National Business Initiative

Business and Ecological Infrastructure

Synthesis of Findings and Recommendations

Ecological Infrastructure for Water Security (EI4WS) Project

Final Report

January 2024

Executive Summary

Project Overview

The Ecological Infrastructure for Water Security (EI4WS) project is funded by the Global Environment Facility (GEF), implemented by the Development Bank of Southern Africa (DBSA) and executed by the South African National Biodiversity Institute (SANBI).

The project is further being implemented in partnership with the Department of Forestry, Fisheries and the Environment (DFFE), Department of Water and Sanitation (DWS), Water Research Commission (WRC) and additional collaborating organisations. The project focuses on improving water security by integrating biodiversity and ecosystem services into planning, finance and development in the water sector.

As a supporting implementing partner, the National Business Initiative (NBI) has made several key contributions to the EI4WS project, including in relation to *Component 3: Social Learning, credible evidence and knowledge management*, and *Component 1.3: Financial Mechanisms for rehabilitation and ongoing maintenance of ecological infrastructure*.

The NBI has played an active role in the EI4WS project, including engaging with specific NBI members, undertaking research, developing key knowledge products, providing targeted support to a variety of project partners, and convening and supporting relevant workshops and conferences.

This report does not seek to outline all areas of NBI's involvement in the EI4WS project, but rather is intended to provide a synthesis of the key themes and findings from the work undertaken. This document therefore aims to:

1. Summarise the main learning outcomes derived from the research and engagement undertaken by the NBI
2. Provide recommendations on future activities and areas of focus in relation to business and ecological infrastructure

A list of additional supporting documents and outputs developed by the NBI within the project is provided in Annexure A.

Key Findings

The decline of ecosystem services is a significant risk to the South African economy and business.

Risk that manifests in relation to ecological infrastructure is based on both direct and indirect dependencies on a range of ecosystem services across the primary, secondary and tertiary sectors of the South African economy (Lazaro et al, 2023). As noted in Figure 2, the South African economy is heavily reliant on the flow of ecosystem services for economic output and export related earnings.

From a water security perspective alone, the decline of ecosystem services has an important bearing not only on the wider economy, but a broad spectrum of the private sector. The interconnection of companies and ecosystem services is exhibited in a variety of risk factors and detrimental impacts experienced by companies, including through the decline of risk reduction elements within the natural system.

Beyond a pure focus on company operations, significant value at risk can also be expected in company value chains, as the risk drivers above manifest throughout their supply chain, with associated knock-on effects for costs, supplier reliability and client relationships.

Business can derive value from ecological infrastructure in a variety of ways.

The drivers of business behaviour are multi-faceted. While there is understandably a strong emphasis within companies on short-term commercial gain (either through increased revenues or reduced costs), businesses are also influenced by other factors.

For example, risk management practices may not have an immediate financial benefit but can be key for maintaining revenues and costs in the medium to long-term. A company's reputation is also critical, as is ongoing business continuity and the social licence to operate.

The NBI's high-level illustrative framework for thinking through the levers that influence company behaviour is outlined in Figure 4. The figure highlights that while it is tempting to consider that companies only act in response to legal compliance or where there is a clearly 'bankable' project with direct financial benefit, this is too narrow a view. Nor are company efforts limited to philanthropic corporate social investment (CSI) activity.

Each of the levers depicted is a potential enabler of company action, depending on the sector and company in question. This framework is important to bear in mind in fields where the opportunities for commercially viable projects may be more limited, such as in the ecological infrastructure space.

A range of stakeholders, such as investors, customers, competitors and clients, can have a significant influence on the behaviour and direction of companies. Much of this resultant company action supports medium-term competitiveness, but is not characterised by immediate financial gain. As such, a wider understanding of what motivates company action is important when thinking about areas such as ecosystem services, and how effective company responses can be supported, accelerated or scaled.

There are industry efforts that can be built upon.

Several leading companies and industries in South Africa are undertaking a meaningful degree of work in relation to ecological infrastructure. The current enablers of industry efforts identified are summarised in Table 1.

In addition to efforts that are known to be underway, there are additional emerging enablers that could significantly scale action on nature-based solutions in the coming years, which are outlined in Figure 5.

Both the current identified and emerging drivers provide a strong starting point for assessing the approaches and tools that can be used to engage with business on ecological infrastructure, and support their uptake of nature-based solutions over time.

Certain data, information and evidence can strengthen private sector uptake.

There are important data gaps and evidence needs, which if filled, will strengthen company efforts on ecological infrastructure. Much of this information relates to making the link between company operations, healthy catchments and the engineered water system more explicit, but is also intended to demystify certain specific areas. The types of information and evidence that can be expected to support private sector work and uptake in relation ecological infrastructure are outlined in Figure 6.

Unlocking the invasive biomass economy will bring economic and ecological value.

The NBI further considered to what extent there may be commercially viable opportunities linked to nature positive efforts, with a focus on the use or beneficiation of the biomass derived from the clearing of invasive alien plants (IAPs). The focus here was placed on a specific intervention that could bring a level of financial return, but also support livelihoods, ecosystem restoration and wider economic development. Invasive alien plants are of particular concern in South Africa, given their impact on South Africa's scarce water resources and economic development.

The NBI noted that there are certain revenues that can be generated from the biomass derived from invasive alien plants. However, just as important are the new land uses and economic activities that are unlocked when sustainable clearing of invasives takes place. Far from being a once-off benefit, the activities of clearing, harvesting and beneficiation of invasive alien biomass can set in motion a virtuous cycle that provides lasting business, societal and ecological benefits, as described in Figure 7.

More specifically, companies can benefit through:

1. Generating revenue flows that also reduce their water and fire risk
2. Facilitating operational improvements, emission reductions and improved legal compliance
3. Offering strong opportunities to support enterprise supplier development, as well as surrounding community upliftment

The alien invasive biomass economy has the potential to significantly support South Africa's future water security and economic development, while offering tangible benefits for companies. The benefits achieved are also likely to be widespread. The clearing of thirsty invasive trees, their subsequent beneficiation into value-added products and the opening up of new economic activities, will support the financial well-being of small businesses, commercial farmers, companies and lenders alike. Invasive alien biomass can thus be considered one of the most under-utilised resources in the landscape.

There are immediate, globally recognised next steps that any company can take on nature.

Through the work of The Nature Conservancy, WWF, CDP, the Taskforce on Nature-related Financial Disclosures (TNFD) and others, the linkages between business and ecosystems has advanced considerably in recent years, providing companies with clear frameworks and roadmaps on the business and nature journey.

The global coalition, *Business for Nature*, has also made clear the overall next steps that companies can take, as they advance on their nature positive journey.

These immediate next steps, combined with the tools and approaches outlined in this report, provide a valuable contribution to efforts to support and scale business action on ecological infrastructure, in support of a climate resilient, water secure future.

The TNFD recommendations can enable effective company disclosure on ecological infrastructure.

While still in its infancy, the Taskforce on Nature-related Financial Disclosures has undergone a rigorous 2-year development process and provides a comprehensive set of recommendations for organisations to identify and report on their material nature-related impacts, dependencies, risks and opportunities, in a globally recognised manner.

The TNFD has also placed strong emphasis on aligning with current global reporting tools and frameworks, including but not limited to the related Task Force on Climate-Related Financial Disclosures (TCFD) guidance.

TNFD adopts a comprehensive approach and allows for consideration and disclosure in relation to 4 distinct areas (or scopes), namely: direct operations, upstream, downstream and financed activities. This approach allows for organisations to report not only on their direct operational activities and wider value chain, but critically allows for the disclosure of key risks and opportunities within investment portfolios, which is critical in relation to the financial sector.

TNFD further expressly acknowledges the requirement that the impact on company revenues, assets and business activities should be quantified in financial terms, when organisations assess their nature-related risks and opportunities. This process assists companies to properly appreciate their level of risk, and to be internally aware of the cost of non-action (or the value of the opportunity) in monetary terms.

This approach also serves to place nature-related decision making on a more equal footing in companies, and allows for organisation-wide communication within the language of traditional financial decision making. This approach will in turn filter into company investor relations, providing a stronger impetus for company and investor action towards nature positive outcomes, as nature risk is increasingly quantified and internalised.

Equally importantly, TNFD has highlighted their intention to develop future guidance on company net zero transition plans, including *the role of nature in climate transition*, and the role of these transition plans in achieving nature positive goals and targets. This points to the interconnectedness of climate, water and biodiversity issues, and the need to adopt a systemic approach when addressing climate change, given the ecological base on which all climate transition plans depend, from a water and ecological services perspective.

It is certainly possible and desirable to advance carbon transition plans that support other environmental objectives. Even as societies and businesses decarbonise, it is essential to protect natural systems, including in support of reduced vulnerabilities to the physical impacts of climate change that are now unavoidable.

A collaborative business-government community of practice will aid implementation.

There are several strong existing communities of practice (COPs) on nature in South Africa, including the Sustainable Finance Coalition (which focuses on innovative financing mechanisms for biodiversity) and the National Business and Biodiversity Network (NBBN), which focuses on private sector engagement.

With that said, at present there is not an active community of practice at a macro level which has a specific focus on business-government collaboration on biodiversity. A dedicated business and government national platform, which acts as an overarching forum on biodiversity-related issues, is therefore proposed for development. This business-government forum would work to:

- Build common understanding and strengthened relationships on ecological infrastructure across business and government
- Share relevant tools, information and frameworks across all parties
- Support collective resource mobilisation
- Enable collaborative planning and the de-risking of implementation

- Help facilitate the wider uptake of other effective conservation measures by business

Such a forum would benefit from the involvement of representative business organisations and voluntary business movements in South Africa. Equally, active involvement by DFFE and SANBI would be critical, as would participation from the major existing communities of practice currently active in the country, in order to draw on their insights and experience.

Conclusion

Business and industry are currently engaged to a reasonable extent in both the theory and practice of ecological infrastructure for water security. These existing practices can be built upon, both by sharing learnings across industry, but also by building on the main drivers of corporate action.

A range of approaches and enablers are needed to engage effectively with business, given that industries differ widely, including in terms of their products and services, water needs, level of biodiversity risk, organisational culture and types of investors.

The enablers identified in this document, combined with the understanding of the key business opportunities, provides a strong starting point for engaging further with business on ecological infrastructure, and to support their action on nature over time.

The role of ecosystem services in supporting company climate adaptation, supply chain resilience and operational risk management cannot be understated. As some of South Africa's major companies and cities have now learnt, we can no longer rely purely on our engineered infrastructure to just 'work', especially with climate change.

Nature positive approaches also represent a key means for corporate South Africa to support the wider just transition. Company net zero transition plans should arguably incorporate opportunities for nature positive development, and further understand the role of water and ecosystems in the achievement of company climate goals.

Restoring ecosystem services and protecting our natural heritage will enhance corporate water security, build climate resilience and unlock future land uses, helping business to play a significant role in tackling South Africa's critical challenges of poverty, inequality and unemployment.

