels illegal trade in wildlife products, as well as targeting local and international syndicates that coordinate such illegal activities.
- **Sustainable planning and management:** There is need to strengthen feasibility assessments, approval systems, and licensing processes. In particular, capacity building for community leaders and public officials (especially those at the local level) should be enhanced.
- **Sustainable extraction of inputs from nature:** There is need to mainstream and incentivise the adoption of sustainable consumption and production at all levels and in all sectors.
- **Genuine inclusion of stakeholders**: The importance of different players in the conservation and protection of nature should be recognised and embraced. Building consensus in the management of nature will have positive impacts on long-term sustainability.

Table of Contents

Abbreviations

AMD	Acid Mine Drainage
ANS	Adjusted Net Savings
CBD	Secretariat of the Convention on Biodiversity
CDP	Carbon Disclosure Project
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DPME	Department of Planning Monitoring and Evaluation
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EU	European Union
GDP	Gross Domestic Product
GDSA	Gaborone Declaration for Sustainability in Africa
GEC	Green Economy Coalition
GDP	Gross Domestic Product
GHA	Global Hectare
GHG	Greenhouse Gas
GNI	Gross National Income
GRI	Global Reporting Initiative
IAP	Invasive Alien Plant
IoDSA	Institute of Directors in Southern Africa
IPAP	Industrial Policy Action Plan
IRC of SA	Integrated Reporting Committee of South Africa
JSE	Johannesburg Stock Exchange
MPA	Marine Protected Area
NBI	National Business Initiative

NCPA-SA	National Cleaner Production Centre of South Africa
NCA	Natural Capital Accounting
NDP	National Development Plan: Vision 2030
NGO	Non-Governmental Organisation
NSSD1	National Strategy for Sustainable Development and Action Plan 2011-2014
SANBI	South African National Biodiversity Institute
SDGs	Sustainable Development Goals
SEEA	System of Environmental-Economic Accounting
SEEA EEA	SEEA Experimental Ecosystem Accounting
Stats SA	Statistics South Africa
UNEP	United Nations Environment Programme
UNSD	United Nations Statistics Division

1

Introduction

Nature refers to the natural resources used to generate economic growth and ecosystem services that support economic activities (UNEP, 2016). These include land and soil, forest and timber, water, minerals and energy resources, fish stocks, and air and climate. South Africa is well endowed in various aspects of nature. It has a wide range of habitats, ecosystems and landscapes comprising of nine terrestrial biomes, 30 freshwater eco-regions and six marine eco-regions (DEA, 2016a). River ecosystems in the country vary from sub-tropical in the north-east to semi-arid and arid in the interior, and to cool temperate rivers of the Fynbos biome (DEA, 2016a). The country's coastline that spans 3 200 kilometres is also rich in biodiversity[1] (Stats SA, 2015). The country is the third most biodiverse country in the world, after Indonesia and Brazil (Barnard and De Villiers, 2012). About 24 000 species, almost 7% of the world's vertebrate species, are found in the country (GCIS, 2015). The country also has about 5.5% of the world's known insect species, and more than 11 000 marine species.

Consequently, the contribution of biodiversity to the country's economy is huge. Conservative estimates approximate biodiversity to be worth 7% of the country's GDP and supports over a million jobs (DEA et al., 2013). In addition to biodiversity-related resources, the country is also richly endowed in mineral resources. South Africa ranks among the top 10 countries in the production of minerals such as manganese, iron ore, gold, chrome, ferrochrome, and platinum (Stats SA, 2015).

The contribution of biodiversity to the country's economy is huge

However, South Africa has many sustainability challenges, such as poverty, inequality, climate change, energy and water crises, and resource

[1] Biodiversity refers to the full variability of living organisms in terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part (DEA et al., 2013).

and environmental degradation (ASSAF, 2014). The country's economic activities are strongly linked to environmental degradation and carbon-intensive energy consumption, raising the need to "decouple" the economy from the environment (NPC, 2012). South Africa's past and current development has relied on using mineral and natural resources with limited concern for long-term environmental impacts and sustainability (DEA, 2010). The country faces the challenge of reducing its impact on the environment as population and consumption patterns grow (DEA, 2016a), generating more demand for resources, such as land, water, energy, shelter, and infrastructure.

Strong connections and dependences between the natural environment, human livelihoods and the economy make it important to take a holistic view when assessing the importance of nature (DEA, 2016a). The value of nature, its recognition and protection are closely related to the issue of sustainability. The term "sustainability" used to dwell much on environmental issues, but has evolved to focus more on socio-economic issues (Montmasson-Clair and Du Plooy, 2012). This brings to the fore the importance of integrating the economic, social, and environmental dimensions into planning to ensure a transition towards sustainable development.

The value of nature, its recognition and protection are closely related to the issue of sustainability.

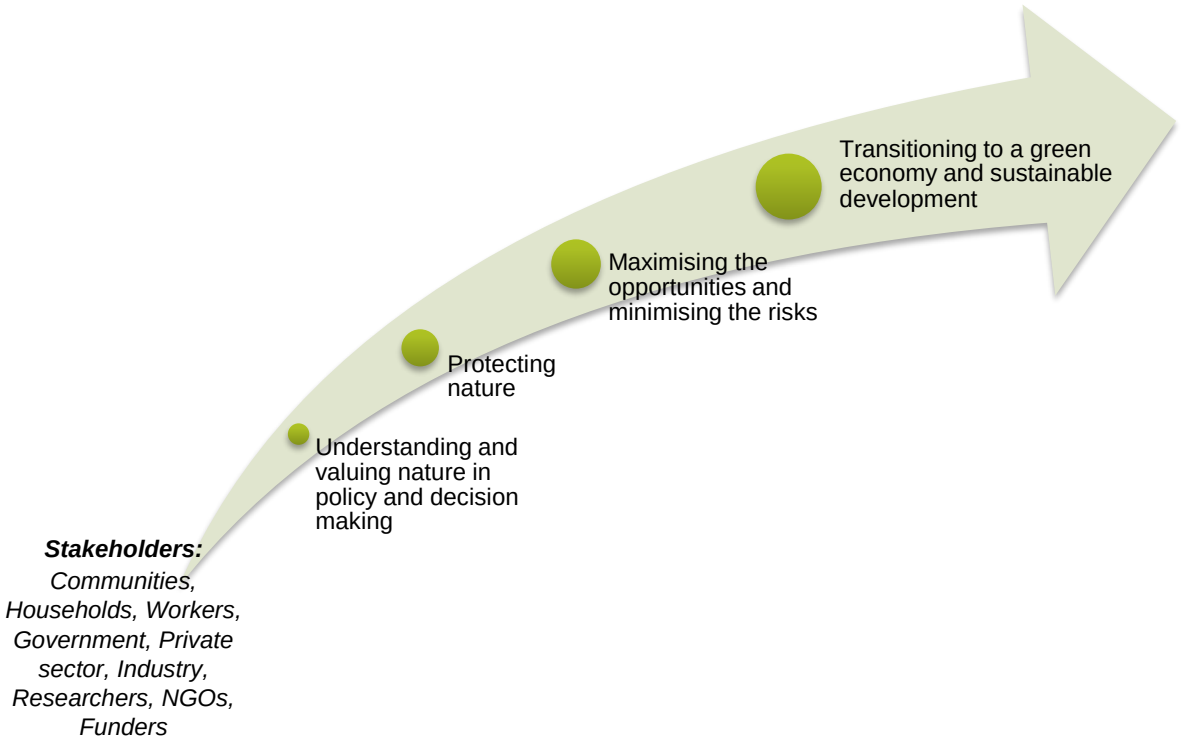
At the national level, the National Strategy for Sustainable Development and Action Plan 2011-2014 (NSSD1) highlights that "South Africa aspires to be a sustainable, economically prosperous and self-reliant nation state … by managing its limited ecological resources responsibly for current and future generations" (DEA, 2011a, p. 7). It is envisaged that the green economy approach will concurrently address South Africa's national priorities for sustainable development, such as employment creation, enhanced public and environmental health, poverty eradication, and ensuring social equality (DEA, 2011b). It is therefore important that the efforts are aligned with the Sustainable Development Goals (SDGs). SDG 12 emphasises the need to protect the planet from degradation, through sustainable consumption and production, as well as the sustainable management of natural resources in order to support the needs of the present and future generations (UN, 2015).

The objective of this policy paper is to give an overview of the valuation, protection and management of nature in South Africa. The paper provides a barometer of the country's transition to sustainable development paying special attention to nature. While there might be differences between the terms "nature", "natural assets" or "natural capital", in this paper they are generally used interchangeably and, in most cases, assumed to mean the same. This policy paper has three main themes, namely: understanding and valuing nature in policy and decision making; protecting nature; and maximising the opportunities and minimising the risks (shown in Figure 1). It immerses the discussion in the broader sustainable development context while, at the same time, using a green economy lens to zoom in on specific issues of interest. The paper postulates that with active and meaningful participation of all stakeholders (households, communities, workers, government, private sector, industry, researchers, non-governmental organisations [NGOs], and funders), their decisions and actions can contribute positively to the protection of

nature, as well as the minimisation of risks and maximisation of benefits thereof.

The structure of the paper is as follows. Each theme starts with a brief introduction and motivation, followed by the diagnostic, i.e. the current state of affairs in the country on that particular theme, and the recommendations for that particular theme. The paper ends with an overall conclusion.

FIGURE 1: LINKING THE VALUATION OF NATURE AND SUSTAINABLE DEVELOPMENT



SOURCE: AUTHOR'S COMPOSITION

2 Understanding and valuing nature

Nature, and the goods and services it provides, are commonly accessed freely[2] (SANBI, 2013). In addition, most of the benefits are poorly visible, yet very important. Their continued availability is often falsely assumed, and such benefits tend to be public goods, hence the little incentive for people to conserve them (TEEB, 2010).

If no proper value is attached to something, it is difficult to manage and conserve it. Value can be interpreted differently, but it relates to how various stakeholders perceive the worthiness of something. Value and price are not the same, something can be highly valued but of low price or vice versa (Kenner, 2014).

