



POLICY BRIEF //

THE IMPORTANCE OF ECOSYSTEM-BASED ADAPTATION AND MITIGATION ACTIONS IN THE NATIONALLY DETERMINED CONTRIBUTIONS

01/ INTRODUCTION TO NATIONALLY DETERMINED CONTRIBUTIONS (NDCs)

Policy makers are increasingly recognising the importance of nature in mitigating and adapting to climate change. In this briefing, the role that nature plays in climate change mitigation and adaptation is explored further to enable policy makers to enhance the inclusion of Ecosystem-based Adaptation (EbA) (the use of nature to adapt to climate change) and Ecosystem-based Mitigation (EbM) (the use of nature to reduce greenhouse gas emissions) mechanisms in South Africa's revised Nationally Determined Contribution (NDC). Policy makers should harness EbA and EbM to raise climate action ambitions, set more robust targets for nature-based goals and recognise the important role ocean and coastal ecosystems can play in responding to climate change.

In accordance with the 2015 Paris Agreement objectives, all signatory countries are required to outline and communicate their intended actions to address climate change in what is known as a Nationally Determined Contribution (NDC). These actions take into consideration a country's circumstances and priorities in contributing to the worldwide effort to limit global temperature increase to well

below 2°C above pre-industrial levels. Intended Nationally Determined Contributions (INDCs) contain voluntary climate actions communicated by signatory countries prior to the adoption of the Paris Agreement. Following the adoption of the Paris Agreement, signatory countries could choose to revise their INDCs before submitting them as NDCs.

Informed by findings of the Intergovernmental Panel on Climate Change (IPCC), South Africa submitted its INDC in 2015, which outlines the national action plans for adaptation and mitigation, as well as the funding and investment requirements. In 2016, the INDC became South Africa's official NDC. It is currently under revision in preparation for the UNFCCC COP 26 in Glasgow. A recent review from the Climate Action Tracker (CAT) has revealed that, although the updated NDC enhances South Africa's climate-related ambitions, the goals are still considered insufficient with regards to the Paris Agreement temperature targets. The updated draft is out for comment until April 2021 (DEFF, 2021), which provides stakeholders with an opportunity to emphasise the need to look at other means of adaptation and mitigation that could enhance the NDC ambition.



KEY CONTRIBUTIONS

1

Harness nature to achieve the 1.5°C goal /

Enhance overall ambition of the NDC towards achieving the 1.5°C global goal by harnessing the mitigation potential of including nature as part of the solution, through both the GHG emissions reductions of Ecosystem-based Mitigation (EbM) and co-benefits of Ecosystem-based Adaptation (EbA). We encourage the adjustment of the lower limit to meet the 1.5°C temperature goal globally and the upper limit at least the 2°C goal. Nature has the potential to contribute cost-effective mitigation potential of at least 73 million tonnes of carbon dioxide equivalents (Mt CO₂e) per year through 2030, with maximum emissions reductions of up to 109 Mt CO₂e per year. If integrated into the NDC revision, GHG reductions through EbM could assist South Africa in further raising its ambition level to be consistent with the goals of the Paris Agreement, specifically enabling a target of 344-414 Mt CO₂e emissions in 2030. In order to achieve this, it is critical to incorporate the Energy and AFOLU sectors into EbM approaches within the NDC.

2

Include the Agriculture, Forestry and other Land Use (AFOLU) sector /

Building on the inclusion of the AFOLU sector in the revised NDC as part of South Africa's GHG inventory, use available tools, such as the **soil carbon map** and [carbon sink atlas](#), to set sector-specific targets for South Africa in the land use sector, such as for hectares conserved and restored and/or carbon sequestered, to show ambition, with an aim to increase the overall mitigation target.

Click below to view
Soil Carbon Map



3

Include the Agriculture, Forestry and other Land Use (AFOLU) sector /

Include specific Ecosystem-based Adaptation (EbA) projects, such as land restoration and stewardship programmes, and the restoration of marine and coastal ecosystems into sectoral targets and activities in South Africa's revised NDC.