Recommendations

It is recommended that the following activities and focus areas be taken forward in relation to the role of business in supporting ecological infrastructure:

1. Work with trusted intermediaries to further enhance the capacity of business to engage on nature, incorporating the use of best practice science, economic analysis, tools and approaches
2. Showcase company best practice on nature, and facilitate peer learning across sectors, providing tangible evidence to industry of the benefits of improved ecosystem services
3. Work to foster the linkages between nature, climate resilience, water security and the achievement of the just transition. Place strong emphasis on role of nature in net zero climate transition plans and ensuring that transition plans achieve nature positive goals

4. Unpack the opportunities related to biodiversity offsets and carbon offsets, where feasible, warranted and appropriate
5. Continue the work on enabling financial mechanisms more broadly within the sector. This includes the role of tax incentives, conservation bonds, green bonds and the blending of grant/public finance with commercial finance
6. Link ecological infrastructure more closely to infrastructure finance in general, to incorporate necessary ecosystem services into the financial models for infrastructure development, from both a capital expenditure and operational expenditure perspective
7. Adress key private sector data, information and evidence needs, in support of effective company engagement and action
8. Build off the launch of TNFD and the emphasis on corporate sustainability reporting more generally, to bring biodiversity closer to the fore. This includes companies assessing their key financial risks and opportunities from nature, and identifying priority geographical areas of intervention
9. Build a stronger community of practice more broadly on nature between business, government and civil society, to advance biodiversity related policy, finance and implementation

Acknowledgements

The authors wish to acknowledge:

- The Global Environment Facility (GEF) for their generous support of the Ecological Infrastructure for Water Security (EI4WS) project
- Dr Michelle Hiestermann (WRC), Mr. John Dini (WRC), Dr Roderick Juba (WRC) and Ms. Alex Marsh (SANBI) for their support and guidance
- Our various interviewees, reference group members and NBI members, for their valuable insight and contributions throughout the course of this work
- The NBI team that contributed to this project, namely Ms. Quraisha Bux, Ms. Mmaphefo Thwala, Ms. Alexa Brown-Robinson and Mr. Garth Barnes

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WRC Project Number: K5/2985

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Acronyms

AWS	Alliance for Water Stewardship
BASA	Banking Association South Africa
BUSA	Business Unity South Africa
CARA	Conservation of Agricultural Resources Act, No. 43 of 1983
CDP	Formerly the *Carbon Disclosure Project*
COP	Community of Practice
DBSA	Development Bank of Southern Africa
DFFE	Department of Forestry, Fisheries and Environment
DWS	Department of Water and Sanitation
ECSA	Engineering Council of South Africa
EI	Ecological Infrastructure
EI4WS	Ecological Infrastructure for Water Security
FSC	Forestry Stewardship Council
GEF	Global Environment Facility
IAP	Invasive Alien Plant
IoDSA	Institute of Directors South Africa
IRMSA	Institute of Risk Management South Africa
NBI	National Business Initiative
NEMBA	National Environmental Management Biodiversity Act, No. 10 of 2004
NRM	Natural Resource Management
SAICA	South African Institute of Chartered Accountants
SAICE	South African Institution of Civil Engineering
SANBI	South African National Biodiversity Institute
SDG	Sustainable Development Goal
SETA	Sector Education and Training Authority
SMME	Small, Medium and Micro Enterprise
TCFD	Task Force on Climate-Related Financial Disclosures
TNFD	Taskforce on Nature-Related Financial Disclosures
WRC	Water Research Commission
WWF-SA	World Wide Fund for Nature South Africa

1 Introduction

1.1 Project background

The Ecological Infrastructure[1] for Water Security (EI4WS) project is funded by the Global Environment Facility (GEF), implemented by the Development Bank of Southern Africa (DBSA), and executed by the South African National Biodiversity Institute (SANBI).

The project is being implemented in partnership with the Department of Forestry, Fisheries and the Environment (DFFE), Department of Water and Sanitation (DWS), Water Research Commission (WRC) and additional collaborating organisations. The project focuses on improving water security by integrating biodiversity and ecosystem services into planning, finance and development in the water sector.

As a supporting implementing partner, the National Business Initiative (NBI) has made several key contributions to the EI4WS project, including in relation to *Component 3: Social Learning, credible evidence and knowledge management*, and *Component 1.3: Financial Mechanisms for rehabilitation and ongoing maintenance of ecological infrastructure*.

The NBI played a substantive role in the EI4WS project, including engaging with specific NBI members, undertaking research, developing key knowledge products, providing technical assistance to a variety of project partners, and convening and supporting relevant workshops and conferences.

The NBI's project role further included engaging widely with the business community, and providing a private sector lens in relation to ecological infrastructure. 'Business' in this context is defined broadly and includes large companies, industry associations, state owned enterprises, banks and investors. Small companies were, however, outside the scope of consideration.

1.2 Overview of NBI's approach

Intermediary institutions such as the NBI are key for partnerships and innovation to occur, through their ability to build bridges between business, government and civil society. Within the project the NBI worked to translate and package the EI4WS outputs for specific target audiences, supported the cross-sectoral dialogue needed to engender trust building and creative problem solving, and facilitated the uptake of project findings through existing NBI engagement channels.

Key to the NBI's approach has been:

- Drawing in generally less well understood perspectives in the biodiversity arena (specifically private sector companies, industry bodies and finance institutions) to identify their needs, responses and approaches towards supporting water security through ecosystem-based approaches
- Drawing in credible evidence from the EI4WS project into business forums and dialogues, as well as packaging this evidence in business language, drawing on NBI's existing relationships
- Engaging key stakeholders within the business and finance community on the project and its findings and results, in support of scalability and impact

[1] Ecological infrastructure refers to healthy mountain catchments, rivers, wetlands, coastal dunes, landscapes and corridors of natural habitat.

- Supporting transparent and constructive cross-sectoral dialogue, in a manner that seeks commonalities and is solution oriented, drawing on expertise from across the public, private and civil society sectors
- Assisting in the formulation and implementation of the overall EI4WS strategy for knowledge management and social learning, in agreed upon areas

In undertaking this work, the NBI employed innovative methods in terms of process, the fostering of social dialogue and effective communication with the private sector, as outlined below.

In terms of process and social dialogue:

In the course of the project the NBI drew from a range of private sector perspectives on enhancing catchment management in South Africa, with a focus on ecological infrastructure. The NBI also specifically applied its finance expertise to the challenge of financing biodiversity related activities.

The NBI further employed innovative means to foster effective public, private and civil society dialogue. This approach drew on two successful partnerships initiated and managed by the NBI in the water sector: the Western Cape Water Task Force (which ran from 2016 to 2018) and the ongoing uMhlathuze Water Stewardship Partnership (UWASP), both of which are leading examples of multi-stakeholder collaboration in the national water arena. Lessons from these partnerships were actively applied to the project where relevant.

In terms of private sector communication, addressing commercial priorities and business language:

Finally, the translation of ecological infrastructure debates, initiatives and planning into business language and business focused communications was an important outcome of the NBI's work and approach, to strengthen their uptake.

Linkages between company-based business continuity planning, risk management, cost savings and water security were consistently identified and explored. This included attempts by companies to quantify the financial benefits of corporate water stewardship practice for their specific operations, which is an embryonic field globally at present.

1.3 NBI's project specific methodology

The NBI's project specific methodology is briefly summarised below. The project included desktop study, stakeholder mapping, one-on-one individual meetings and interviews, focused workshops, roundtables and events, the development of project specific outputs, and various dissemination activities.

The specific areas of NBI involvement are outlined below:

A. Development and implementation of EI4WS social learning strategy:

- This area of work focused on supporting the formulation and implementation of the overarching EI4WS knowledge management and social learning strategy, where appropriate. This included working closely with the service provider tasked with the strategy's

development, and the overall Component 3 Working Group on *Knowledge Management and Social Learning*

- Applying lessons learnt from other existing multi-stakeholder partnerships managed by the NBI to the EI4WS project, both in the strategy's development and its rollout
- Mapping out key relevant business sector stakeholders and their needs, to ascertain what would enhance their project engagement and uptake

B. Convening and participating in strategically identified platforms, learning alliances and dialogues with key stakeholders and partners

- This included participating in and contributing to a wide range of project forums and workshops, as well as presenting at various SANBI, WRC and other external workshops
- Leading and hosting NBI's own dedicated workshops and events
- Conducting over 30 individual interviews with key identified companies, industry bodies and finance institutions. The team developed a semi-structured interview questionnaire that was used to illicit responses on the key barriers to the development and financing of ecological infrastructure, as well as the data, tools and evidence required to support company decision-making and the uptake of biodiversity. A key component of these individual engagements included to consider what (if any) commercially viable business models could potentially be applied to ecological infrastructure

C. Working with partners to interpret and translate the project's technical outputs, capture lessons and co-produce knowledge products

- This activity focused on translating key project outputs into concise, business language and business friendly formats, in support of advanced communications. Key outputs included developing presentations, articles and a summary infographic for use under the project

D. Working with the private, public, and civil society sectors to develop and implement catchment-wide solutions to water security

- This activity focused on drawing on NBI's existing networks to specifically support the convening of business role-players (and the bringing of private sector expertise more broadly) into the project's pilot catchments located in the Western Cape and KwaZulu-Natal Province

E. Providing support to the Component 3 Working Group

- This activity focused on working closely with the project's Component 3 Working Group on *Knowledge Management and Social Learning*, to support internal knowledge sharing, coordination and collaboration

1.4 NBI's main project outputs

1.4.1 Learning from corporate engagement

Throughout the project the NBI has been able to draw in a range of private sector perspectives on enhancing ecological infrastructure in South Africa. This corporate engagement informed our approach, focus areas and research related outputs. The NBI also specifically applied its finance related expertise to the challenge of financing ecological infrastructure, with a focus on the role and investment decision making of companies.

The major findings of these private sector engagements are outlined in detail in two supplementary documents to this report, namely:

- NBI (2019) *Business Needs and Enablers: Ecological Infrastructure for Water Security*
- NBI (2022) *Unlocking Corporate Investment in the Invasive Biomass Economy*

Key findings from the above documents are summarised in this report.

1.4.2 Communicating with a business audience

The translation of ecological infrastructure debates, initiatives and planning into business focused communications formed an important aspect of the NBI's work. This included emphasis on how water and nature can form part of wider corporate strategy, performance, and public disclosure.

Linkages between company-based business continuity planning, risk management, cost savings and water security were further identified and explored. This included alignment with the release of critical enabling documents in the course of the project, including the Task Force on Climate-Related Financial Disclosures (TCFD), and in the final stages of NBI's project involvement, the Taskforce on Nature-Related Financial Disclosures (TNFD).

Key presentations, articles and infographics developed by the NBI in order position the project and its work for a business audience include the following:

- NBI (2020) Presentation on *The Green Stimulus Opportunity in South Africa*
- NBI (2020) Presentation on *Nature-Based Solutions for Water Security*
- NBI (2020) Article on '*Nature for Recovery and Resilience'*
- NBI (2021) Infographic on *'Ecological Infrastructure is Key for South Africa's Water Security'*
- NBI (2021) Project background presentation on *Ecological Infrastructure for Water Security*
- NBI (2023) Presentation on *Nature-Related Financial Risks and Opportunities in South Africa*

Once again, key findings from the above documents are summarised in this report.

A full list of additional supporting outputs developed by the NBI within the project is provided in Annexure A and are available upon request.