2.1. Diagnostic: The need to promote well-informed decision-making on nature

When nature, as a provider of essential goods and services, is recognised and mainstreamed into policy and decision-making, this enhances its management and ensures long-term sustainability. Because of the complexity and diversity of nature, there is varying progress on different aspects of valuation of nature in the country. The government, especially through the Department of Environmental Affairs (DEA), the South African National Biodiversity Institute (SANBI) and Statistics South Africa (Stats SA), and academia play a key role in developing the relevant information, data, and monitoring and

[2] In this context, "accessed freely" – means that the price or cost does not reflect the true value of the good or resource, even though there might be other costs that can be incurred in acquiring or in extracting it.

evaluation systems, as well as improving valuation and measurement tools and methods. In addition, there are notable efforts to strengthen corporate governance and entrench sustainability issues into the operations of big corporates. However, the outcomes and impacts of the efforts are still not yet clear as they are mostly at early stages of implementation. This section looks, in turn, at: information, data, and monitoring and evaluation systems; valuation and measurement beyond gross domestic product (GDP); and corporate governance and private sector efforts.

When nature, as a provider of essential goods and services, is recognised and mainstreamed into policy and decision-making, this enhances its management and ensures long-term sustainability

Information, data, and monitoring and evaluation systems

Information and data are necessary to show the status quo and trends in various aspects of nature, and in turn help inform the decision-making process and its management. Thus, measuring, quantifying and valuing different aspects of natural capital is necessary. This can enable its consideration in market transactions, national accounting, management, and the allocation of public sector resources (Driver et al., 2012).

The availability and development of information and data systems vary. Some components are well developed while others need further improvement. For instance, Montmasson-Clair et al. (2015) highlight that most of the critical data and information on the interplay between economic activities and environmental issues are not yet in country, and where they are available, some are not publicly available. Letete et al. (2016b) concur, asserting that data availability remains a big obstacle to proper tracking and assessment of progress. The DPME (n.d.) notes that while the environmental governance system is generally good, capacity constraints exist in compliance monitoring and enforcement. Barnard and De Villiers (2012) state that, although there are some good datasets on biodiversity in the country, the data needs to be analysed properly to have a better understanding on the state and trends.

Besides these general challenges, there has been some notable progress. South Africa has a long history of biodiversity science and a strong community of practice for science-based biodiversity planning (Manuel et al., 2016). In addition, the country is advancing in ecosystem mapping and classification (Driver et al., 2012; SANBI, 2013). It has experience in undertaking natural capital accounting initiatives, with data availability and monitoring initiatives being well developed (Reuter et al., 2016). Some of the South African national government data sources are the Environmental Sustainability Indicator Technical Reports,[3] the National Biodiversity Assessment (NBA), the State of the Environment Reports/South Africa Environment Outlook Report, and the South African Environmental Observation Network (SAEON) (Reuter et al., 2016). Barnard and De Villiers (2012) further highlight important information and data-

[3] The DEA has been applying and testing sustainable development indicators, including environmental indicators. For instance, the Environmental Sustainability Indicator Technical Report (initially published in 2009, further updated in 2011) is one of DEA's monitoring and evaluation initiatives (DEA, 2011c), through which government has been applying and testing sustainable development indicators.

related milestones that have been reached on various components of biodiversity:

- the first comprehensive assessment of South African flora was completed in 2009 and updated in 2011;
- the first comprehensive assessment of the butterflies of South Africa, Lesotho and Swaziland was completed in 2011;
- the Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland was published in 2014;
- the Red List assessments for baboon spiders and three groups of scorpions were completed in 2011;
- the Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland was published in 2004, and all frog species of South Africa were reassessed in 2010; and
- the Southern African Bird Atlas Project collects data on bird distributions in South Africa, Lesotho and Swaziland.

Another government effort towards monitoring, evaluation and valuation of nature is encapsulated in the government's outcome-based approach. A total of 14 outcomes have been agreed on by the South African government, outlining the main strategic priorities of the country (DEA, 2011c, 2010). Each outcome is comprised of some measurable outputs, targets, and delivery agreement. Of greater relevance to the valuation of nature is Outcome 10, which focuses on environmental assets and the protection and continual enhancement of the country's natural resources. One of the expected sub-outputs of Outcome 10 focuses on valuing ecosystem services (DEA, 2010, p. 13).

In addition, the DEA is developing a National Climate Change Response Monitoring and Evaluation System. The system aims to help assess and keep track of progress in the implementation of climate change adaptation and mitigation projects (Letete et al., 2016a).

Information and data are necessary to show the status quo and trends in various aspects of nature, and in turn help inform the decision-making process and its management.

Valuation and measurement: Going beyond GDP

Besides progress in understanding nature, the South African government recognises the need to develop new measures of progress (Montmasson-Clair and Du Plooy, 2012).[4] The National Strategy for Sustainable Development and Action Plan (NSSD1) states that "South Africa's current economic development path is based primarily on maximising economic growth – as measured by the gross domestic product (GDP) […] This has resulted in an energy-intensive economy and an erosion of the resource base: a situation that is clearly unsustainable" (DEA, 2011a, p. 12). Boxes 1a and 1b shows the performance of the country using performance measures other than GDP.

[4] In the context of sustainability, GDP as a measure has many shortcomings. GDP measures economic quantity, and not economic quality or welfare; it excludes welfare aspects, non-market transactions, quality improvements, social and environmental externalities, the depletion of natural resources, and issues of inequality (Costanza et al., 2009; Montmasson-Clair and Du Plooy, 2012). When using GDP as a measure, it is difficult to distinguish between an economy that grows by exhausting its assets, from one which grows using its assets efficiently and sustainably (UNEP, 2016).

Box 1a: South Africa's performance on sustainability indicators

The current

production and consumption patterns

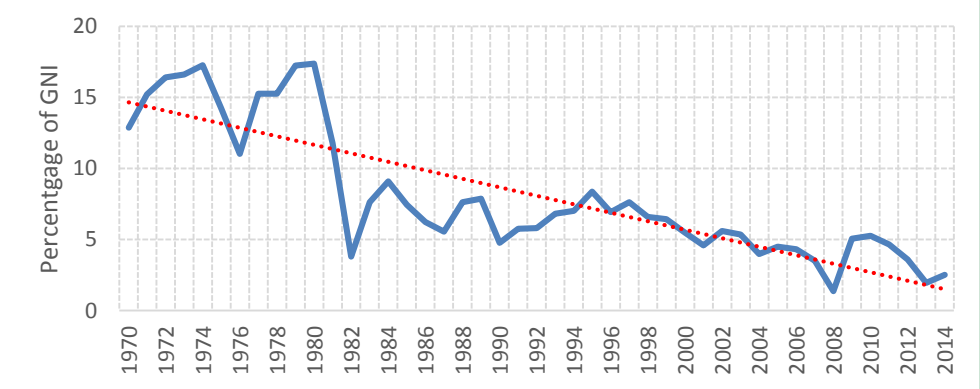
are not sustainable

To have a better understanding of how South Africa is positioned on the international arena, it necessary to have a glimpse of other international environmental performance comparisons. Based on an Environmental Performance Index (EPI) that ranks the performance of countries in terms of protection of human health and protection of ecosystems, South Africa had an EPI score of 70.52, which gave it a rank of 81 in the world and fourth in sub-Saharan Africa after Mauritius, Namibia, and Botswana which had EPI scores of 70.85, 70.84, and 70.72 respectively (Hsu et al., 2016).

South Africa's sustainability challenges can be revealed by looking at the Adjusted Net Savings (ANS). From the literature, the ANS seems to have more support as a better measure compared to GDP. Stiglitz et al. (2010) assert that ANS appears to be the best indicator available to assess an economy's sustainability. ANS is equal to net national savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide (World Bank, 2016). ANS incorporates a wider view that natural and human capital are important assets which influence the productivity and well-being of a country (Bolt et al., 2002). While the appropriateness of the measure is debatable, it is a relatively easy way to give an idea about a country's sustainability.

Figure 2 presents the country's ANS as a percentage of its Gross National Income (GNI). The figure shows a general decrease in the indicator, suggesting a poor and declining performance in terms of sustainability.

FIGURE 2: EVOLUTION OF ADJUSTED NET SAVINGS FOR SOUTH AFRICA



SOURCE: AUTHOR'S COMPOSITION, BASED ON DATA FROM THE WORLD BANK (2016)

This ANS series excludes particulate emissions damage

Box 1b: South Africa's performance on sustainability indicators

In 2013, South Africa had an EF of 3.4 global hectares (GHAs) per capita,

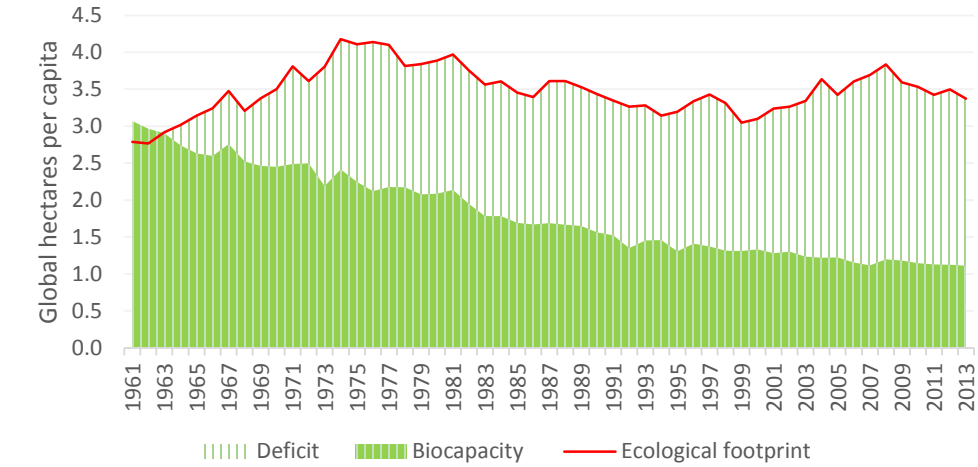
and a biocapacity of 1.1 GHAs per capita,

leading to deficit of 2.3 GHAs per capita.

Another important measure is the Ecological Footprint (EF). The EF assesses how much of the regenerative capacity of the biosphere is used up by human activities (consumption), through calculating the amount of biologically productive land and water area required to support a given population at its current level of consumption (Stiglitz et al., 2010; UNEP, 2016). In 2013, South Africa had an EF of 3.4 global hectares (GHAs) per capita (that is the area of biologically productive land and water an individual requires to produce all the resources it consumes and to absorb the waste it generates), and a biocapacity of 1.1 GHAs per capita, leading to deficit of 2.3 GHAs per capita (Global Footprint Network, 2017).