02 / THE ROLE OF NATURE IN THE NDC

The Paris Agreement emphasises the importance of nature in achieving global climate goals, and the need to protect vulnerable ecosystems. South Africa's 2016 NDC does not make explicit reference to the use of terrestrial ecosystems, such as grasslands, or coastal ecosystems, for instance mangroves, in climate change adaptation. However, the adaptation section does prioritise programmes, such as Working on Wetlands, Working for Water, and Working on Fire that require scaling up beyond 2020. These programmes present opportunities to scale the use of nature as a solution to reduce the risk of climate-related disasters and adapt to climate change, while generating a range of co-benefits for people, nature, and climate – an approach known as Ecosystem-based Adaptation (EbA). See Box 1 for South Africa's vision for EbA, as expressed in national policy and strategy. The 2016 NDC and 2021 revisions also recognise the role that nature can play in mitigating climate change – an approach known as Ecosystem-based Mitigation (EbM). EbM refers to the use of ecosystem services and biodiversity to reduce greenhouse gas (GHG) emissions.

Globally, below and above ground the carbon storage potential from vegetation offers over 30% of the solution to mitigating climate change. Ecosystems such as wetlands and rangelands act as carbon sinks and restoring and sustainably managing these systems enhances

their capacity to absorb carbon emissions. Grassland and rangelands can store more carbon if grazing and herd structures are managed properly. Healthy coastal ecosystems also absorb and store carbon from the atmosphere and oceans.

BOX 1: Setting South Africa's vision for Ecosystem-based Adaptation (EbA) through policy and strategy

The implementation of Ecosystem-based Adaptation (EbA) in South Africa is supported through policies and strategies, such as the National Climate Change Response White Paper (2011), Strategic Framework and Overarching Implementation Plan for EbA 2016 – 2021, Guidelines for EbA (2017), the National Development Plan 2030, and Climate Change Sectoral Adaptation Plans. South Africa's vision for EbA, as expressed in policy and strategy, is to use nature to transition to an economy that is able to withstand climate shocks, and secure the livelihoods of vulnerable people, while making a fair contribution to the global effort to reduce greenhouse gas emissions.



37%

Ecosystem-based Mitigation (EbM) can provide up to 37% of the greenhouse gas (GHG) reductions needed by 2030 to keep global temperature increases well below 2°C.

Plants and soils in terrestrial systems annually absorb 20% of anthropogenic GHGs however, this sink is offset by emissions from land use change, agriculture and mining.

Through EbM, South Africa has a cost-effective mitigation potential totalling 73 million tonnes of carbon dioxide equivalents (Mt CO₂e) per year through 2030,

with maximum emissions reductions of up to 109 Mt CO₂e per year. If integrated into the NDC revision, GHG reductions through EbM could assist South Africa in further raising its ambition level to be consistent with the goals of the Paris Agreement, specifically enabling a target of 344-414 Mt CO₂e emissions in 2030. In order to achieve this, it is critical to incorporate the Energy and AFOLU sectors into EbM approaches within the NDC.

In South Africa, important pathways to cost-efficient EbM approaches include nutrient management through conservation agriculture, as well as rangeland restoration to optimise grazing and livestock management. Improving land stewardship is a successful approach to enhance sequestration from soils and plants while reducing land degradation. Another important potential pathway for EbM is appropriate reforestation and activities to reduce deforestation and forest degradation.