1.5 Objectives of this report

This report does not seek to outline all areas of NBI's involvement in the EI4WS project, but rather is intended to provide a synthesis of the key themes and findings from the work undertaken. This document therefore aims to:

1. Summarise the main learning outcomes derived from the research and engagement undertaken by the NBI
2. Provide recommendations on future activities and focus areas for business and ecological infrastructure

2 Key Findings

2.1 Ecological infrastructure is essential for company water security

It is increasingly recognised, including with the National Water and Sanitation Master Plan (DWS, 2019), that natural infrastructure and engineered infrastructure form an *integrated* system in South Africa, and that both are required for effective and consistent water delivery to take place for cities and communities.

The linkages between ecological infrastructure, engineered infrastructure and the water resilience of human settlements, is displayed graphically in Figure 1 below:

Figure 1: The role of the natural system in engineered water supply

Source: NBI (2021) *EI4WS Project Summary Infographic*.

Growing national and international recognition of the interrelationship between natural systems and engineered infrastructure has led to increased emphasis on the concepts of 'nature-based solutions' and 'ecological infrastructure'. As stated by UN-Water:

> "Nature-based solutions are able to enhance overall water security by improving water availability and water quality while simultaneously reducing water-related risks and generating additional social, economic and environmental co-benefits" (UN-Water, 2018 p5).

Nature-based approaches offer a variety of social, ecological and economic benefits of strong relevance to South Africa and its diversified economy, including:

- Increasing water yield at a competitive cost
- Improving water quality
- Supporting food security

- Reducing flood damage
- Reducing fire risk (from the reduced growth of invasive alien vegetation)
- Enhancing carbon sequestration (through the preservation of natural carbon sinks)
- Enabling tourism and eco-tourism
- Developing rural economies

As a corollary to this, the decline of ecological infrastructure brings with it important economic risks for society and financial risks for companies. This relates to both declining water availability and quality, as well as increased exposure to shocks and extreme weather events, as discussed further below.

2.2 The decline of ecosystem services is a significant risk to the South African economy

Risk that manifests in relation to ecological infrastructure is based on both direct *and* indirect dependencies on a range of ecosystem services across the primary, secondary and tertiary sectors of the South African economy (Lazaro et al, 2023).

Figure 2 below highlights some of the inherent risk to the South African economy from both the abrupt and gradual decline of ecosystem services:

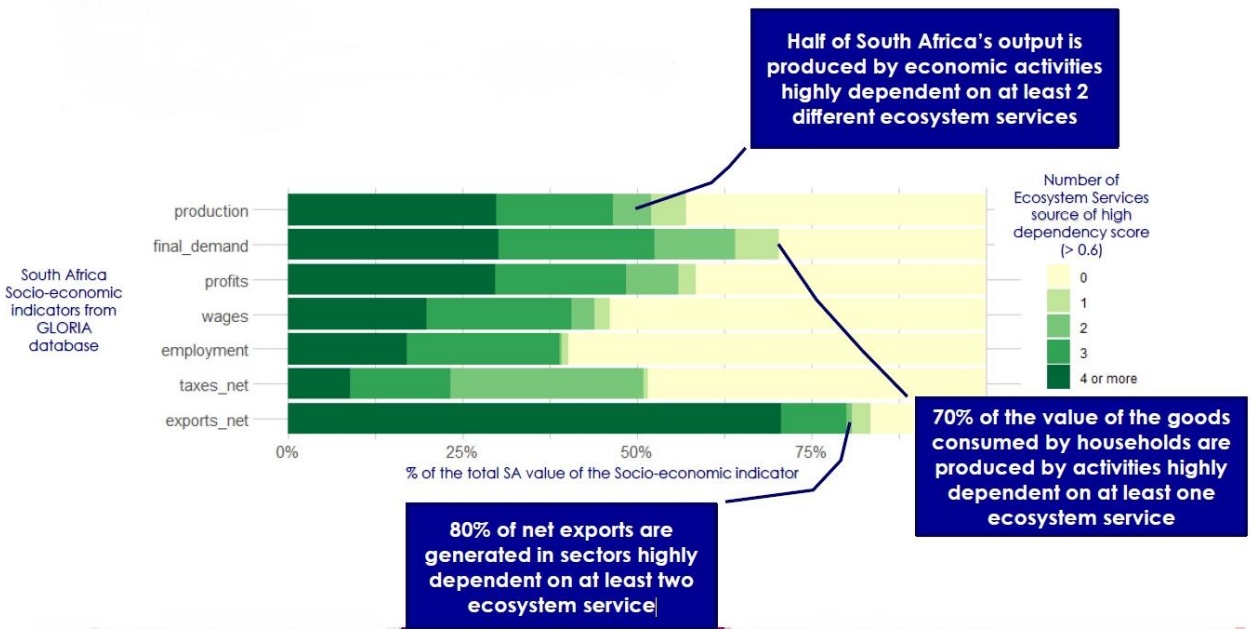

Figure 2: Key economic dependencies on ecosystem services in South Africa

Source: Lazaro et al. (2023). *Nature-related risks and opportunities in South Africa: A socioeconomic, financial and spatially-explicit assessment, synthesis of a working paper*.

As noted in Figure 2 above, the South African economy is heavily reliant on the flow of ecosystem services for economic output and export related earnings. From a water availability perspective alone, the decline of ecosystem services has an important bearing on a broad spectrum of the private sector, including commercial agriculture, mining and manufacturing (Lazaro et al, 2023).

The interconnection of companies and ecosystem services is exhibited in a variety of risk factors and detrimental impacts experienced by companies, including through the decline of risk reduction elements within the natural system.

Key *operational* risk factors and detrimental impacts already reported by companies in South Africa, at the interface of ecological infrastructure and water, are illustrated in Figure 3 below.

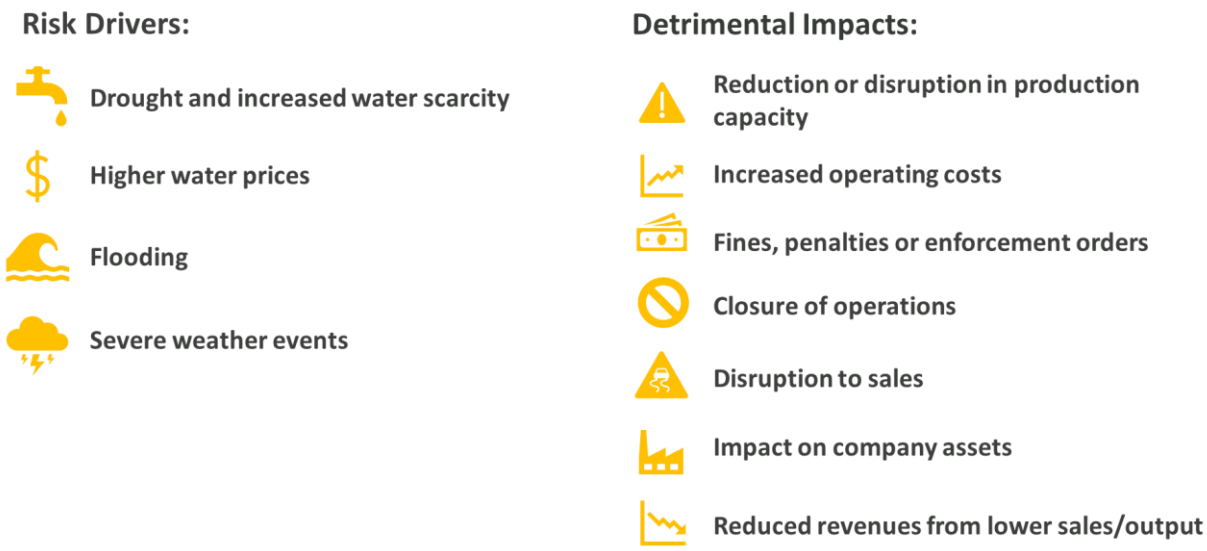

Figure 3: Key operational risks and detrimental impacts for business from the decline of ecosystem services

Source: NBI (2020) *CDP Water in South Africa 2019: Water for Economic Development.*

Beyond a limited focus on company operations (as outlined in Figure 3 above), significant risk can also be expected to reside in company *value chains*, as the risk drivers above manifest throughout their supply chain, with associated knock-on effects for costs, supplier reliability and client relationships.

An increased understanding of the risks posed to business by nature, both for their operations and value chain, does however provide opportunities for companies to strengthen their business continuity planning and build improved relationships with investors, policymakers and communities, as outlined below.

2.3 Business can derive value from ecological infrastructure in a variety of ways

The drivers of business behaviour are multi-faceted. While there is understandably a strong emphasis within companies on direct short-term financial gain (either through increased revenues or reduced costs), businesses are also influenced by other factors.

For example, risk management practices may not have an immediate financial benefit but can be key for maintaining revenues and costs in the medium to long-term. A company's reputation is also critical, as is ongoing business continuity and the social licence to operate.

The NBI's high-level illustrative framework for thinking through the levers that influence company behaviour is outlined in Figure 4 below. The figure, while not exhaustive, does highlight that while it is tempting to consider that companies only act in response to legal compliance or where there is a clearly 'bankable' project with direct financial benefit, this is a very narrow view. Nor are company efforts on nature limited to philanthropic corporate social investment (CSI) activity.

Each of the levers depicted in Figure 4 is a potential enabler of company action, depending on the sector and company in question. This framework is important to bear in mind in fields where the opportunities for commercially viable projects may be more limited, such as in the ecological infrastructure space.

A range of stakeholders, such as investors, customers, unions, competitors and clients, can have a significant influence on the behaviour and direction of companies, as discussed further below. Much of this resultant company action supports medium-term competitiveness, but is not characterised by immediate financial gain. As such, a wider understanding of what motivates company action is important when thinking about areas such as ecosystem services, and how effective company responses can be supported, accelerated or scaled.

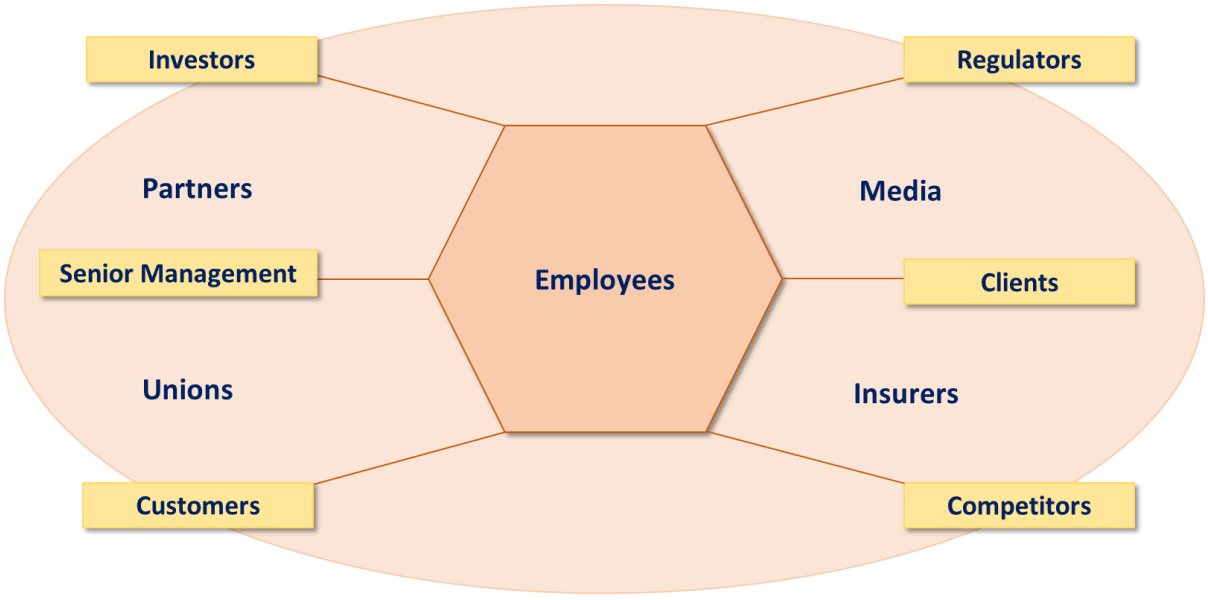

Figure 4: Illustrative overview of key drivers of corporate behaviour

Source: NBI (2019) *Business Needs and Enablers: Ecological Infrastructure for Water Security.*

A brief explanation of key role-players outlined in Figure 4 that are considered to have an important current bearing on ecological infrastructure, is provided below:

Investors

- Investors and financiers have a strong ability to influence company decision-making and areas of focus. In the case of ecological infrastructure, it is imperative to make the case for the high direct and indirect dependencies of specific industries on ecosystem services, and therefore the potentially significant risk located in investment portfolios as a result of ecological decline.
- As a shareholder, active investors have the ability (and responsibility) to validate that the companies they invest in address the material risks located in their operations and value chain, which can include nature-related financial risk.
- The role of investors in supporting improved ecological infrastructure is elaborated on in latter portions of this document.