Figure 3 shows the trends of EF and biocapacity for the country. In general, a surplus was only experienced before 1963, however, since then the deficit has grown considerably. The biggest contributor to the high EF is the high carbon footprint, which mirrors the country's high carbon intensity (WWF, 2012). In the context of sustainability, the current production and consumption patterns are not sustainable in the long run. The continued growth in the deficit is largely due to the declining biocapacity. The assessment of the different components of the biocapacity reveals that this can be attributed mostly to the marked decline in the biocapacity for grazing land over the years.

FIGURE 3: ECOLOGICAL FOOTPRINT AND BIOCAPACITY PER CAPITA FOR SOUTH AFRICA FROM 1961 TO 2013



SOURCE: AUTHOR'S COMPOSITION, BASED ON DATA FROM GLOBAL FOOTPRINT NETWORK (2017)

To bridge the gap between existing, misleading measures of progress (such as GDP) and the necessary tools to track the country's transition to sustainable development, the South African government is engaged in a number of cutting-edge initiatives.

South Africa is party to the Gaborone Declaration for Sustainability in Africa (GDSA)[5], a platform initiated in 2012 to promote the valuation of nature, and the transition to a green economy and sustainable development. It aims to achieve environmental integrity, improve social capital, and amplify best practices across the continent. The initiative involves the participation of corporate leaders and heads of states. Its members committed to act on three areas, namely:

- Incorporating the value of natural capital into public and private policies and decision-making;
- Pursuing sustainable production in agriculture, fisheries, and extractive industries while maintaining natural capital; and
- Generating data and building capacity to support policy network.

One key aspect of the GDSA is to enhance Natural Capital Accounting (NCA) through capacity building, learning exchanges, establishing a community of practice, resource mobilisation, and collaboration. NCA involves the 'measurement of natural resource stocks (both renewable and non-renewable) and the flows of benefits they provide' (GDSA & CI, 2016; Reuter et al., 2016).[6]

In addition, South Africa is participating in a global project on Advancing System of Environmental Economic Accounting (SEEA) - Experimental Ecosystem Accounting (EEA). In this project, the country is one of seven pilot countries selected by the United Nations Statistics Division (UNSD) to showcase the approach (Stats SA, 2015). Though this project is still at the initial stage, it seeks to enhance the valuation of nature in the country[7] within the context of the SEEA Central Framework.[8] The approach used in the SEEA project allows for the construction of an integrated set of accounts by combining closely related and interlinked but distinct elements encompassing land cover, ecosystem extent, ecosystem condition and ecosystem services generation (Stats SA, 2015). The SEEA project is being implemented through a collaboration between Stats SA, SANBI, UNSD, the United Nations Environment Programme (UNEP) and the Secretariat of the Convention on Biodiversity (CBD) (Reuter et al., 2016). In addition to Stats SA and SANBI, other South African organisations involved are the Council for Scientific and Industrial Research (CSIR), the

[5] The Government of Botswana has been instrumental in establishing the platform. Some of the functions of the GDSA Secretariat have been delegated to an international non-profit environmental organisation Conservation International (CI). As of May 2017, ten countries are signatories, namely Botswana, South Africa, Gabon, Ghana, Kenya, Liberia, Mozambique, Namibia, Rwanda, and Tanzania. The GDSA was endorsed by the African Ministerial Conference on the Environment in 2015 as a key platform to implement its African Green Economy Partnership Regional Flagship Programme. It was also accepted by the Executive Council of the African Union (Conservation International, 2017; GDSA, 2016; Reuter et al., 2016).

[6] Maskell et al. (2014) outlined and defined the following list of assets that are important for natural capital reporting as: species, ecological communities, soils, sub-soil, freshwaters, land, atmosphere, minerals, marine (or oceans), and coasts.

[7] Access more information at: http://biodiversityadvisor.sanbi.org/planning-and-assessment/experimental-ecosystem-accounting/

[8] SEEA Central Framework is "…a multipurpose conceptual framework for understanding the interactions between the economy and the environment, and for describing stocks and changes in stocks of environmental assets. It puts statistics on the environment and its relationship to the economy at the core of official statistics" (UN et al., 2014, p. vii).

Department of Water and Sanitation (DWS) and the DEA (Stats SA, 2015). A stakeholder consultation meeting was convened (on 20-21 September 2017) by STATS SA together with other partner organisations for the start of a follow up project, Natural Capital Accounting and Valuation of Ecosystem Services in South Africa. The project involves other countries namely Brazil, China, India and Mexico (Stats SA, n.d.).

The State of Play of Natural Capital Accounting report (DEA, 2016b) reveals that various components of NCA are implemented in the country, though there are large gaps and fragmentation in data availability.

The report on the Workshop on Regional Perspectives on Natural Capital Accounting (GDSA and CI, 2016) highlights that the implementation of NCA in the country is relatively more established as reflected by the number of accounts that have been compiled in the past.[9] The country has well-established natural capital accounts in three sectors, namely energy, fisheries, and minerals (Table 1). There is also demonstrated capacity in implementing NCA in eight sectors, and there is a desire to further establish or strengthen this in six sectors. Key barriers to NCA implementation in the country are the lack of technical expertise, the unavailability of financial resources, and the lack of statistics/data (GDSA and CI, 2016).

TABLE 1: SUMMARY OF THE PROGRESS IN THE IMPLEMENTATION OF NCA IN VARIOUS SECTORS IN SOUTH AFRICA

	Agriculture	Biodiversity	Carbon	Ecosystem	Emission	Energy	Fisheries	Forest/ Timber	Freshwater/ Aquatic/ Lake	Land	Minerals	Soil	Waste	Water	Total
Desired		X	X	X						X		X	X		6
Demonstrated				X	X	X	X		X	X	X		X		8
Established						X	X				X				3

SOURCE: EXTRACTED FROM GDSA AND CI, 2016, P. 18

[9] South Africa is one of the leaders in NCA in Sub-Saharan Africa (GDSA and CI, 2016, p. 21). The history of incorporating natural capital into its national accounting system dates back to the 1980s, starting with the country's national Mineral Accounts assessment (which was only published in 2004 by the National Accounts Division of Stats SA) (DEA, 2016b).

Corporate governance and private sector efforts

Private sector actors are also engaged in mainstreaming sustainability in their activities. Corporates that have increasingly been putting in place measures to ensure that their business operations are (or at least, perceived as) aligned with sustainability objectives. However, the picture is not very good. The Institute of Directors in Southern Africa (IoDSA, 2016) asserts that pressure on natural assets continues to increase as they are being used faster than their regenerative capacity. Moreover, the investment industry struggles in linking environmental, social, and governance considerations with a company's ability to achieve and sustain long-term value creation (JSE, 2013).

Against this situation, South Africa has been implementing several of initiatives with the aim of promoting sustainable governance practices, in particular for big businesses. The IoDSA (2016) has been leading a number of initiatives to enhance governance among South African companies. This is coupled with the efforts by the Johannesburg Stock Exchange (JSE) to transform itself into a sustainable stock exchange (see Box 2) by integrating financial investment and returns with sustainability issues. A notable effort is the development and promotion of the King Codes[10] and reports on good governance. These codes and reports seek to entrench good corporate governance practices and outcomes in the country. The King IV Report on Corporate Governance emphasises ethical leadership, the organisation in society, corporate citizenship, sustainable development, stakeholder inclusivity, integrated thinking and integrated reporting (IoDSA, 2016). The King Code on Corporate Governance stresses the need to embrace the six forms of capital, namely financial, manufactured, human, intellectual, natural, as well as social and relationship capital. These forms of capital are also specified in the International ‹IR› Framework that has been endorsed by several bodies as a guide for integrated reporting (see Box 2). The inclusion of natural capital brings to the fore the importance of valuation of nature.

> *South Africa has been implementing several of initiatives with the aim of promoting sustainable governance practices, in particular for big businesses.*

In line with the IoDSA and the JSE, the DEA (2011a) seeks to encourage private sector reporting on sustainability, through integrated reporting, in an attempt to address key disclosure gaps and inadequacies in traditional reporting.[11] Though the objectives of integrated reporting are noble, some corporates produce good integrated reports (on paper), while their actual operations are not as clean (sustainable) as what is reported. This implies that such firms are more concerned with being perceived as compatible with sustainability objectives rather than actually achieving sustainability.

Another important initiative is the Carbon Disclosure Project (CDP). In South Africa it is implemented by the National Business Initiative

[10] The King code has evolved from King I up to King IV.

[11] Some of the benefits of integrated reporting are: providing a better picture on the viability and future resilience of an organisation, helping meet the information needs of investors and other stakeholders, and enhancing effective allocation of limited resources (IIRC, 2011). An integrated report seeks to communicate concisely an organisation's strategy, governance, performance and prospects in relation to value creation over the short, medium and long term (EY, 2013; IIRC, 2013).

(NBI). The initiative targets mostly the JSE top 100 companies (by market capitalisation), though other companies which are not in that category can be included. The CDP Climate Change focuses on corporates' disclosure of climate change risks and opportunities (NBI, 2017a), while CDP Water focuses on the disclosure of water-related risks and opportunities in their value chains (NBI, 2017b). Such information helps companies and investors to understand and integrate the associated climate change and water risks into their strategies and governance structures. Over the years, the NBI has published a number of CDP South Africa reports, with the first report having been launched in 2007. In each year, an information request is send to companies, who then respond, and the data is publicly disclosed.

The CDP South Africa Climate Change 2017 report (NBI, 2017c) asserts that a decade of CDP data indicates that South African companies have been responding to CDP consistently ahead of their global peers across many metrics. In addition, South African companies invested about R3.35 billion in emissions reduction activities, and 56% of them have put an internal price on carbon, while about 30 companies have set or plan to set a science-based target.

It is noteworthy to highlight that although sustainability concerns have largely been focused on big businesses, progressively the DEA and Global Reporting Initiative (GRI) are promoting sustainability reporting for small businesses. For instance, they held a policy dialogue in Pretoria (on 14 June 2018) focusing on supply chain sustainability management and reporting in the context of SMEs.

Box 2: Efforts to promote integrated reporting in South Africa

while the objectives of integrated reporting are noble,

some corporates produce good integrated reports (on paper),

while their actual operations are not as clean (sustainable) as what is reported.

Integrated reporting has gained prominence the world over, including in South Africa. It aims to give a full picture on the interconnections and interrelatedness of the six capitals (namely financial, manufactured, human, intellectual, natural, as well as social and relationship capital), its activities, and the links to the operating triple context comprised of the economy, society, and environment (IoDSA, 2016).