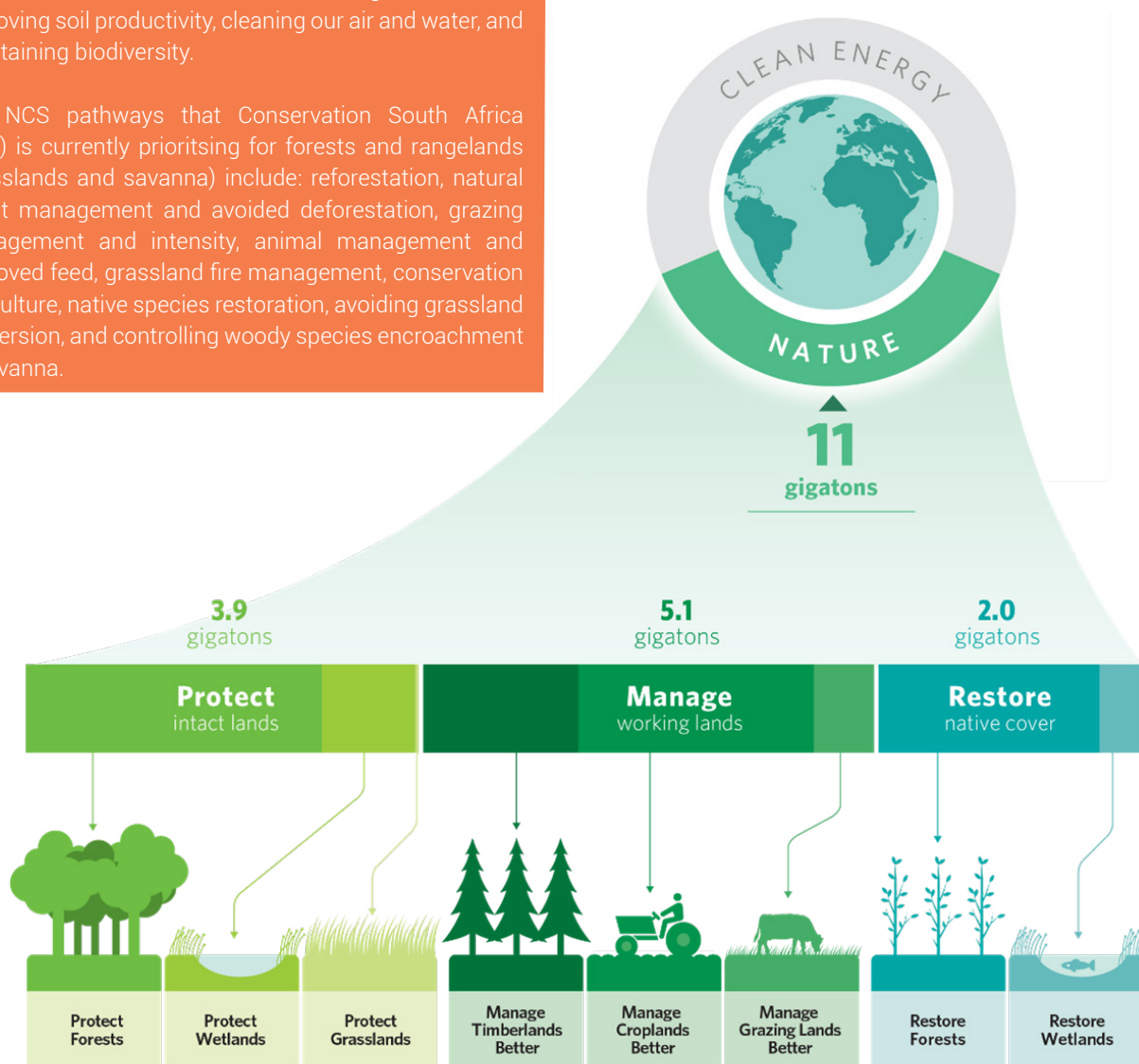
South Africa's 2016 NDC and 2021 revision specifically refer to the Agriculture, Forestry and Other Land Use (AFOLU) sector in national GHG accounting, however, no explicit targets for GHG mitigation have been set in the land use sector.

See Box 2 for EbM potential pathways.

BOX 2: EbM potential pathways.

Natural climate solutions (NCS) have been defined as "Conservation, restoration, and/or improved land management actions that increase carbon storage and/or avoid greenhouse gas emissions across global forests, wetlands, grasslands, and agricultural lands" (Griscon, et al., 2017). NCS can provide over one-third of the cost-effective climate mitigation needed between now and 2030 to stabilise global warming to below 2°C. Alongside aggressive fossil fuel emissions reductions, NCS offers options for countries to deliver on the Paris Climate Agreement while improving soil productivity, cleaning our air and water, and maintaining biodiversity.

The NCS pathways that Conservation South Africa (CSA) is currently prioritising for forests and rangelands (grasslands and savanna) include: reforestation, natural forest management and avoided deforestation, grazing management and intensity, animal management and improved feed, grassland fire management, conservation agriculture, native species restoration, avoiding grassland conversion, and controlling woody species encroachment in savanna.