Regulators

- Compliance with legislation and regulation is key for any company. Other important influences of company behaviour that are led by regulators include taxes, incentives and subsidies.
- In the case of ecological infrastructure, a key focus here is on ensuring company compliance with water use license conditions and discharge limits into water bodies, compliance with any extended producer responsibility legislation that may be applicable to their sector, as well as awareness of the legal requirement for landowners to clear specific invasive alien plants from their land. South Africa now also has two biodiversity related tax incentives that can be taken advantage of by the private sector.

Senior Management

- CEOs and senior executives are the primary decision makers within companies. They are also accountable to the company board and investors.
- To the extent that senior executives have specific key performance indicators linked to addressing biodiversity risk, backed by board oversight, so they can be expected to prioritise addressing an organisation's nature and water-related risks and opportunities.

Employees

- Employees are the heart of any organisation. They are also the driving force behind any change. As for senior management, their buy-in to a new approach is essential. They can also be critical in sparking internal change.
- From conceptualisation to implementation to disclosure, employees play a vital part in addressing nature-related issues.

Partners

- Partner organisations provide support, motivation, information, bridge-building, recognition and access to new networks. They also conduct research, develop tools and standards, as well as implement pilot projects, and have the ability to influence companies to varying degrees.
- This context is no different in South Africa, where a number of established civil society groups and non-profit organisations have implemented leading conservation efforts, often in partnership with business, for decades. This well-established partner network is an important enabler of biodiversity improvement in South Africa.

Clients

- By clients we refer to large buyers of a company's goods and services within their value chain. It is important to distinguish here between a company's large corporate buyers (clients) and individual public buyers (customers). Clients can have significant influence over company behaviour, including cascading their own organisational social and environmental objectives to key companies within their supply chain.
- Of greatest relevance to nature is the extent to which large companies engage with their suppliers on their climate, nature, and water goals. If large companies place pressure on their supply chain to improve their environmental performance, there is a good chance these efforts will not go unrewarded. Several South African companies run sophisticated engagement programmes on environmental issues with their main suppliers.

Customers

- An increasing number of customers consider social and environmental aspects in their purchasing. Companies that are 'customer facing' and thus have an immediate relationship to their customers (such as retailers) are often most influenced by changes in consumer preferences.
- Arguably the most recent example of this has been growing consumer concern related to the impact of single use and non-recyclable plastics on river systems and oceans. This consumer pressure, backed by a responsive retail and manufacturing sector, has helped accelerate action across the entire plastics value chain to reduce non-recyclable plastic in the market, and increase the volume of recycled plastic in use and in store. This effort can be expected to have a positive impact on ecological infrastructure, through reducing the volume of plastic waste that would otherwise enter South Africa's rivers.

Competitors

- Companies do not want to be outpaced or outdone by their competitors. Companies that lead in a certain direction or adopt a practice to obtain a competitive advantage can influence other companies in their sector, as well as in the broader economy.
- For companies that have a significant reliance on ecosystem services for their product or service, there is an immediate opportunity for improved reputation, risk management, access to capital and price differentiation, through leadership on nature and water.
- Backed by growing global and local concern, environmental goals can help companies outcompete others in the market.

The drivers of company action outlined above are already playing out in South Africa on ecological infrastructure to a reasonable extent. As a result, certain enablers and company efforts are already in place that can be strengthened over time.

2.4 There are industry efforts that can be built upon

Several leading companies and industries in South Africa are undertaking meaningful work in relation to ecological infrastructure, drawing on the levers outlined in Figure 4 above. The **current enablers** of this company action on nature, as specifically identified by the NBI within the EI4WS project, are discussed in more detail in Table 1 below.

Table 1: Current identified enablers of corporate engagement on ecological infrastructure

Enabler	Description
Partner Institution	• Industry bodies, NGOs and business oriented non-profit organisations have played a considerable role in supporting company maturity on water and the role of nature-based solutions • As enablers, these institutions raise awareness, build company capacity, outline the business case for action, support peer learning and facilitate company recognition • Leading NGOs in South Africa, such as the Endangered Wildlife Trust (EWT), The Nature Conservancy (TNC), Birdlife South Africa and WWF South Africa, to name a few, have worked as implementation partners on conservation and restoration projects across the country with corporate South Africa for decades
Investor Interest and Action	• Investor interest and action is critical to the development of future CEO and Board level champions. What a company's investors pay attention to, so does the company's senior management. It is for this reason that the NBI has served as the local implementation partner to CDP since 2007 • CDP is the world's largest investor-led initiative focused on improving company environmental performance active globally. CDP Water data forms a key repository of knowledge on corporate water management in South Africa, with a focus on large, listed companies • CDP, along with other key investor disclosure platforms, such as the Global Reporting Initiative (GRI), have arguably played a key role in the domestic market by encouraging Board and senior leadership oversight for climate change and water security in large companies, and strengthening investor ties and visibility on environmental issues more broadly
Use of Water Risk Assessment Tools (primarily the WWF Water Risk Filter, but also the WRI Aqueduct and Ceres Aqua Gauge)	• CDP Water data suggests that the WWF's Water Risk Filter is second only to WRI's Aqueduct in the application of an external water tool by large, listed companies in South Africa • While not influential for all businesses, depending on the nature of their work, tools such as the Water Risk Filter can make a discernible difference for specific companies. These tools are often employed as part of the process of company disclosure to key stakeholders and investors, and are an important part of company water risk management

Enabler	Description
CEO Champion	• In a number of instances a CEO champion is in place on biodiversity in South Africa, who has driven nature and water as a company focus area and imperative. This top-level buy-in supports internal operational measures and aids companies in engaging externally in catchment management
International Environmental Standards (ISO 14001: Environmental Management System)	• The emphasis on continuous improvement within ISO 14001 can be regarded as an enabler. New methods and approaches are encouraged to ensure adequate compliance, such as engaging more closely with a company's external environment and seeking environmental improvement outside of their own operations • Companies that indicate accreditation under the ISO 14001 standard are therefore arguably good potential partners in catchment management related activities • Practical examples have been cited in South Africa where ISO 14001 accreditation has supported companies in working on nature outside of their factory fence
International Water Stewardship Standard (Alliance for Water Stewardship (AWS) Standard)	• The globally recognised Alliance for Water Stewardship (AWS) standard has been in place since 2014 and assisted hundreds of companies to raise the profile of water and see the value of engagement with their external environment. The certification of specific facilities to the standard strongly encourages companies to think beyond their fenceline • AWS is currently most influential amongst the forestry, food and beverage, agriculture, electronics and manufacturing sectors, including in South Africa • A list of AWS certified sites globally can be accessed here: https://a4ws.org/certification/certified-sites/. In reviewing this list bear in mind that a number of companies use AWS on a voluntary, non-public basis
Contextual Water Targets and Water Stewardship	• The concept of 'contextual water targets' has been in place since 2019 and focuses on how company water targets move beyond narrow operational targets, to adopt a much more catchment wide approach • This approach to target setting encourages companies to consider the wider 'water system' in which they are located, and to consider how they can contribute to the integrity of this system as a whole, rather than a more traditional focus on a company's own water use and discharges • This approach to target setting recognises that while companies must make important operational improvements, ultimately they need to exist in a well-functioning water system to ensure their water security and social license to operate • A successful contextual water targets pilot took place in South Africa in 2019, and the emphasis on setting catchment wide water targets remains a key element in corporate water stewardship
Supply Chain Risk	• Water related supply chain risk is a major driver of business action on water outside of a company's own operations, particularly in the manufacturing, retail, and food & beverage sectors in South Africa

Enabler	Description
Enterprise Supplier Development	• This opportunity would appear to apply most directly to companies in the food and beverage sector that work to support emerging farmers • While supporting emerging farmers, an opportunity has been generated for the company to include a focus on sustainable farming practices with their supply chain

Source: NBI (2019) *Business Needs and Enablers: Ecological Infrastructure for Water Security.*

In addition to the areas of existing practice outlined in the table above, there are also additional *emerging* enablers of enhanced corporate action on biodiversity and ecological infrastructure, as outlined in Figure 5 below.

2.5 There are several emergent enablers that can be leveraged

In addition to efforts that are known to be underway in South Africa, there are additional enablers that could significantly scale action on nature-based solutions in the coming years. Overall, we have identified 8 major **emerging or potential enablers**, as illustrated in Figure 5 below, which are at varying stages of maturity.

Figure 5: Potentially significant future drivers of company action on nature in South Africa

Source: NBI (2019) *Business Needs and Enablers: Ecological Infrastructure for Water Security.*

Table 2 below discusses a selection of these emerging potential drivers in more depth.