The Integrated Reporting Committee of South Africa (IRC of SA) is key in promoting integrated reporting (IRC of SA, 2015, n.d.). The IRC of SA endorsed the International ‹IR› Framework developed by the International Integrated Reporting Council. The IRC has additional guides on how to prepare an integrated report, as well as understand the requirements to disclose performance and outcomes. Outcomes relate to the internal and external consequences (positive and negative) for the six capitals, due to business activities and outputs of an organisation (IIRC, 2013; IRC of SA, 2015).

The JSE has also been promoting the wider adoption of integrated reporting by stipulating the incorporation of the King Code into the listing requirements of companies on the stock exchange (JSE, 2015; 2013). The JSE provides incentives for companies to integrate sustainability into their policies, practices and reporting. For instance, the adherence to the principles of the King Code on Corporate Governance is an important requirement, and it is mandatory to adopt integrated reporting. The King IV has 17 basic principles to assess good governance (IoDSA, 2016).

In addition, the JSE has been promoting the inclusion of sustainability issues into investment analysis and decision-making. The JSE engages in the global sustainability debate through the United Nations-supported Principles for Responsible Investment and the Sustainable Stock Exchanges initiative. The JSE serves on the World Federation of Exchanges Sustainability Working Group, the King Committee on Corporate Governance, the Code for Responsible Investment in South Africa Committee, the Integrated Reporting Committee of South Africa, and various United Nations Consultative Groups (JSE, 2015).

There are efforts to report on listed companies' performance for key sustainability indicators. From 2004 to 2015, the JSE used the Socially Responsible Investment Index (SRI Index), which was then replaced in 2016 by the FTSE/JSE Responsible Investment Index Series.

While all these efforts are noble, there are challenges. The IRC of SA (2015) revealed that: organisations tend to be biased toward reporting only the positive outcomes; insufficient disclosure of indirect and unintended outcomes persists; some terminology is misunderstood (e.g. outputs versus outcomes); reporting focused on funding spent rather than the outcomes (consequences on capitals); not all capitals are considered; there is a failure to adhere to guiding principles of comparability, reliability, and completeness; and generic rather than company-specific statements are made.

SOURCES: AUTHOR'S COMPOSITION, BASED ON IRC OF SA (2015, N.D.) AND JSE (2015; 2013)

2.2. Recommendations

The government as well as other stakeholders should continue to mobilise for the valuation of nature. Having good and reliable data and information, coupled with relevant analysis and dissemination, is central to nurturing well-informed decision-making. Deciding which measure to use is challenging, particularly as valuation of nature is often done for different needs and at different scales. These varying needs imply that there are different tools and measures, from which the most appropriate in a particular situation should be used. Particular measurement approaches and indicators can be adopted, depending on the priorities and capacities as well as the measurement purposes (UNEP, 2016). Thus, a one-size-fits-all prescriptive approach is not applicable. What is important is to ensure that the best appropriate and feasible approach is adopted.

Montmasson-Clair and Du Plooy (2012) recommended the development of tailor-made sustainability indicators suited for South African realities, such as the dual economic system and policy priorities. Stiglitz et al. (2010) and UNEP (2016) recommend the dashboard approach, complemented by aggregate measures, such as ANS. In the same context, ecological footprints can be applied at different levels, such as at community, corporate or even country level. But for aggregate measures, such as the ANS, these become more relevant when assessing at a large scale i.e. economy-wide or when the objective is to have a broader overview. If the objective is to properly assess sustainability in its entirety, then a comprehensive dashboard measure is more applicable as each sustainability component can be included in the dashboard and be measured using appropriate units. Overall, some approaches can complement each other, hence can be applied in combination (UNEP, 2016).

Socio-environmental externalities should be incorporated into accounting systems and decision-making processes. While efforts are already underway to employ NCA, it is still confined to a few sectors and, in some cases, the methodologies are still at an experimental stage. Therefore, it is vital to ensure that the NCA concept is widely adopted across all sectors. Proper information and data are key to inform on the state of natural capital, hence greater investments are required to improve accuracy and reliability. Every stakeholder that produces relevant data and information should endeavour to promote ease of access, use, interpretation and understanding so that any decision-maker whose decisions have a bearing on nature cannot, in the end, blame data and information gaps for their poor decisions.

In addition, the private sector should ensure that its governance systems and actions are conducive for the protection of nature. The private sector should continue to promote and adopt integrated reporting. The protection of nature by corporates should not just be motivated by the desire to get a social licence to operate but must ensure that sustainability is the core objective and desired outcome.

3 Protecting Nature

Nature is necessary for the survival of humanity. However, its protection and conservation should not be done just to meet human needs and wants, as it has other crucial roles that go beyond that. Unfortunately, the extraction of raw materials generally tends to be selfishly biased towards meeting human endeavours. The world over, higher extraction than the regenerative capacity of resources is rampant. The proverbial "tragedy of the commons" has been witnessed with various users depleting nature to the detriment of all. In most cases, nature as a resource is shared among many users, whose access tends to be unlimited and free for all, but at the same time none of the users is willing to take on the responsibility to monitor and conserve the resource. Given this background, there is need to ensure that measures are implemented that contribute to the protection of nature. This is particularly relevant because of the rich biodiversity in South Africa, some of which is highly sensitive and requires special attention. For example, three globally recognised biodiversity hotspots are in South Africa, namely the Cape Floral Kingdom, the Succulent Karoo and the Maputaland-Pondoland-Albany Centre of Plant Endemism (GCIS, 2015).

3.1. Diagnostic: The need to strengthen the implementation of legislation

To understand the need to protect nature, it is necessary to give an overview of the associated status or trends of the various components of nature. The 2nd South Africa Environment Outlook (DEA, 2016a) and the National Biodiversity Assessment (Driver et al., 2012) give an in-depth picture of the state of the environment in the country. Findings from the 2nd South Africa Environment Outlook (see Appendix, Table 3) show that the trends for most environmental aspects are going in an unfavourable direction. For instance, rates of loss of natural habitat are high in some parts of the country. It is forecasted that if current rates of loss were to continue in areas, such as Gauteng, KwaZulu-Natal and the North West Province, there would be almost no natural habitat left outside protected areas by 2050 (DEA, 2016a; Driver et al., 2012). The National Biodiversity Assessment (Driver et al., 2012) also gave the following key highlights:

- wetlands are the most threatened of all the country's ecosystems, with 48% of wetland ecosystem types critically endangered;
- South Africa has over 2 000 medicinal plant species, of which 656 species are traded in medicinal markets and 54 are threatened;
- nearly a fifth of South Africa's coast has some form of development within 100 m of the shoreline, placing people and property at risk and compromising the ability of coastal ecosystems to buffer the impacts of climate change;
- for coastal and inshore ecosystem types, 58% are threatened (24% critically endangered, 10% endangered and 24% vulnerable), compared with 41% of offshore ecosystems types (11% critically endangered, 8% endangered and 22% vulnerable), reflecting the fact that coastal and inshore ecosystems are more heavily impacted by human activities; and
- 57% of river ecosystem types are threatened (25% critically endangered, 19% endangered and 13% vulnerable).

In general, there are notable efforts underway to protect nature, especially in the formulation of necessary policies and legislation. However, the outcomes and impacts on nature seem to suggest that there are still challenges with implementing these policies and legislation. This section is divided into two broad sub-themes. The first part highlights policy-related government efforts to protect nature. The second part mainly focuses on designation of protected areas and conservation areas.

Policy-related government efforts to protect nature

The South African government plays a crucial role in formulating, implementing, and enforcing policies and legislation that seek to protect nature. South Africa's Constitution (Section 24) stipulates that everyone has the right to an environment that is not harmful to their health or well-being (RSA, 1996). In addition, it emphasises that the environment should be protected for the benefit of present and future generations, and efforts should be directed at preventing pollution and ecological degradation, as well as promoting conservation and securing ecologically sustainable development. One of the key outcomes (number 10) targeted by the government (as raised in Section 2.1) envisions "a South Africa where environmental assets and natural resources are valued, protected and continually enhanced" (DEA, 2010, p. 2).

Nature is necessary for the survival of humanity. However, its protection and conservation should not be done just to meet human needs and wants, as it has other crucial roles that go beyond that.

Besides the Constitution, a number of pieces of legislation have been enacted to support the protection of different aspects of the rich and diverse natural assets in the country. Such Acts of Parliament include the National Environmental Management Act No. 107 of 1998 and its variants (for biodiversity, protected areas, air quality, waste) and other issue-specific legislation, such as the Marine Living Resources Act No. 18 of 1998, the Sea Shores Act No. 21 of 1935 and the Sea Birds and Seals Protection Act No. 46 of 1973.

In addition, key government policy documents also enunciate the importance of nature. For example, the National Climate Change Response White Paper (DEA, 2011b) outlines the need to mitigate and adapt to climate change. Such actions, if successful, will also contribute to the overall preservation of nature. Chapter 5 in the National Development

Plan: Vision 2030 (NDP) focuses on ensuring environmental sustainability (NPC, 2012). A key strategic priority in the NSSD1 is sustaining ecosystems and using natural resources efficiently, with the objective to "value, protect and continually enhance environmental assets and natural resources" (DEA, 2011a, p. 20).

Moreover, there are efforts to strengthen the knowledge, science and policy interface on the sustainable management of biodiversity. This includes efforts to implement the National Biodiversity Strategy and Action Plan, which is supported by the National Biodiversity Research and Evidence Strategy and the Implementation Plan. In support of this, the DEA, in conjunction with other partners,[12] has so far held three annual National Biodiversity Research and Evidence Indabas, in 2016, 2017, and 2018. These Indabas seek to enhance the interaction between policymakers, researchers, practitioners, and civil society representatives on key issues that pertain to biodiversity in the country.

Good legislation is enabling as long as it is implemented and enforced properly.

While these policy efforts are notable, significant challenges around the sustainable management of nature have been highlighted. Good legislation is enabling as long as it is implemented and enforced properly. South Africa has generally been noted to have good legislation; however, the implementation stage seems to have inadequacies. Montmasson-Clair (2017) notes that the inconsistency and misalignment between multiple plans and strategies is problematic and hinders the effectiveness of the policy framework, hence the need to improve implementation, clarity and coherence of the mix of measures.