Table 2: Future potential signifcant enablers of corporate action on ecological infrastructure

Enabler	Description
The Task Force on Climate - Related Financial Disclosures (TCFD) and Taskforce on Nature-Related Financial Disclosures (TNFD)	• The Task Force on Climate-Related Financial Disclosures (TCFD) was established in 2015 by the Financial Stability Board (FSB). Since its publication in 2017, the recommendations of the TCFD have attracted significant local and international interest from companies and investors • Over time, the TCFD could be a major driver of change, as domestic companies are forced to strengthen their water resilience to curb their potential scrutiny by investors, given their financial exposure to the physical impacts of climate change • Equally important, the outlining of how company climate transition plans are nature positive (and indeed, how company net zero plans are supported and enabled by ecosystem services) is a key area of future intervention and opportunity within TCFD • Lastly, the TNFD framework released globally in 2023 could serve as a springboard for a range of companies and industries to not only disclose on nature, but to identify and address their material nature-related impacts and dependencies
The Sustainable Development Goals (SDGs)	• Used correctly, the SDGs can be a lever for orienting companies in a more sustainable direction, both socially and environmentally • For example, NBI's work in this regard has focused on assisting companies to prioritise the SDGs and, most importantly, to make a meaningful impact with the SDGs that are material to their business. Where such an approach is supported by an internal company change management process, significant gains can be achieved • To the extent that SDG6 (Water and Sanitation) and/or SDG 15 (Life on Land) are material or prioritised by a company or sector as a whole, opportunities for EI4WS engagement are strengthened
Heightened Investor Interest and Action	• Companies care about what their investors think and what information they ask for. Where investors place their emphasis, so do companies. The rise of investor action and shareholder activism on environmental issues globally and in South Africa (particularly related to climate change) provides an important entry point • Particularly for listed South African companies that have a range of active investors, there is an opportunity to engage with their key investors, and the investor relations teams within companies themselves, as a significant potential change mechanism
Bank Capital Allocations, Lending Rates and Credit Assessments	• Commercial banks and development finance institutions can have a heavy influence on the nature of economies, through decisions on where they invest, as well as which organisations and activities they lend money to • Banks can also influence, through their lending, the practices of their clients, whether these clients are companies, farmers or individuals. This can include offering better loan terms to those organisations that have strong social and environmental credentials, or providing financial incentives for the adoption of environmentally friendly products

Enabler	Description
	• Banks, including where they allocate capital, what interest rates they offer and what activities they lend to, serve as one of the most powerful change agents in modern economies • It is also a requirement that banks adequately assess the risks in their investment portfolios and lending. To the extent that a bank's risk assessment process takes into account natural capital and water impacts and dependencies, so their lending practices may start to shift. This approach requires the mainstreaming of environmental dependencies and their linkages to traditional investments in bank risk and credit committees, to achieve scale and real impact
Aligning 'Green' and 'Grey' in Investment Decision Making	• Engineered (grey) infrastructure investments, where large amounts of capital are to be deployed, can provide an important opportunity for the financing of ecological (green) infrastructure. This can normally be achieved at low cost, where the overall project remains financially feasible • The preferred pathway for 'linking green and grey' in infrastructure investment is as follows: build into all future grey infrastructure projects an appropriate capital expenditure (capex) and operational expenditure (opex) for the ecological infrastructure linked to the engineered asset. This ongoing investment into the surrounding ecological infrastructure will serve to reduce insurance costs and extend the life of the engineered asset, while bringing a range of social and environmental benefits
The Use of Green Bonds	• The approach to linking green and grey in infrastructure investment can be taken a step further through the use of green bonds • Under the green bond approach, a bond is issued for an infrastructure project, but a small portion of the bond is ideally employed to address key natural capital dependencies that relate to the engineered asset. In this way a normal debt instrument (debt allocated to an engineered infrastructure project) can include an environmental benefit, rendering it a green bond. The undertaking of certain environmental remediation and protection would be part of the loan agreement • It is important to note that the revenues from the grey infrastructure project will still be required to provide the cash flows that are needed to pay back the overall loan. However, these revenues will also now be used to subsidise the investment needed in ecological infrastructure • Critically, the value of issuing a bond in the first place is that the revenues from the grey infrastructure project are much more closely tied to the project under a loan agreement, which allows for a level of revenue ringfencing to occur
Policy Direction for State-Owned Enterprises	• State-owned enterprises are largely driven by policy direction and are heavily influenced by the Department of Public Enterprises (DPE) in their thinking and practice, given that the DPE is their sole shareholder • Influencing the policy direction of DPE, and other entities such as the National Planning Commission, The Presidency and the National Development Plan, could thus play a substantive role in influencing the

Enabler	Description
	direction and practice of state-owned enterprises with regard to ecological infrastructure
A Focus on Company Insurance Costs and the Reinsurance Industry	• The preferred approach here is arguably best to think from the vantage point of the insured, rather than the insurer. In other words, how can companies strengthen their resilience to droughts, floods, wildfires, and other extreme events, and thereby reduce their insurance costs • In addition, the global reinsurance industry is extremely worried about the effects of climate change on the financial stability of the insurance sector as a whole. It may be possible to use the reinsurance sector as a lever in engagements with the insurance sector, such that the traditional insurance sector encourages and rewards their clients for being more climate resilient, or indeed, undertake their own efforts to reduce exposure to extreme weather events in a particular region, to lower overall insurance claims
Droughts, Floods and Water Crisis	• Severe droughts, floods and water crises are an enabler, now and in the future. In reality, the severe drought in South Africa between 2015-18 spurred many companies to invest in a variety of operational measures, with cost saving and business continuity benefits. The drought also prompted a host of businesses to look at their water risk more closely and develop company water security strategies • The next form of such a severe drought in South Africa will result in similar facility level investments, but could well also spur certain companies into action in the catchment and their supply chain, especially as diminishing returns occur operationally. This will particularly be the case if drought events are supported by strong media attention that highlight the impact on specific towns and economies • Extreme flood related events also further highlight the importance of healthy catchments and riverine areas, as well as wetland restoration and sustainable urban drainage, including water sensitive city design, with associated ecological benefits
Raw Water Users	• Companies that are required to treat raw water that is of insufficient quality, could see a cost reduction by investing in rehabilitation and maintenance of upstream ecological infrastructure. This could be a direct cost saving for the company if implemented effectively • Farmers would equally have an incentive to either treat raw water themselves or invest in wetland rehabilitation upstream, in cases where poor raw water quality could impact food safety and their associated export markets • With declining raw water quality being experienced in much of South Africa, a focus on cost savings or improved market access for raw water users could be an important future opportunity
Industry Specific Drivers (Power Generation, Tourism, Health Care, Textiles and Clothing, Mining, Commercial Agriculture)	Globally there are industry specific drivers that are encouraging certain sectors to seriously engage with water issues beyond their factory fence. Key industry examples include the following: • *Power generation:* the hydropower industry has a strong vested interest in reducing sediment load in rivers, as this sediment can clog their turbines and increase maintenance costs. In other words, reduced flow

Enabler	Description
	and sedimentation is an important operational risk for hydropower plants. Other energy technologies such as coal thermal and Concentrating Solar Power (CSP) are also large water users and may engage in water stewardship related activity in future, to support their own water security • *Tourism:* drought, the need for water security and the desire to maintain landscapes, has had a meaningful impact on the global tourism sector, where water stewardship is increasingly prominent (see for example, the International Tourism Partnership) • *Health care:* private sector managed hospitals are major water users that cannot operate without readily available water supplies. While they have sophisticated backup water supplies and plans in place, these are not inexhaustible. This context has driven certain water stewardship activity in the health care industry to date, and could extend further in future • *Textiles and clothing:* globally the clothing industry is under increasing scrutiny to address its water-related impacts, particularly in relation to their discharges. This momentum is likely to increase over time and drive greater water efficiency, effluent management, and stewardship practices in this sector, with associated benefits for natural systems • *Mining:* already a potential provider of potable water for communities in their area of operation, mines may also in future be compelled to invest in nature-based solutions in response to water scarcity and to account for their often considerable water use. There is also at least a theoretical opportunity to use mine rehabilitation funds during life of mine (as opposed to at mine closure) for ecological infrastructure related activities • *Commercial agriculture:* given their large water use and considerable reliance on raw water, there is an incentive for commercial farmers to think more carefully about both upstream water quality and quantity improvements. While many South African farmers are water conscious and water efficient, further gains can be made across a range of agricultural industries
Voluntary Carbon Offsets	• If pooled together collectively into a specific South African hotspot and focused on areas such as grassland and thicket restoration, it may be possible for companies that voluntarily offset their carbon emissions to play a meaningful role in restoring ecosystems and enabling greater water security • A portion of South African companies do undertake voluntary carbon offsetting at present; the key challenge is to ensure an adequate pipeline of projects that are focused on improving land use practices at scale in an effective, socially inclusive, and environmentally sustainable manner

Source: NBI (2019) *Business Needs and Enablers: Ecological Infrastructure for Water Security.*

The current (Table 1) and emerging (Table 2) drivers outlined above provide a strong starting point for assessing the approaches that can be used to engage with business on ecological infrastructure, and support their uptake of nature-based solutions over time. In undertaking this work, however, a differentiated approach to thinking about and engaging with industry is encouraged.

2.6 A differentiated approach to working with industry is needed

A differentiated approach is preferred when thinking about and engaging with business. Some approaches will apply better for specific sectors and/or different types of water users.

The key factors that should be borne in mind are as follows:

1. How much water does the company use? Is water a very small operational cost for them?
2. How central is water to their business? Is water used for manufacturing, power generation or processing?
3. What sources provide for their water needs? (raw water, rainfall, municipal supply, groundwater, desalination, water reuse)
4. How is their water mix likely to change in the short to medium term?
5. Where are their operations located? This applies particularly to operations located in water stressed areas that also contribute strongly to company revenues
6. What is the level of water risk in their supply chain?
7. What other ecosystem services is the company heavily reliant on, either directly or indirectly? Where does the majority of their nature-related risk and opportunity lie?
8. What are the company's key impacts on biodiversity, either in their direct operations, value chain or financing activities (in the case of financial institutions)?

In addition to adopting a nuanced approach when engaging with business, there are also important data gaps and evidence needs, which if filled, will strengthen company efforts on ecological infrastructure. The key gaps and evidence needs identified within the project are outlined below.

2.7 Certain data and evidence can strengthen private sector uptake

As illustrated in Figure 6 below, there are different types of information and evidence that can be expected to support private sector uptake in relation ecological infrastructure. Much of this data and information relates to making the link between company operations, healthy catchments and the engineered water system more explicit, but is also intended to demystify certain specific areas.

Figure 6: Key examples of data and evidence to strengthen private sector uptake

Source: *NBI (2020) Nature-Based Solutions for Water Security.*

The above examples of data and evidence that would likely strengthen private sector engagement are discussed in more detail in Table 3 below.