Designation of protected areas and conservation areas

The protection of nature and ecosystems is a priority area for the government. It is the custodian of most natural resources and is obligated to ensure the sustainable management of those resources. To enhance the improved management of biodiversity, certain areas can be designated as protected areas or conservation areas. Protected areas refer to zones that have been set aside mainly for nature and biodiversity, while conservation areas comprise of land designated for conservation, though other land uses may be allowed (DEA, 2013a).

As shown in Table 2, Figure 4, and Figure 5, South Africa has a total of 1 563 areas that are designated either as protected or conservation areas. There are about 37 conservation areas covering a total of 11.5 million hectares. The greatest proportion of conservation areas, in terms of numbers, are designated as Ramsar sites[13] (62%), while, in terms of area, biosphere reserves cover the greatest proportion of the area (95%). There are about 1 526 protected areas covering a total of 30.2 million hectares. The greatest proportion of the protected areas, in terms of numbers, are designated as nature reserves (85%) while, in terms of area, the greatest proportion are marine protected areas (62%).

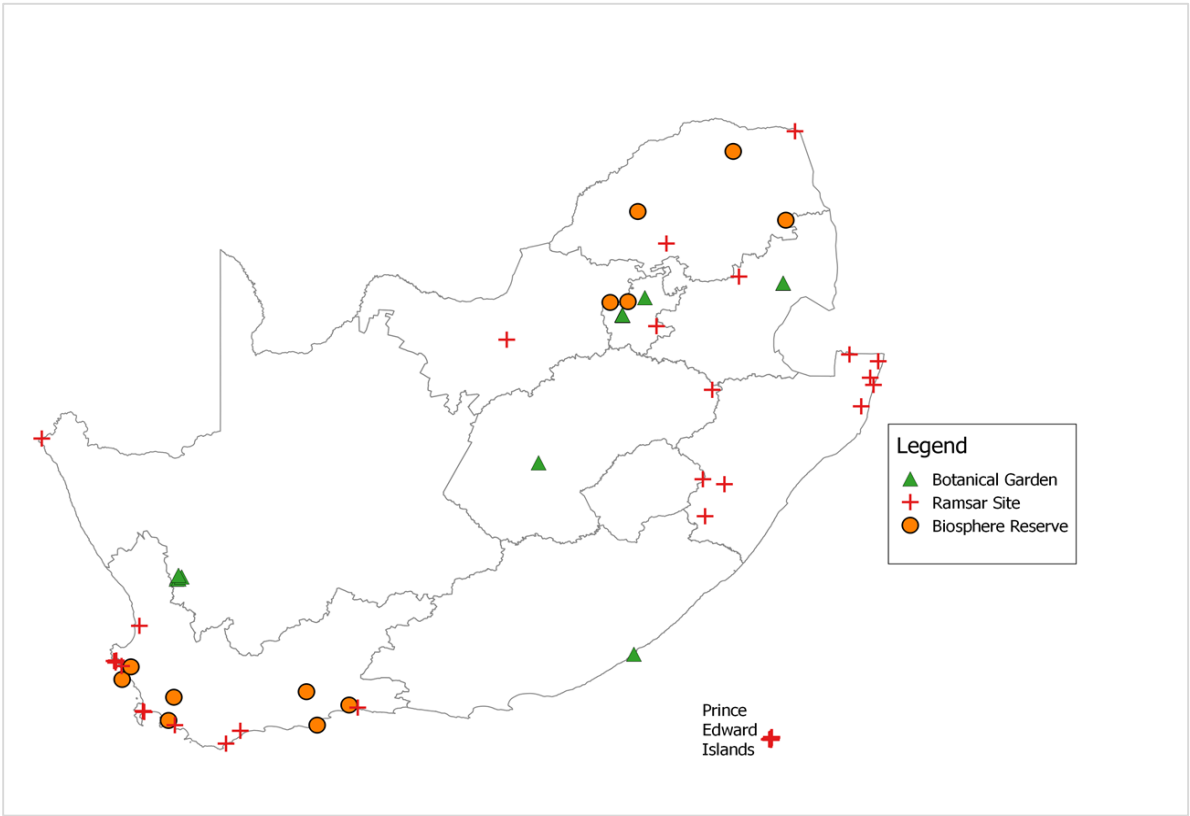
[12] The Department of Science and Technology (DST), Department of Planning Monitoring and Evaluation (DPME), the Africa Centre for Evidence of the University of Johannesburg, the University of Pretoria, and Future Earth.
[13] Ramsar site refers to a wetland listed in the Ramsar List of Wetlands of International Importance under the Ramsar Convention. This comprises of the following types classification: marine/coastal wetlands, inland wetlands, and human-made wetlands (DEA, 2013a).

TABLE 2: BREAKDOWN OF THE NUMBER OF PROTECTED AND CONSERVATION AREAS IN SOUTH AFRICA IN 2017

Category	Designation type	Number per site type	Total area (hectares)
Conservation area	Biosphere Reserve	8	10 928 531
	Botanical Garden	6	7 126
	Ramsar Site	23	568 200
	Sub-total	*37*	*11 503 857*
Protected areas	Forest Nature Reserve	51	172 511
	Forest Wilderness Area	12	274 489
	Marine Protected Area	25	18 598 318
	Mountain Catchment Area	16	624 568
	National Park	21	3 978 307
	Nature Reserve	1 355	3 872 344
	Protected Environment	23	588 511
	Special Nature Reserve	2	33 603
	World Heritage Site	21	2 027 070
	Sub-total	*1 526*	*30 169 719*
Grand total		*1 563*	*41 673 576*

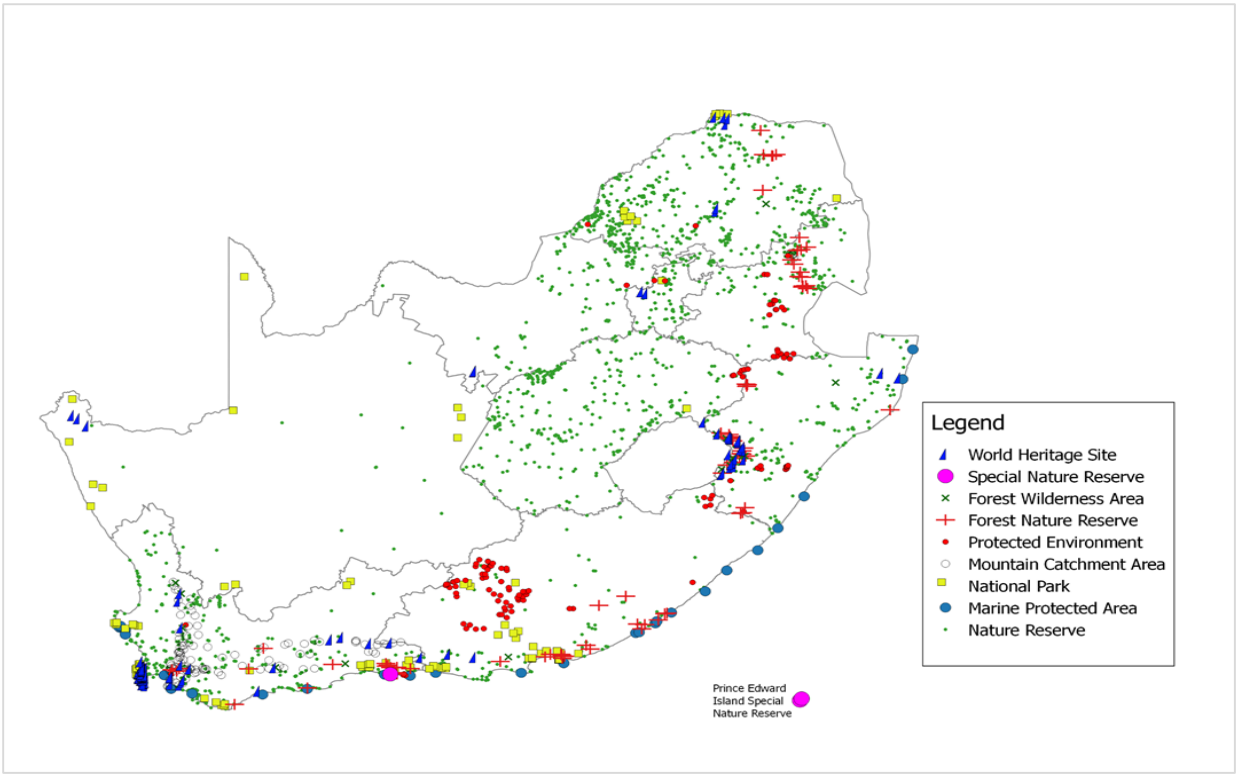
SOURCE: AUTHOR'S COMPOSITION, BASED ON DATA FROM SOUTH AFRICA CONSERVATION AREAS DATABASE (DEA, 2017A) AND SOUTH AFRICA PROTECTED AREAS DATABASE (DEA, 2017A)

FIGURE 4: SOUTH AFRICA'S CONSERVATION AREAS IN 2017



SOURCE: AUTHOR'S COMPOSITION, BASED ON DATA FROM SOUTH AFRICA CONSERVATION AREAS DATABASE (DEA, 2017B)

FIGURE 5: SOUTH AFRICA'S PROTECTED AREAS IN 2017

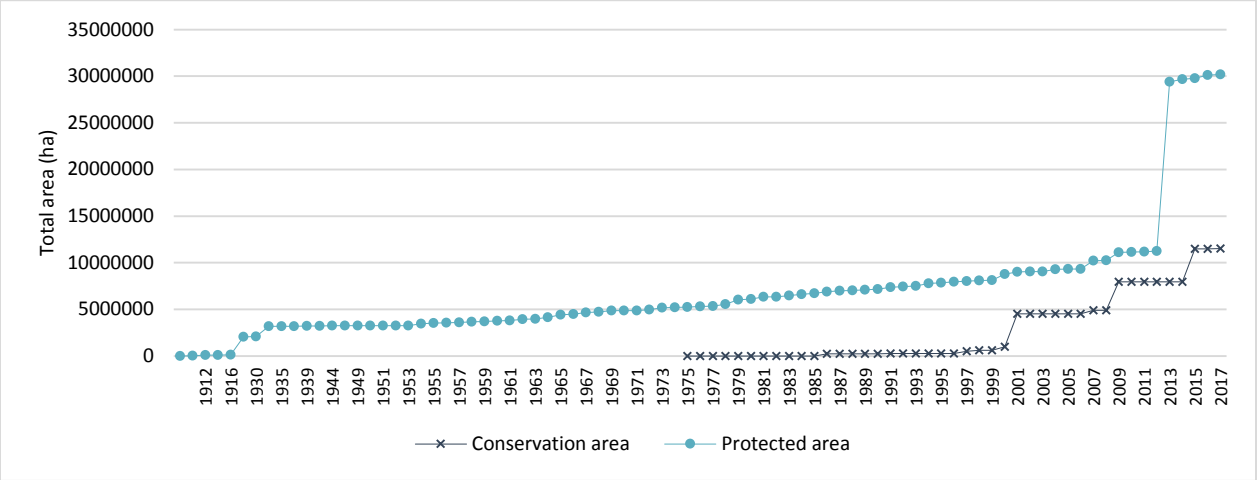


SOURCE: AUTHOR'S COMPOSITION, BASED ON DATA FROM SOUTH AFRICA PROTECTED AREAS DATABASE (DEA, 2017A)