Table 3: Key identified business data and evidence requirements

Data / Evidence Requirement	Description of Need
1. Priority Invasive Alien Plants	• A short, easy to read, visual brochure that identifies the 'top 3' invasive alien species of concern from a water and biodiversity perspective, would assist with dissemination and uptake, particularly in the agricultural community • This brochure would need to be a deliberate simplification, presumably based on geographical region, of what farmers and landowners should focus on when addressing invasive alien vegetation
2. Priority Restoration Measures	• Similarly, clear and simple messaging on the top restoration and biodiversity related activities that a landowner can employ would be useful. This could also focus on what techniques and approaches are currently working in particular areas • The key to this approach is having organisations with strong ties to landowners communicating these main messages, and to have landowners ultimately train each other
3. Clear Visual Dashboard on State of Water and Ecological System	• An authoritative online dashboard indicating the state of the South African water system, from both a green and grey infrastructure perspective would be useful. This would include current water availability, water quality and the state of rivers and critical ecosystems across the country • Seasonal forecasts that have sufficient modelling skill (and hence are sufficiently reliable and usable) could also potentially be included in this platform • The ability to demonstrate change in this system over time would be ideal. Any information portrayed would need to be clear, concise, visual and widely disseminated to support mainstream use outside of limited expert networks. In essence this portal would serve as a central repository of evidence in a visually accessible manner, but backed by rigorous science
4. Explicit Linkages between Major Water Users and their Water Source	• A tool that makes it explicit to companies (based on their location) where the water for their operations ultimately comes from, what the state of that system is, and how the water availability of this system is being affected by invasive alien vegetation, landscape degradation and climatic warming could prove very useful • Ideally, this tool would be linked to an understanding of local and regional hydrology, and could reasonably estimate what impact upstream interventions would have on water quantity and quality for downstream users
5. Explicit Linkages between Strategic Water Source Areas and Engineered Water Systems	• It would be further useful to illustrate how South Africa's Strategic Water Source Areas link to the country's engineered water systems, and from there how the engineered systems provide for specific towns (and company operations) • In simple terms, it is not common knowledge how the South African water system works, and how each user is ultimately reliant on certain catchments and engineered systems. This information gap will need to be addressed to promote action

Data / Evidence Requirement	Description of Need
6. Identification and Analysis of Large Water Users Located in Water Stressed Catchments	• Banks, insurers, financiers and practitioners could benefit from understanding what kinds of industrial operations and company revenue generation is derived from or located in water stressed catchments • The purpose of this exercise would be to identify priority economic nodes from a water risk perspective, ideally focusing on a quaternary catchment level, to allow for specific granularity. This approach could also be extended to include large commercial farmers that are similarly at risk • This analysis and its resultant outputs could serve as a strong engagement tool, when interfacing with banks, insurers and lenders who require their clients to have sufficient water access to maintain their operations and revenues
7. Hydrological Modelling, Cost Benefit Analysis and the Use of Measurable Metrics in Ecological Restoration	• The undertaking of a quantitative hydrological analysis on the water volumes that can be secured, at what price and what assurance of supply is invaluable in building a business case for investment and demonstrating the financial case for nature-based approaches • This hydrological assessment would need to form part of an overall case for investing in ecological infrastructure in a specific region • The hydrological assessment (supported by the use and monitoring of measurable metrics over time) will allow for a scientific and fact-based approach to tracking the benefits of investing in ecological infrastructure, including at what point, and at what rate, benefits accrue to the system and downstream users
8. Linkages Between Rehabilitation and Maintenance of Ecological Infrastructure and Raw Water Quality	• Accurate modelling, field testing and monitoring of how ecological infrastructure projects are able to support improved raw water quality, would help strengthen the argument and evidence base for raw water users to invest in upstream restoration work
9. Dissemination of Results of Pilot Projects	• The more examples of successful nature-based solution projects, backed by quantitative data on what the actual costs and benefits have been, both for water security and ecosystems, including the value derived for every Rand spent, the stronger the argument for replication and scaling • These pilots would need to include measurable indicators for aspects such as changes in flow, water quality, sediment load, hectares cleared, hectares restored etc.
10. Formal, SETA Accredited Training in Sustainable Farming	• There is currently no formal Sector Education and Training Authority (SETA) accredited training course for sustainable farming. This limits the ability to fund or support the training of farmers in these practices, especially where donors and companies need to be able to demonstrate that formal, accredited training has been provided to beneficiaries

Source: NBI (2019) *Business Needs and Enablers: Ecological Infrastructure for Water Security.*

In addition to identifying evidence and data needs, the NBI also looked more closely at to what extent there may be commercially viable opportunities linked to nature positive efforts. In particular, this area of work focused on the use or beneficiation of the biomass derived from the clearing of invasive alien plants (IAPs), as one specific intervention that could bring a level of financial return, but also support livelihoods and wider economic development. The high-level findings of this exercise are summarised below.

2.8 Unlocking the invasive biomass economy will bring economic and ecological gains

2.8.1 The current cost to the economy from invasive alien plants is significant

The spread of invasive alien species is the third largest threat to South Africa's biodiversity and is responsible for 25% of all national biodiversity loss (SANBI & CIB, 2020).

Invasive alien plants (IAPs) are of particular concern, given their impact on South Africa's scarce water resources and economic development.

Currently the three greatest IAP threats (by estimated total condensed area and percentage reduction of mean annual surface water runoff) are:

- Acacia mearnsii (black wattle)
- Eucalpytus spp. (gum)
- Pinus spp. (pine)

What are Invasive Alien Species?
Invasive alien species, such as invasive alien plants, are species that are 'non-indigenous' to an area, that have been introduced from other countries either intentionally or accidentally.

They can reproduce and spread without the direct assistance of people in natural and semi-natural habitats, and are destructive to native biodiversity, ecosystems and human livelihoods.

There are almost 1,500 alien species in South Africa, many of which have become invasive (van Wilgen et al., 2020). To be classified as 'invasive' implies the ability of an alien species to have a negative impact on native biodiversity and ecosystems, or the human economy and well-being.

Invasive alien plants currently use 3-5% of South Africa's surface water runoff each year, exacerbating the effects of droughts (SANBI & CIB, 2020) and, according to Stafford (2017) over 10 million hectares of land in South Africa have been invaded by IAPs. With IAPs growing at 5-10% per annum, this figure is probably closer to 15 million hectares at present.

The economic effects of IAPs are also considerable. SANBI estimate the loss of grazing areas reduces the value of livestock production from natural rangelands by R340 million per year, threatening rural livelihoods and food security (SANBI & CIB, 2020). The spread of IAPs can also lead to crop decimation, the clogging of water facilities and waterways, and result in adverse effects for farmers.

DFFE spends approximately R1.5 billion per annum through the Working for Water programme in an attempt to keep IAPs in check (DFFE, pers. comm 30 August 2021) and have spent around R15 billion on clearing IAPs since the programme's inception (van Wilgen et al, 2020).

What is also clear, however, is that clearing invasive alien plants opens up the productive use of the land and restores valuable ecosystem services, and is thus arguably an important opportunity to be harnessed in a water-scarce country with high unemployment and limited high value agricultural land.

2.8.2 New land uses and economic activities can be unlocked by sustainable clearing

There are revenues that can be generated from the biomass derived from invasive alien plants. However, just as important are the new land uses and economic activities that are unlocked when sustainable clearing takes place. Viewed in a South African context, this activity is key to economic diversification, rural development and the achievement of a just transition.

Far from being a once-off benefit, the activities of clearing, harvesting and beneficiation of invasive alien biomass can set in motion a virtuous cycle that provides lasting business, societal and ecological benefits. This virtuous cycle, which leverages the productive use of the land and water resources, is illustrated in Figure 7 below:

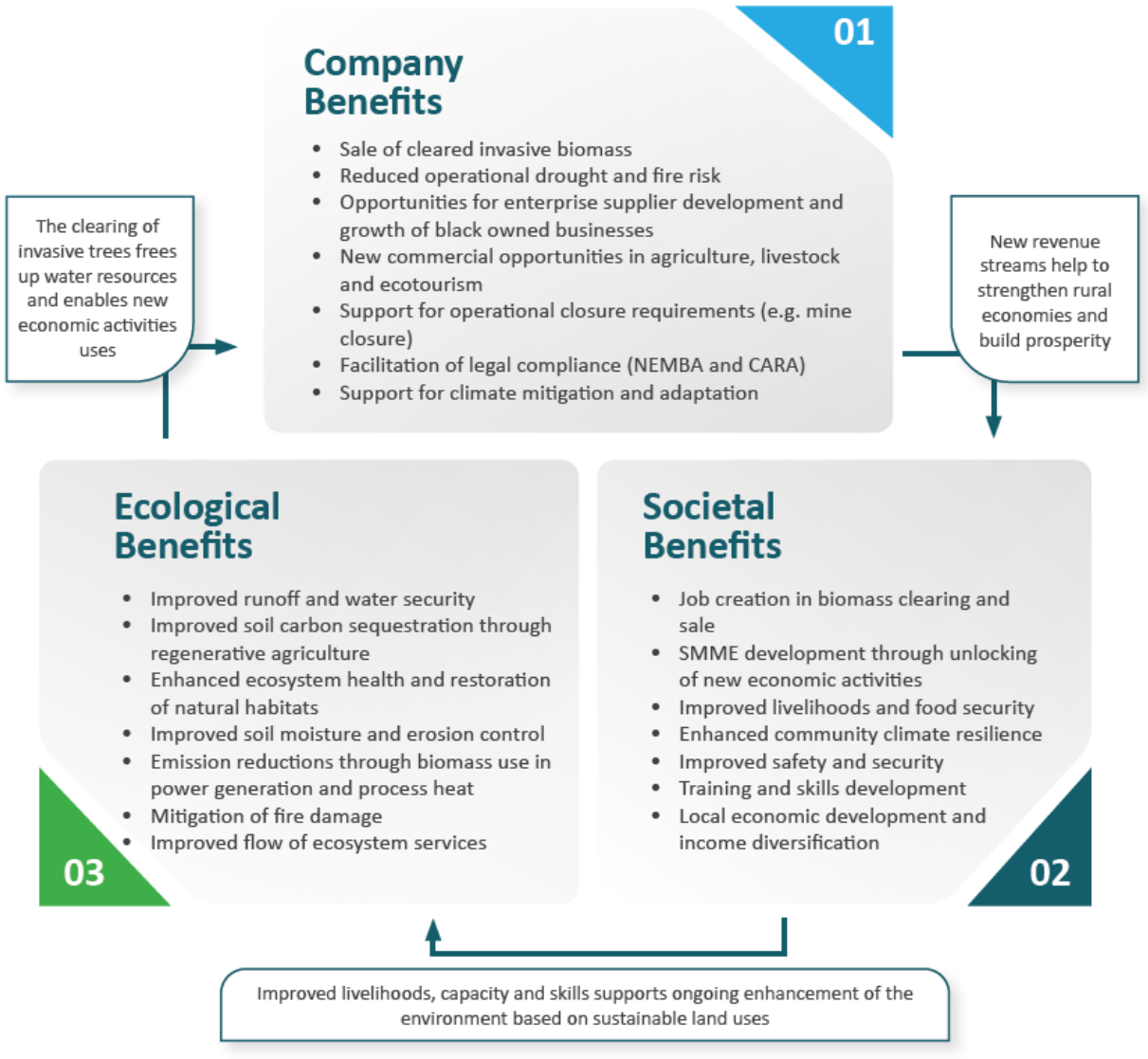

Figure 7: The invasive biomass economy can unlock a virtuous cycle for companies and society

Source: NBI (2022) *Unlocking Corporate Investment in the Invasive Biomass Economy*.

As outlined in Figure 7 above, companies can benefit through:

1. Generating revenue flows that also reduce their water and fire risk
2. Facilitating operational improvements, emission reductions and improved legal compliance
3. Offering strong opportunities to support enterprise supplier development, as well as surrounding community upliftment

In addition, what follows from company level action is the opportunity for new local industries to emerge, from commercial to smallholder agriculture, through to ecotourism and sustainable cattle farming. This in turn offers opportunities for improved well-being of employees and suppliers, while strengthening ties with local municipalities and communities.

2.8.3 There are two main implementation approaches for business to unlock the invasive biomass economy

NBI's research identified at least two main methods by which business can derive value from the invasive alien biomass economy. The choice of approach depends on the company in question, including its specific drivers and type of operations.

Implementation Model 1: Using invasive alien biomass in power generation and/or process heat

There is a strong global imperative to reduce carbon emissions and improve air quality. One means to reduce emissions is to replace or supplement coal and natural gas feedstocks with invasive alien biomass. The biomass could be used as a substitute feedstock for power generation or for process heat production in industrial boilers and other applications. This is often referred to as 'biomass cofiring' and is now a widely established practice with both air quality and carbon benefits[2].

In this investment model, companies purchase cleared invasive alien biomass at market prices from existing clearing contractors or small businesses active in the domestic market. The key company driver, amongst other potential drivers, in this case, is a corporate commitment to greenhouse gas reductions and/or improved air quality.

Key company considerations include the cost, caloric value and reliability of the invasive biomass feedstock.

Implementation Model 2: The sale of value-added products derived from invasive biomass

Cleared invasive alien biomass can be beneficiated for a variety of purposes and by-products. The market benefit here is the development of value-added products that attract a higher retail price. The value-added products that can be developed range from artisanal charcoal through to furniture, activated carbon and land rehabilitation materials, as outlined further in Figure 8 below.

In this investment model, companies may choose to support new or existing Small, Medium or Micro Enterprises (SMMEs) to develop higher value products from the cleared invasive alien biomass.

[2] See for example: https://www.sciencedirect.com/topics/engineering/biomass-cofiring and https://www.nrel.gov/docs/fy00osti/28009.pdf

The main value-added products that can be produced from invasive alien biomass are outlined in Figure 8 below.

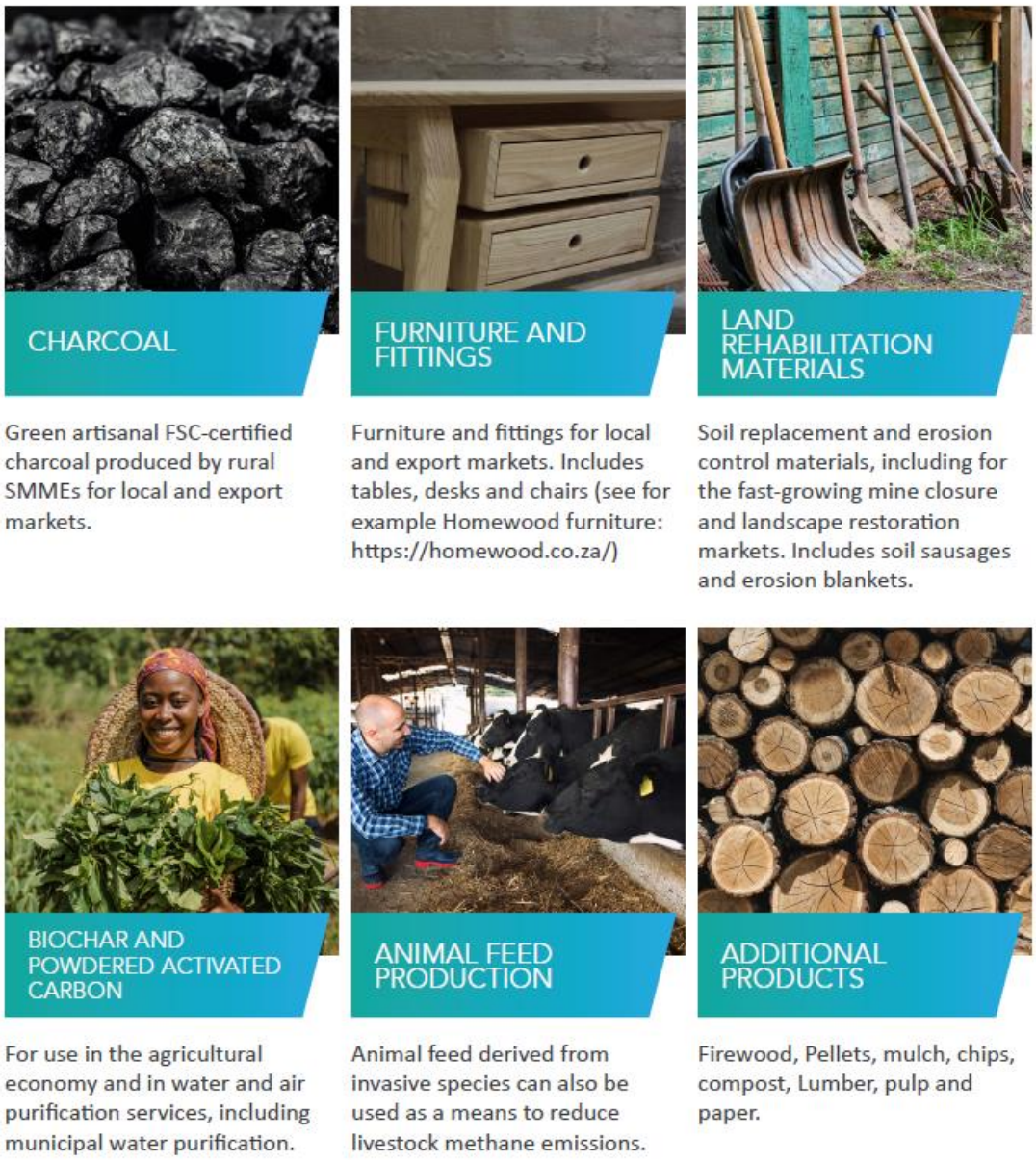

Figure 8: Market driven products for investment in the alien invasive biomass economy

Source: NBI (2022) *Unlocking Corporate Investment in the Invasive Biomass Economy*.

An assessment of the *likely* implementation model per economic sector is provided in Table 4 below. Actual opportunity uptake will be largely dependent on company goals, stated commitments and business models.

Table 4: Likely application of invasive biomass implementation models per sector

Model 1: Invasive & Alien Biomass for Power Generation/Process Heat	Model 2: Development of Value-Added Products
Forestry	Mining
Power Generation	Power Generation (Generation and Transmission)
Food & Beverages	Food & Beverages
Manufacturing (e.g., agroprocessing, pharmaceuticals)	Agriculture
Petrochemicals	Livestock
Chemicals	Forestry
Paper & Packaging	Banking & Finance
Metals & Mining	Hospitality & Tourism
Glass	Retail
Ports & Railways	Chemicals
Health Care	Health Care

Source: NBI (2022) *Unlocking Corporate Investment in the Invasive Biomass Economy*.

Regardless of the eventual implementation model chosen, the key next step is unlocking new economic activities in areas where invasive plants have been cleared. This prevents reinfestation and generates strong multiplier effects. This approach can also support the development of a localised circular economy, where the cleared material serves as an input into new activities in the same area.

One example of this circular approach is the conversion of cleared invasive biomass into biochar. Biochar can be used to improve soil moisture and support regenerative agriculture, including on cleared land. In this instance, a higher value product is developed from the biomass, which is then used an input to new economic activities in the same region, such that benefits for the local economy are strengthened.

2.8.4 How can companies get started on the invasive biomass journey?

Specific recommendations are provided in Figure 9 below, which will hopefully spur further internal thinking within companies.

Figure 9: Immediate next steps for companies to tackle invasive alien plants

Source: NBI (2022) *Unlocking Corporate Investment in the Invasive Biomass Economy*.

The alien invasive biomass economy has the potential to significantly support South Africa's future water security and economic development, while offering tangible benefits for companies.

The benefits achieved are also likely to be widespread. The clearing of thirsty invasive trees, their subsequent beneficiation into value-added products and the opening up of new economic activities, will support the financial well-being of small businesses, commercial farmers, companies and lenders alike. Invasive alien biomass can thus be considered one of the most under-utilised resources in our landscapes.

2.9 There are immediate, globally recognised next steps that any company can take

Any efforts to realise the value of invasive alien biomass should arguably form part of wider company strategy and commitment in relation to water security, biodiversity and climate resilience. Through the work of The Nature Conservancy, WWF, CDP, TNFD and others, the linkages between business and ecosystems has advanced significantly in recent years, providing companies with clear frameworks and roadmaps that can be employed by the private sector as needed.

The global coalition, *Business for Nature*, has also made clear the overall next steps that companies can take as they advance on their overall nature positive journey. These 4 immediate next steps are:

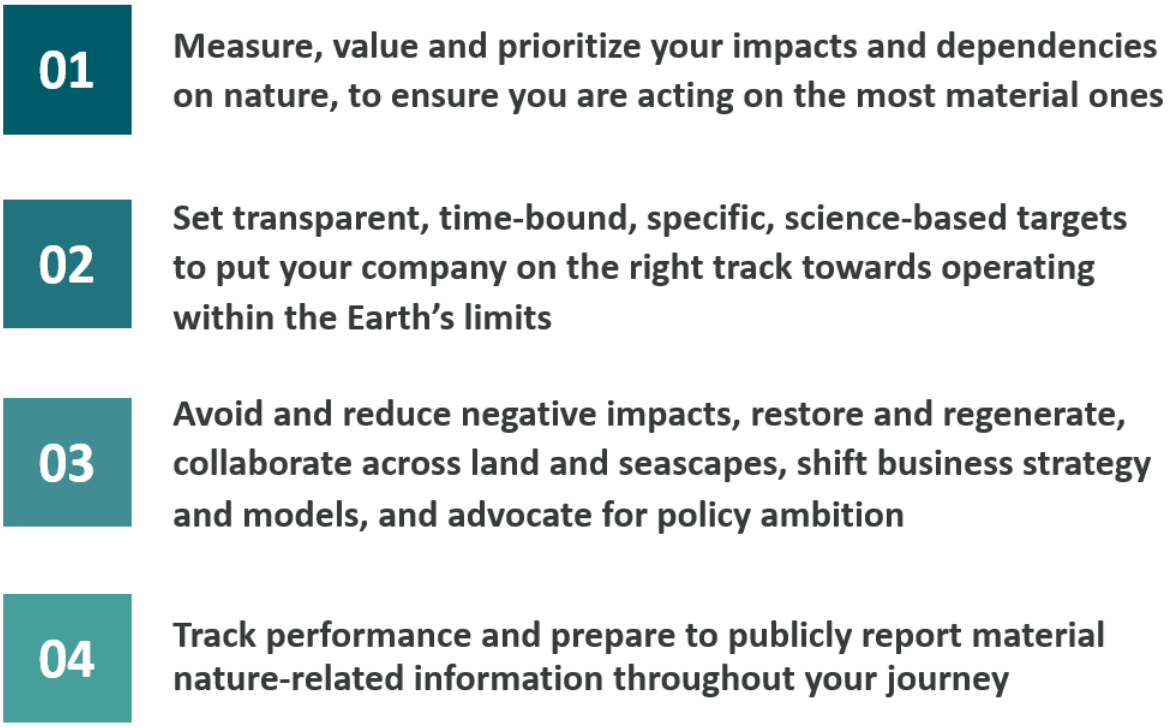

Figure 10: Key next steps for companies starting their nature positive journey

Source: Business For Nature: *High-level Business Actions on Nature*.

The above next steps, combined with the tools and approaches outlined in this report, provide a viable means to foster, support and scale business action on nature, in support of a water secure future.

Complementing this report, the recently released TNFD in many ways provides a synthesis approach by which any South African company, in any sector, can grapple with their ecological infrastructure related issues, identify what to prioritise, and disclose appropriately, in line with the next steps outlined by Business for Nature above.

2.10 The TNFD recommendations can enable effective company disclosure

While still in its infancy[3], the Taskforce on Nature-related Financial Disclosures (TNFD) has undergone a rigorous 2-year development process and provides a comprehensive set of recommendations for organisations to identify and report on their material nature-related impacts, dependencies, risks and opportunities, in a globally recognised manner.