The area under protection, as an indicator of biodiversity and ecosystem health, has generally been improving, and state funding for biodiversity conservation has also been improving, though slightly (DEA, 2016a). South Africa has since the early 1900s been formally[14] designating protected areas (Figure 6). The total area designated as protected has increased steadily from 1903 to date. The designation of conservation areas in the country started in the 1970s and has been expanding rapidly since the 2000s. A huge increase in the protected area in the country in 2013 can be attributed to the designation of the Prince Edward Islands Marine Protected Area (MPA), which is the country's the first offshore MPA (DEA, 2013b). This MPA covers an area of about 18.1 million ha (about 180 000 km^2). It comprises three types of zones: a 12-nautical mile sanctuary zone (where fishing is prohibited, and the passage and anchoring of vessels is restricted); four restricted zones (where limited commercial fishing is permitted); and a controlled zone, linking the four restricted areas (where fishing is permitted) (RSA, 2013).

[14] The indigenous African population has always protected nature through various traditional and cultural ways. This is not captured in the databases referred to in this paper, hence the phrasing "formally designating protected areas since the early 1900s", implying that historically there have been other forms of important designations by indigenous populations which have not been formally documented as in such databases.

FIGURE 6: GROWTH IN PROTECTED AND CONSERVATION AREA IN SOUTH AFRICA



SOURCE: AUTHOR'S COMPOSITION, BASED ON DATA FROM SOUTH AFRICA CONSERVATION AREAS DATABASE (DEA, 2017A) AND SOUTH AFRICA PROTECTED AREAS DATABASE (DEA, 2017A)

An important programme contributing to the expansion of protected areas is the government-led Operation Phakisa. This programme was initiated in 2014 to enhance the implementation of the NDP. Under Operation Phakisa, one of the main initiatives led by the DEA focuses on tapping into the economic potential of the country's oceans, particularly marine transport and manufacturing, offshore oil and gas exploration, aquaculture, and marine protection services and ocean governance (DPME, n.d.).

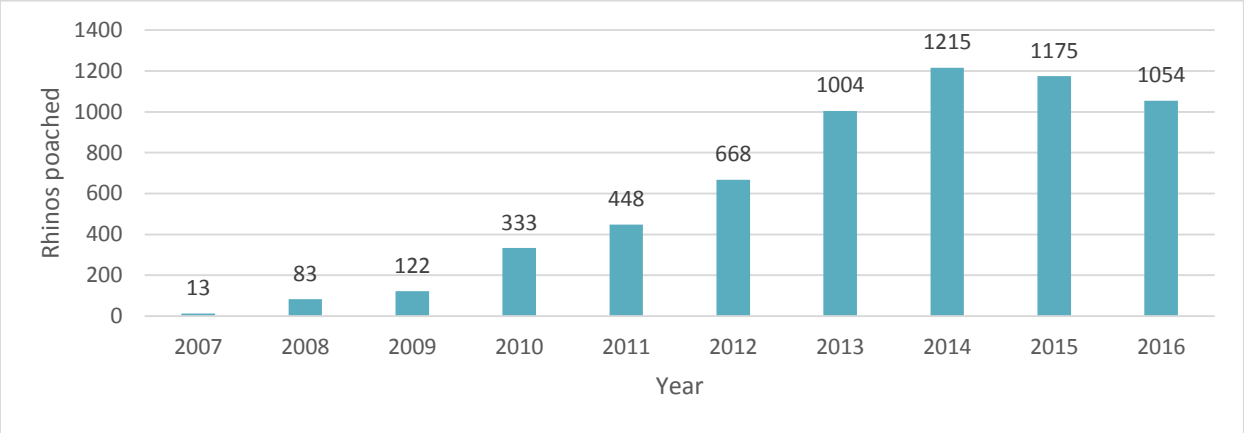
The aquaculture work stream seeks to contribute to a sustainable fishing industry. The marine protection services and ocean governance aims to promote effective governance of the oceans under the country's jurisdiction through the enactment and implementation of a proper governance framework (DEA, 2017c). In 2016, as part of the implementation of Operation Phakisa, the Minister of Environmental Affairs proposed new MPAs (RSA, 2016). The declaration aims to create about 70 000 km^2 of MPAs so as to enhance the protection of coral reefs, mangroves and coastal wetlands (DEA, 2016c).

Besides the concerted efforts to designate protected and conservation areas, a huge challenge relates to the policing and enforcement of legislation. For example, Save the Rhino International (2017) reports that while South Africa has one of the largest population of rhinoceros globally, the country witnessed a huge increase (over 9 000% from 2007-2014) in poaching, mostly in the Kruger National Park. As a result of these high rates, increased attention is now being paid by many stakeholders[15] to combat rhinoceros poaching. Some of the notable efforts to fight poaching include the declaration in 2014 of rhinoceros poaching as a National Priority Crime as well as the implementation of the Integrated Strategic Management of Rhinoceros (DEA, 2017d). Concerted efforts by the government and international donors in availing more resources to improve security in parks is also noted.

[15] Key stakeholders include the DEA, the South African National Defense Force, the South African Police Service, South African State Security Agency, Justice and Correctional Services Department, South African National Parks, and provincial conservation agencies.

Recent developments seem to indicate some positive results. Figure 7 shows a decreasing trend in the number of rhinoceros poached from a peak of 1 215 in 2014 to 1 054 in 2016 (Save the Rhino International, 2017). Besides this progress, more needs to be done to bring down poaching. WWF-SA (2017a) observes that, though the decrease of nearly 20% in the number of rhinoceros carcasses found in the Kruger National Park is commendable, the pronounced fall in the white rhinoceros population remains a genuine concern. In addition, while poaching in the Kruger National Park has decreased due to improved security, poaching syndicates now target other areas in the country. For example, in 2016, about 161 rhinoceros were killed in the KwaZulu-Natal province, an increase of 38% compared to the previous year (WWF SA, 2017a).

FIGURE 7: NUMBER OF RHINOCEROS POACHED IN SOUTH AFRICA PER YEAR FROM 2007 TO 2016



SOURCE: AUTHOR'S COMPOSITION, BASED ON SAVE THE RHINO INTERNATIONAL (2017)

3.2. Recommendations

While the policies and legislation that seek to contribute to the protection of nature are in place, the government should continue to mobilise different stakeholders for the protection of nature. These efforts should include using policy and regulations to incentivise different users to protect and conserve nature while, at the same time, being robust enough to discourage actions that destroy nature. Generally, the policy framework seems to recognise the need to protect nature, however, the coherence and implementation of the various policy and supporting instruments need to be further strengthened.

The progress made by the government in designating conservation and protected areas is commendable. However, it is necessary for the government, together with other stakeholders, to properly enforce and manage such areas. It does not help much to designate an area as protected if the actual protection of such an area is weak. In addition, the fight against poaching should be further strengthened. This should target fighting corruption that fuels illegal trade in wildlife products, as well as targeting local and international syndicates that coordinate such operations.

4 Maximising the opportunities and minimising the risks

Nature provides many goods and services that are important for socio-economic development. However, the ability of nature to continue supplying these benefits depends on how it is managed. Some aspects of nature are very delicate. If certain thresholds and limits are exceeded, these can have detrimental effects on its overall state. Therefore, it is necessary to ensure that nature is managed properly to maximise opportunities that are derived from it and minimise risks, i.e. the negative impacts that can destroy it. This section dwells mainly on the following themes: the need to minimise economic impacts on nature, and the potential to harness ecosystem services and ecological infrastructure.

4.1. Diagnostic: Leveraging efforts towards sustainability

South Africa is utilising various opportunities that are provided by nature. However, there are notable risks that threaten the regenerative capacity and sustainable management of nature. The policy framework seeks to ensure that the country benefits from nature in a sustainable way and various measures are in place towards this. But, there are significant risks and externalities, some of them historical. This makes it necessary to ensure that the current developmental trajectory is aligned to address these challenges and, at the same time, that a precautionary approach is adopted to curb such potential challenges in future.

The need to minimise economic impacts on nature

The direct impact of economic activities, particularly extractive industries, on the environment is dramatic in South Africa. This can be neatly illustrated through the interplay between mining and the environment. While mining is key for the South African economy and employment creation, there are significant negative impacts. Mining has both past/legacy externalities and current problems (Montmasson-Clair et al., 2015), such as air and water pollution, acid mine drainage (AMD), negative impact on flora and fauna, health impacts, and the displacement of human settlements.

Furthermore, there is a lot of uncertainty associated with these impacts, as some of the

negative costs tend to be inter-generational and will be experienced at a later stage. Feasibility and evaluation studies also tend not to capture such costs, making them even harder to mitigate. AMD is one such challenge. A.T. Kearney (2012) notes "the effects of AMD on the entire water system and the human and natural environments are not widely known. Since it was first identified as an issue in the 1970s, it has been partly ignored and partly misunderstood, with potentially costly implications across the entire ecosystem". Its effects are wide-ranging, but centre around the acidity and heavy metals in the water, which negatively impact on health, the environment and the economy. While the challenge of AMD is immense, the solutions adopted so far are insufficient (A.T. Kearney, 2012). Due to the legacy nature of the problem, there is no agreement on who (i.e. the state or present mining companies) should pay to address it. In the end, managing and addressing environmental impacts from historic mining operations continue to be a burden on the state (DEA, 2016a).

The issue of fracking in South Africa, particularly in the Karoo, has also been topical. There is no common position on this issue. Pro-environment groups are generally against, while those more concerned with energy security tend to support fracking. Scholes et al. (2016) note that, while a large shale gas resource in the Karoo Basin could trigger huge economic and energy security benefits, there are also many associated social and environmental issues. The Karoo has high levels of biodiversity, including sensitive and unique ecosystems and species, and it spans over extensive areas, such that the setting up of fracking infrastructure would fragment the landscape. Some stakeholders are of the view that the country does not yet have the relevant legislation to guide fracking activities as well as the capacity to monitor and ensure compliance with requirements. For instance, the Endangered Wildlife Trust (EWT, 2016, p. 1) states that "there are multiple risks and impacts associated with large-scale fracking on the environment, water and livelihoods, and that there is a lack of confidence with respect to the South African government's ability to mitigate the risks associated with fracking". Therefore, the exploitation of shale gas in the Karoo should be considered using a more precautionary approach, so as to avoid the associated negative impacts that take time to manifest, as is the case with the current AMD challenge.

Many cases in which mining considerations have taken precedence over nature are being reported. For instance, the Oxpeckers Reporters (2017) documents that a coal mining project situated in a critical water catchment in Mpumalanga was approved by Ministers of Environment and Mineral Resources, without any public notification. The ministers justified the decision by saying that the mining company had obtained the legally required licences and permits necessary for them to operate. Also, the Centre for Environmental Rights (CER, 2016) states that by 2014, 61.3% of the surface area of Mpumalanga fell under prospecting and mining rights applications. This shows the potential extent of destruction of nature as a result of mining activities. The CER suggests that the challenges can be attributed mostly to a poor governance framework.[16]

It is noteworthy to highlight that all is not gloom. Recently, the Constitutional Court sustained a decision by the Supreme Court of Appeal, which dismissed a mining company's application to prospect for gold in a nature reserve (Yende, 2017). In this case, the mining company had been granted a prospecting permit in 2006 by the Department of Mineral Resources (DMR) to extend its mining operations into a nature reserve. However, the Mpumalanga Tourism and Parks Agency together with the Mountainlands Estate

[16] Some of the key findings by the CER (2016, p. viii), especially with reference to the Department of Mineral Resources (DMR) are: "The DMR ignores comprehensive spatial planning and designation of sensitive, vulnerable and important areas…grants rights without having regard to cumulative impacts on water resources, biodiversity, air quality, and food security, nor to the health or wellbeing of affected communities...unlawfully grants rights to companies already in violation of mining legislation…The conflict of interest in the DMR's mandate, to promote mining, and to regulate its environmental impacts, fundamentally compromises effective regulation of the detrimental impacts of mining".

Owners' Association objected to this and appealed to the courts to protect nature in line with legislation that prohibits mining in protected areas.

There are some efforts seeking to ensure that mining activities do not have significant negative impacts on the environment and biodiversity. This includes the formulation of the Mining and Biodiversity guidelines (see Box 3). Though this is notable, what is more important is the actual implementation and enforcement of the guidelines. Montmasson-Clair et al. (2015) note that implementation challenges attributable to the government's lack of capacity and coordination lead to environmental externalities. The impact and success of the guidelines is yet to be seen as their operationalisation is at an early stage.

Improved efficiency in production and consumption processes can reduce the demand for inputs derived from nature.

Minimising the impact of economic activities on nature also requires the greening of value chains. Green products and services[17] are desirable as they are generally environmentally friendly, with minimal negative impacts on nature. In addition, improved efficiency in production and consumption processes can reduce the demand for inputs derived from nature, thereby conserving it. An important aspect of the green economy agenda is seeking to promote behavioural change among producers, as well as consumers for them to reduce waste. In this regard, the circular economy, which centres on the "reduce, reuse, and recycle" drive, is widely promoted across various parts of the country. The South African government has identified the growth of green sectors as an economic opportunity, as emphasised in the Industrial Policy Action Plan (IPAP), and the noteworthy resources that have been harnessed by the government to promote green activities (Montmasson-Clair, forthcoming).

Industrial symbiosis is of particular relevance to greening value chains.[18] It was first piloted in the country by the National Cleaner Production Centre of South Africa (NCPC-SA) in 2010 (O'Carroll et al., 2017). Since then, there has been marked growth in its adoption. There are three regional programmes already underway in Gauteng, KwaZulu-Natal, and the Western Cape.

Significant benefits are associated with industrial symbiosis, including its contribution to the conservation of nature. O'Carroll et al. (2017) estimate that, if industrial symbiosis were to operate at scale in the country, at minimum, annual economy-wide benefits could be:

- the diversion of more than 10 000 tonnes of waste from landfill;
- the generation of more than R33 million in economic benefits (including additional revenue, cost savings and private investment);
- the mitigation of more than 47 100 tonnes of carbon dioxide equivalents[19]; and
- the generation of more than 100 jobs by returning secondary materials to the economy before losing them to waste-to-energy or landfill.

[17] They can be defined as 'technologies, products and services that deliver benefits to users of equal or greater value than those of conventional alternatives, while limiting the impact on the natural environment as well as maximising the efficient and sustainable use of energy, water and other resources' (CGTI, 2012).
[18] This is a resource efficiency approach where unused or residual resources (material, energy, water, waste, assets, logistics, expertise) of one company are used by another – thereby creating mutual economic, social and environmental benefits (NCPC-SA, n.d.).
[19] Corresponding to fossil GHG (greenhouse gas) emissions of 12 900 passenger vehicles taken off the road each year in South Africa.

Box 3: South African guidelines for biodiversity and mining

The wider adoption and implementation of the guidelines is essential.

The development of the guidelines is an important attempt to mainstream the respect of nature into mining operations. These guidelines were developed by the South African Mining and Biodiversity Forum, a consortium of stakeholders from industry, conservation organisations and government. This was motivated by the observed accelerated loss of natural capital and risks on ecosystems, which could be attributed to the mining sector.

The guidelines provide a practical, user-friendly manual for integrating biodiversity considerations into the mining life cycle, from exploration to closure. They promote the adoption of a risk-based approach and the utilisation of high-quality, readily-accessible spatial and non-spatial biodiversity information to guide thinking and decision-making. The guidelines have six principles applicable to addressing biodiversity issues and impacts in a mining context. These are:

1. applying the law;
2. using the best available biodiversity information;
3. engaging stakeholders thoroughly;
4. using best practice environmental impact assessment (EIA) to identify, assess and evaluate impacts on biodiversity;
5. applying the mitigation hierarchy in planning any mining-related activities and developing robust environmental management programmes (EMP); and
6. ensuring effective implementation of the EMP, including adaptive management.

SOURCE: DEA ET AL. (2013).

Harnessing ecosystem services and ecological infrastructure

In addition to minimising the negative impacts of economic activities on the environment, transitioning to a sustainable development model relies on preserving, nurturing and fostering ecosystems services. In this context, ecological infrastructure is important. For example, the Drakensberg mountain range occupies less than 5% of South Africa's total surface area, but it produces 25% of the country's surface water runoff, with a supply reach that covers almost 60% of the country (Blignaut et al., 2008).

Some of South Africa's ecological infrastructure is, however, degraded (DEA, 2011a; SANBI, 2014).[20] There has been significant loss of natural habitat and negative trends are being observed on many attributes (see Section 3.1 and Table 3 in the Appendix). About 5.5 million hectares of arable land in the country is degraded, meaning such land has low productivity, cannot capture water efficiently and has reduced biodiversity (Four Returns, 2014).

The country is also faced with a huge challenge of invasive alien plants (IAPs). Such plants disrupt the functioning of ecosystems. They reduce the availability of water, and increase the incidences and risk of fire. Estimates show that about 9 000 plant species have been introduced in the country, of which 161 species are deemed invasive (DEA, 2016a). The total area infested by IAPs in the country doubled between the mid-1990s and 2007, and at least R6.5 billion of ecosystem services are lost every year as a result (Driver et al., 2012).

There are efforts to control IAPs. This includes legislation which has been enacted, for instance, the 2014 Alien and Invasive Species Regulations. Moreover, there are programmes, such as the Working for Water, that are instituted by the government to eradicate IAPs while, at the same time, creating employment (Barnard and De Villiers, 2012; Barnes et al., n.d.).

The country is faced with a huge challenge of invasive alien plants (IAPs)

The South African government has also been promoting the maintenance and development of ecological infrastructure. One notable programme is through the implementation of Strategic Integrated Projects (SIPs). The proposed SIP 19 aims at improving the country's water resources and other environmental goods and services through the conservation, protection, restoration, rehabilitation and maintenance of key ecological infrastructure (PICC, 2014).

The uMngeni Ecological Infrastructure Partnership project, led by SANBI, endeavours to improve the state of ecological infrastructure to boast water security in the uMngeni Catchment in KwaZulu-Natal province (Colvin et al., 2015). Furthermore, there are efforts to promote water stewardship,[21] for instance, the one undertaken in the Western Cape's Breede River catchment (WWF SA, 2017b).

The country's water pricing strategy promotes ecological sustainability (DWS, 2015). It facilitates funding for the provision of water for the ecological reserve, ecosystem maintenance and rehabilitation programmes including the control of IAPs.

[20] Nature and ecosystems have tipping points beyond which restoration efforts will consume considerable time, resources and effort (TEEB, 2010). Unfortunately, in most cases, once nature has been destroyed, it cannot be repaired, or when repaired will not go back to the original state (SANBI, 2013). Human activities are a significant contributor to the destruction of ecological infrastructure. This calls for the need to uphold ecological integrity so as to achieve economic growth and social wellbeing (ASSAF, 2014).

[21] Water stewardship is a commitment to sustainable management of shared water resources in the public interest through collective action between businesses, governments, NGOs, and communities (WWF-SA et al., 2014). It seeks to engage various stakeholders to manage water resources or water infrastructure and enabling them to contribute positively to water security (Colvin et al., 2015).

Box 4: The importance of stakeholder inclusion and participation

Further efforts are required to broaden the interest and participation of all groups in society in environmental stewardship.

Different stakeholders have different ways of valuing nature, depending on how they benefit (directly or indirectly), and their needs and perceptions. Without the necessary collaboration and interaction between stakeholders, it is easy to destroy nature. This is due to competing needs and demands on nature's stocks and flows that can exceed sustainable extraction thresholds. For example, Blignaut et al. (2008) note that the land degradation in the Drakensberg area is mainly due to the uncontrolled harvesting of fuelwood and overgrazing by livestock, which is worsened by inappropriate fire management practices.