The TNFD has also placed strong emphasis on aligning with current global reporting tools and frameworks, including but not limited to the related TCFD disclosure guidance.

TNFD adopts a comprehensive approach and allows for consideration and disclosure in relation to 4 distinct areas (or scopes), namely: direct operations, upstream, downstream and financed activities. This approach allows for organisations to report not only on their direct operational activities and wider value chain, but critically allows for the disclosure of key risks and opportunities within financial portfolios, which is critical for understanding nature-related impacts and dependencies for the financial sector.

TNFD further expressly acknowledges the requirement that the impact on company revenues, assets and business activities should be quantified in financial terms, when organisations assess their nature-related risks and opportunities. This process assists companies to properly appreciate their level of risk, and to be internally aware of the cost of non-action (or the value of the opportunity) in monetary terms.

This approach also serves to place nature-related decision making on a more equal footing in companies, and allows for organisation-wide communication within the language of traditional financial decision making. This approach will in turn filter into company investor relations, providing a stronger impetus for company and investor action towards nature positive outcomes, as nature risk is increasingly quantified and internalised.

Equally importantly, TNFD has highlighted their intention to develop future guidance on company net zero transition plans, including the role of nature in climate transition, and the role of these transition plans in achieving nature positive goals and targets. This points to the interconnectedness of climate, water and biodiversity issues, and the need to adopt a systemic approach when addressing climate change, given the ecological base on which all climate transition plans depend, from a water and ecological services perspective.

It is certainly possible and desirable to advance carbon transition plans that support other environmental objectives. Even as societies and businesses decarbonise, it is essential to protect natural systems, including in support of reduced vulnerabilities to the physical impacts of climate change that are now unavoidable.

As an example of efforts in this regard, both the EU and South African green finance taxonomies require that any climate mitigation action undertaken should 'do no significant harm' to other environmental goals (such as nature and water security) for this climate action to be classified as green[4].

[3] Following a global consultation process, the final TNFD disclosure recommendations and guidance were released in September 2023. Available at: https://tnfd.global/

[4] See for example the criteria outlined in the South African Green Finance Taxonomy, launched in 2022: https://sustainablefinanceinitiative.org.za/wp-content/downloads/SA-Green-Finance-Taxonomy-1st-Edition-Final-01-04-2022.pdf

2.11 A collaborative business-government community of practice will aid implementation

There are several strong existing communities of practice (COPs) on nature in South Africa, including the *Sustainable Finance Coalition* (which focuses on innovative financing mechanisms for biodiversity) and the *National Business and Biodiversity Network* (NBBN), which focuses on private sector engagement.

With that said, at present there is not an active community of practice at a macro level which has a specific focus on *business-government* collaboration on biodiversity. A dedicated business and government national platform, which acts as an overarching forum on biodiversity-related issues, is therefore proposed for development in South Africa.

This business-government forum would work to:

- Build common understanding and strengthened relationships on ecological infrastructure across business and government
- Share relevant tools, information and frameworks across all parties
- Support collective resource mobilisation
- Enable collaborative planning and the de-risking of implementation
- Help facilitate the wider uptake of other effective conservation measures by business

Such a collaborative forum would benefit from the involvement of representative business organisations and voluntary business movements in South Africa. Equally, active involvement by DFFE and SANBI would be critical, as would participation from the major existing biodiversity communities of practice currently active in the country, in order to draw on their insights and experience.

3 Conclusion and Recommendations

3.1 Conclusion

Business and industry are currently engaged to a reasonable extent in both the theory and practice of ecological infrastructure for water security. These existing practices can be built upon, both by sharing learnings across industry, but also by building on the main drivers of corporate action.

A range of approaches and enablers are needed to engage effectively with business, given that industries differ widely, including in terms of their products and services, water needs, level of biodiversity risk, organisational culture and types of investors.

The enablers identified in this document, combined with the understanding of the key business opportunities, provides a strong starting point for engaging further with business on ecological infrastructure, and to support their action on nature over time.

The role of ecosystem services in supporting company climate adaptation, supply chain resilience and operational risk management cannot be understated. As some of South Africa's major companies and cities have now learnt, we can no longer rely purely on our engineered infrastructure to just 'work', especially with climate change.

Nature positive approaches also represent a key means for corporate South Africa to support the wider just transition. Company net zero transition plans should arguably incorporate opportunities for nature positive development, and further understand the role of water and ecosystems in the achievement of company climate goals.

Restoring ecosystem services and protecting our natural heritage will enhance corporate water security, build climate resilience and unlock future land uses, helping business to play a significant role in tackling South Africa's critical challenges of poverty, inequality and unemployment.

3.2 Recommendations

It is recommended that the following activities and focus areas be taken forward in relation to the role of business in supporting ecological infrastructure:

1. Work with trusted intermediaries to further enhance the capacity of business to engage on nature, incorporating the use of best practice science, economic analysis, tools and approaches
2. Showcase company best practice on nature, and facilitate peer learning across sectors, providing tangible evidence to industry of the benefits of improved ecosystem services
3. Work to foster the linkages between nature, climate resilience, water security and the achievement of the just transition. Place strong emphasis on role of nature in net zero climate transition plans and ensuring that transition plans achieve nature positive goals
4. Unpack the opportunities related to biodiversity offsets and carbon offsets, where feasible, warranted and appropriate
5. Continue the work on enabling financial mechanisms more broadly within the sector. This includes the role of tax incentives, conservation bonds, green bonds and the blending of grant/public finance with commercial finance

6. Link ecological infrastructure more closely to infrastructure finance in general, to incorporate necessary ecosystem services into the financial models for infrastructure development, from both a capital expenditure and operational expenditure perspective
7. Adress key private sector data, information and evidence needs, in support of effective company engagement and action
8. Build off the launch of TNFD and the emphasis on corporate sustainability reporting more generally, to bring biodiversity closer to the fore. This includes companies assessing their key financial risks and opportunities from nature, and identifying priority geographical areas of intervention
9. Build a stronger community of practice more broadly on nature between business, government and civil society, to advance biodiversity related policy, finance and implementation

4 References

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Annexure A: List of Main NBI Project Reports and Outputs

The NBI has developed various materials within the *Ecological Infrastructure for Water Security* project. The following documents developed by the NBI under the project (divided by theme below) are available on request:

Reports

NBI (2019) *Business Needs and Enablers: Ecological Infrastructure for Water Security*, November 2019

NBI (2022) *Unlocking Corporate Investment in the Invasive Biomass Economy*, October 2022

NBI (2023) *High Level Comments on the TNFD Global Reporting Framework (TNFD Beta v0.4)*, June 2023

Presentations

NBI (2019) *Financing Ecological Infrastructure in South Africa*, October 2019

NBI (2020) *The Green Stimulus Opportunity in South Africa*, July 2020

NBI (2020) presentation summarising the Business Needs and Enablers Report, entitled *Nature-Based Solutions for Water Security*, October 2020

NBI (2021) EI4WS project background presentation entitled *Ecological Infrastructure for Water Security*, January 2021

NBI (2022) *Unlocking Private Sector Investment in the Invasive Biomass Economy*, May 2022

NBI (2023) *Nature-Related Financial Risks and Opportunities in South Africa*, October 2023

Articles and Infographics

NBI (2020) *Nature for Recovery and Resilience*, November 2020

NBI (2020) *Water in the Time of the Coronavirus*, included in the 2020 edition of the Trialogue 'Business in Society Handbook'

NBI (2021) EI4WS Project Summary Infographic*: 'Ecological Infrastructure is Key for South Africa's Water Security'*, June 2021

Annexure B: Business Organisations of Key Relevance to Biodiversity

Table 5: Business organisations of key relevance to ecological infrastructure

Organisation Name	Organisation Type	Website
AgriSA	**Industry association**	https://agrisa.co.za/
Association for Savings and Investment South Africa (ASISA)	**Industry association**	https://www.asisa.co.za/
Banking Association South Africa (BASA)	**Industry association**	https://www.banking.org.za/
Business for Nature	**Business led coalition**	https://www.businessfornature.org/
Business Unity South Africa (BUSA)	**Umbrella federation of business associations**	https://www.busa.org.za/
CDP (formerly the *Carbon Disclosure Project*)	**Non-profit organisation**	https://www.cdp.net/en
Climate Bonds Initiative (CBI)	**Non-profit organisation**	https://www.climatebonds.net/
GrainSA	**Industry Association**	https://www.grainsa.co.za/
Green Finance Institute (GFI)	**Non-profit organisation**	https://www.greenfinanceinstitute.com/
Global Reporting Initiative (GRI)	**Non-profit organisation**	https://www.globalreporting.org/
Global Sustainable Tourism Council (GSTC)	**Non-profit organisation**	https://www.gstcouncil.org/
International Council on Mining and Metals (ICMM)	**Industry Association**	https://www.icmm.com/
Institute of Directors in Southern Africa (IoDSA)	**Non-profit organisation**	https://www.iodsa.co.za/
Institute of Risk Management South Africa (IRMSA)	**Professional Body**	https://www.irmsa.org.za/
International Sustainability Standards Board (ISSB)	**Non-profit organisation (an initiative of the International Financial Reporting Standards (IFRS) Foundation**	https://www.ifrs.org/groups/international-sustainability-standards-board/
National Business Initiative (NBI)	**Non-profit organisation**	www.nbi.org.za
Network for Greening the Financial System (NGFS)	**Non-profit organisation**	https://www.ngfs.net/en
Principles for Responsible Investment (PRI)	**An investor initiative in partnership with the United Nations Environment Programme (UNEP) Finance Initiative and UN Global Compact**	https://www.unpri.org/
South African Insurance Association (SAIA)	**Industry Association**	https://www.saia.co.za/

Organisation Name	Organisation Type	Website
South African Institute of Chartered Accountants (SAICA)	**Industry Association**	https://www.saica.org.za/
South African Institution of Civil Engineering (SAICE)	**Industry Association**	https://saice.org.za/
Sustainability Accounting Standards Board (SASB)	**Non-profit organisation**	https://sasb.org/
Science Based Targets Network (SBTN)	**A global network of NGOs, business associations and consultancies**	https://sciencebasedtargetsnetwork.org/
The Capitals Coalition	**Non-profit organisation**	https://capitalscoalition.org/
The Taskforce on Nature-related Financial Disclosures (TNFD)	**A global reporting framework housed in the Green Finance Institute**	https://tnfd.global/
We Mean Business Coalition	**Non-profit organisation**	https://www.wemeanbusinesscoalition.org/
World Business Council for Sustainable Development (WBCSD)	**Non-profit organisation**	https://www.wbcsd.org/
World Economic Forum (WEF)	**Non-profit organisation**	https://www.weforum.org/

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The National Business Initiative is a voluntary coalition of South African and multinational companies, working towards sustainable growth and development in South Africa and the shaping of a sustainable future through responsible business action.

Since our inception in 1995, the NBI has made a distinct impact in the spheres of housing delivery, crime prevention, local economic development, public sector capacity building, further education and training, schooling, public private partnerships, energy efficiency and climate change.

The NBI is a global network partner of the World Business Council for Sustainable Development (WBCSD) and an implementation partner of We Mean Business, the CEO Water Mandate and CDP.

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