Partnerships and co-management play an important role in biodiversity mainstreaming in the country (Manuel et al., 2016). This includes biodiversity stewardship programmes, which have contributed significantly to meeting national protected area targets, at a lower cost to the government than land acquisition (Driver et al., 2012). Such programmes involve agreements between private landowners, communal landowners, and state conservation bodies to protect and manage biodiversity areas (SANBI, 2013).

Barnard and De Villiers (2012) also highlight the important role that scientists and members of the public play in improving the management of biodiversity. For example, since the launch of Protea Atlas Project in 1992, nearly a thousand volunteers have been involved in collecting a lot of information on the distribution of proteas and related plants. However, further efforts are required to widen the interest of all groups in society, as volunteerism is mainly concentrated among the middle and upper classes.

SOURCE: AUTHOR'S COMPOSITION

4.2. Recommendations

The South African government should continue to strive to ensure that economic activities are undertaken but not at a great expense of nature. Project impact and sustainability assessments should take a holistic approach. This should include assessing all impacts on natural capital, including the identification of how the impacts are distributed over various forms of stock and across different time periods (Maddison and Day, 2015). For instance, serious challenges manifest due to the conflict between mining interests and the need to conserve and protect nature. Some mining impacts are multi-scale and transcend generations, which result in socio-environmental costs that far outweigh the economic benefits. This necessitates the need to strengthen feasibility assessments, as well as approval and licensing processes. In particular, capacity building for community leaders and public officials (especially those at the local level) should be enhanced so that they make informed decisions that seek to safeguard nature rather than being overshadowed by the so-called technical experts/consultants who conduct feasibility studies meant to rubberstamp and approve projects whose benefits are far-outweighed by their socio-environmental costs.

In addition, there seems to be a challenge in implementing legislation and ensuring that it is followed. This has been attributed to a weak governance framework. The CER (2016) observes that effective regulation of the negative impacts of mining is compromised by the conflict of interest in the DMR's mandate. On the one hand, the DMR seeks to promote mining, while, on the other hand, it seeks to regulate its environmental impacts. It is therefore important that organs of the state, such as the DMR, play an important role in safeguarding nature by not just putting mining interests at the forefront. It is also evident that legislation stipulates conditions for certain activities to take place. For example, as long as mines have the requisite licences they can operate. However, some mines can use licences that were obtained improperly. Such licences give a leeway for mining operations to take place even in areas where negative impacts on the environment are substantial. It is important to bear in mind that having a licence does not necessarily mean that the activity to be undertaken is suitable for that particular area, as such licences can be obtained without proper pre-feasibility studies and, in some cases, they are corruptly attained. Both public and private officials who make reckless decisions or approve activities that are not in line with the legislation should be made accountable for their decisions. If the sustainability objective is to be achieved, then everyone who is liable should get the necessary penalties to discourage the continued careless disregard for nature.

The demand for inputs derived from nature should be in line with the regenerative capacity of nature. Comprehensive information availability is crucial in assessing sustainability. Having good data and robust analytical systems would help avail the much-needed information to support decision-making and inform policy. This also requires strong monitoring and compliance enforcement. Demand for proper indicators can stimulate investment in research and monitoring systems that promote data collection and enhance the development of concepts (UNEP, 2016). Knowing the tipping points and the scale of change (Kosonen, 2012), as well as defining sustainable use or extraction rates (UNEP, 2016) is necessary for the identification of threats to natural capital. Furthermore, knowing what is available and its location is vital for the sustainable planning, management, and use of resources (DEA et al., 2013). However, putting in place proper measurement and monitoring systems requires significant investment, hence the government and other agencies should increase their funding to bridge the gap.

Promoting the development of green industries and the greening of traditional industries is needed for sustainable industrial development. To minimise the negative impacts on nature, efforts should continue to promote the development of a circular economy, in which enhanced efficiency in both production and consumption processes is

central, while encouraging both reuse and recycling.

Behaviour change is key to the adoption of requisite actions, hence the need to promote awareness as well as incentivising the adoption of ways and means to operationalise the circular economy concept at all levels (individual, household, community, and national). This is already happening in a few industries but, to have significant impact, it should be embraced on a larger scale, and be embedded in the socio-economic fabric of society.

The importance of different players in the conservation and protection of nature should be recognised and embraced. Their inclusion should not just be tokenistic. Collaboration from the state, the private sector, landowners and civil society is crucial (SANBI, 2014). Chan et al. (2016) stress that embracing relational and eudemonic values of nature is essential for the genuine inclusion of diverse stakeholders in the proper stewardship of nature for present and future generations. Taking concerns of all stakeholders into account would help build consensus in the management of nature with likely positive impacts on long-term sustainability.

5 Conclusion

Nature is an important aspect of the environment. Its sustainable use is central to sustainable growth and can be used to ensure that social objectives of inclusion and benefit-sharing are met. This policy paper revealed that besides a lot of challenges, remarkable progress has been made in the country. This includes the formulation of various policies that seek to mainstream the protection and conservation of nature. Significant strides are also being made in the development and implementation of measurement tools. In particular, NCA is already being applied in a few sectors, though there is need for further expansion to cover all sectors. The South African government has done much in the designation of protected and conservation areas. However, more needs to be done to ensure that such areas are well protected and managed so as to achieve the objectives that motivated their designation. At the same time, the private sector is also working on reducing its negative impacts on nature by increasingly incorporating sustainability issues.

Some of the challenges affecting nature are historical, multi-scale and transcend generations. This makes it crucial to ensure that the current developmental trajectory is aligned to address these challenges, while, at the same time, taking a precautionary approach to curb the potential for such challenges in future. Decision-makers at various levels (at the individual, household, community, regional, national, and global levels, as well as company and industry levels) need to be aware and informed of the importance of valuing nature and ensuring that their decisions contribute to its sustainable management. This necessitates having decision-makers that incorporate long-term considerations into their decisions to ensure that nature is preserved for both current and future generations.

The valuation of nature (particularly in incorporating it into economic decision-making) tends to be constrained by challenges in the actual measurement and quantification of stocks and flows of benefits derived from nature, as well as the associated impacts on nature. The unavailability of reliable, timely and valid data is a significant constraint. Because of resource and capacity constraints, there is a need to forge synergetic relationships between government, the private sector, labour unions, communities, academia and civil society. Such partnerships can create incremental benefits and cost savings in data collection and management. In addition, efforts should continue to be focused on improving measurement tools and methods. While the tools and methods are still inadequate, it is important to

point out that using them (though with limitations) is a step in the right direction. What is important is their continuous improvement and tailoring to suit different contexts.

From the policy side, the South African government should continue to ensure that appropriate incentives and disincentives are put in place to promote the sustainable management and conservation of nature. Effort at the national level to promote the valuation of nature should cascade down to the local level, where direct interaction with nature occurs. In particular, the inclusion of local people and communities is necessary to promote good stewardship of nature. Most importantly, capacity building for community leaders and public officials (especially those at the local level) should be enhanced so that they can make informed decisions that seek to safeguard nature. In addition, nurturing social capital and facilitating social learning will create the necessary collaboration and motivation for stakeholders to work together for the common good which is the protection and sustainable utilisation of nature.

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Appendix

TABLE 3: TREND ANALYSIS PER ENVIRONMENTAL FEATURE

Issue	Indicator	Trend
Land	Land degradation	Increasing
	Loss of natural habitat	Increasing
	Soil erosion	Deteriorating
	Invasive alien plants	Deteriorating
	Land contamination	Uncertain
	Deforestation	Increasing
Biodiversity and ecosystem health	Loss of natural habitat	Deteriorating
	Overexploitation of species	Deteriorating
	Threatened species	Deteriorating
	Areas under protection	Improving
	Terrestrial ecosystems	Deteriorating
	Freshwater ecosystems	Deteriorating
	Marine ecosystems	Deteriorating
	Use of GMOs	Increasing
	Ecological footprint	Deteriorating
	State funding for biodiversity	Improving (but only slightly)
Inland water	Water availability	Deteriorating
	Water quality	Deteriorating
	Trophic state of dams	Deteriorating
	Groundwater quality	Deteriorating
	River health	Deteriorating
	Wetlands	Deteriorating
	Freshwater aquaculture	Deteriorating
Oceans and coasts	Oil spill incidents	Very varied over years
	Waste water discharges	Deteriorating
	Blue flag beaches	Deteriorating
	Coastal Clean-up (pollution indicator)	Improving
	Coastal land transformation	Deteriorating
	Fish capture for production	Deteriorating
	Illegal harvesting	Deteriorating
	Marine aquaculture	Improving
	Non-extractive resource use	Improving
	Coastal and marine mining	Deteriorating
	Sea level rise	Deteriorating
	Legislation and policy	Improving

	Expenditure	Improving
Air quality	Indoor and outdoor pollution	Deteriorating
	Vehicle emissions	Deteriorating (although lead emissions ceased to be a problem)
	Domestic fuel burning	Improving
	Industrial emissions	Uncertain due to lack of data
	Biomass burning	Increasing
	Particulate Matter (PM10) concentrations	Deteriorating
	Sulphur dioxide	Stable
	Nitrogen dioxide and ozone	Increasing
	Carbon monoxide	Stable
	Persistent organic pollutants	Largely unknown but potential for deterioration
	Ozone depleting substances	Deteriorating
	Mercury emissions	Largely unknown but potential for deterioration
Climate change	Greenhouse gas emissions	Increasing
	Temperature	Increasing
	Rainfall	Seasonal shifts
Energy	Energy supply	Declining
	Energy intensity linked to energy use	Improving
	Ash and particle emissions from coal fired power generation	Improving
	Air pollution from use of energy in transportation	Uncertain
	Water use and contamination	Uncertain
	Land use and degradation	Increasing
	Availability of clean or renewable energy	Improving
Waste management	General waste management	Improving (but there is still rapid growth in waste volumes)
	Municipal waste removal	Improving
	Illegal dumping of tyres	Increasing
	Available hazardous waste landfill space	No change
	Available landfill space	No change
	Health care risk waste	Improving
	Pesticides	Deteriorating
	Electronic waste	Deteriorating
	Mining waste	Deteriorating
	Capacity to deal with waste	Improving

SOURCE: EXTRACTED FROM THE 2ND SOUTH AFRICA ENVIRONMENT OUTLOOK (DEA, 2016A, PP. 17–26)

This policy paper reviews the role of Nature in South Africa's Transition to Sustainability.

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