03/ UNDERSTANDING THE ROLE NATURE CAN PLAY IN THE CLIMATE CHANGE RESPONSE

3.1 WHAT NATURE CAN DO / Nature can help people withstand climate shocks like droughts and floods, across diverse landscapes and seascapes. Healthy rivers and wetlands can store water for longer during periods of drought and buffer the effects of floods. Rangelands are better able to provide fodder for livestock during extended dry periods if they have been rested and well managed. Managing animals by changing the herd age structure and animal types as well as choosing better genetics can also decrease GHG emissions from enteric fermentation (a natural part of the digestive process in ruminant animals). There is evidence that the amount of carbon stored in soil decreases under the encroachment of invasive aliens such as wattle, and it can continue to decrease for 50 years (Oelofse, et al., 2016). Clearing woody alien invasive vegetation like wattle provides long-term carbon sequestration benefits. Once restored, rangelands in grasslands and savanna biomes can sequester between **0.8-2.5 tons of carbon per hectare per year for 10 years (conservatively), but possibly up to 30 years**. Peatlands, a type of wetland ecosystem found on peat soils, act as the globe's largest natural terrestrial stores of carbon, **sequestering up to 0.37 gigatonnes of CO₂ per year** (IUCN). In addition, the natural ecosystems provide critical ecosystem services and protection from climate-

related hazards such as flood and drought resilience and seawater intrusion.

Marine and coastal ecosystems offer vast opportunities to tackle climate change, however, their EbA, and EbM potential is widely overlooked. In fact, **South Africa's current NDC does not mention oceans or coastal ecosystems at all**. Well-functioning coastal ecosystems made of mangroves, seagrasses, and marshes (also known as blue carbon ecosystems) can protect communities from storm surges, salt water intrusion and coastal erosion. They also provide nursery grounds for fish, and other organisms, as well as livelihoods for coastal communities. In addition to the critical roles that they play in supporting a range of threatened organisms, promoting biodiversity, buffering against ocean acidification, and sheltering coastlines by reducing wave power, coastal ecosystems act as carbon sinks. **Seagrasses store 18% of global oceanic carbon**. Mangroves and salt marshes also play a valuable role in carbon sequestration. It is estimated that the soils in **mangrove forests store approximately 6.4 billion tonnes of carbon globally**. Additionally, coastal ecosystems contribute to enhanced water quality by filtering, cycling, and storing nutrients, and other pollutants.



3.2 NATURE IS ALSO VULNERABLE / Nature often falls victim to inappropriate management practices, as well as the impacts of a changing climate – one with warmer temperatures, unpredictable rainfall and more frequent and intense storms. Limited economic opportunities and worsening poverty place further stress on natural resources as people become increasingly dependent on them. Intensive grazing patterns and overstocking of livestock damage the integrity of rangelands and wetlands and threaten the biodiversity supported by these ecosystems. About 15% of the world's peatlands have been overexploited and damaged by being drained and converted for agricultural use or mined for fuel, among others uses. It is estimated that 1.3 gigatonnes of CO₂ is emitted from damaged peatlands annually (IUCN, 2017). In addition, warmer temperatures, unpredictable rainfall and more frequent and intense storms are expected to affect the health of terrestrial ecosystems. Increasing temperatures and evaporation rates are expected to place further stress on already sparse water resources and exacerbate degradation of rangeland and wetland habitats.

Coastal and ocean ecosystems are also vulnerable to the impacts of climate change and inappropriate land uses. Longer dry periods reduce the flow in estuaries, resulting in prolonged and more frequent river mouth closure which negatively affects salt marsh habitat. Eutrophication in

river is becoming an increasingly severe threat to seagrass ecosystems, as algae outcompetes the native species. More severe flooding events cause inundation leading to loss of mangrove forests. In addition, coastal development, such as bridge and harbour construction, the resulting pollution thereof, and poor land use practices, such as dredging, have detrimental impacts on coastal habitats. According to the National Biodiversity Assessment (NBA) (2018), 60% of South Africa's coastal ecosystems are threatened. In South Africa, 30% of salt marshes have been destroyed. Mangrove habitats are facing a significant decline and no longer occur in 10 out of 26 subtropical estuaries (NBA, 2018). Several seagrass species have been listed as vulnerable in the Red Data List of Species.

Ecosystems also rely on wildlife, and in many cases naturally occurring fires, to maintain, and regenerate soil organic carbon (SOC) (the carbon component of organic compounds in soil). The loss of terrestrial and coastal ecosystems and the services they provide due to poor management and inappropriate land uses will cause significant cascading effects for both people and nature. If they are not sufficiently protected, they will become more vulnerable to the effects of climate change. Therefore, the potential of these systems to act as carbon sinks, provide ecosystem services and support EbA and EbM measures will be jeopardised.



3.3 PROTECTING NATURE AND ITS POTENTIAL FOR CLIMATE CHANGE ADAPTATION AND MITIGATION

The Marine Protected Area system is an important mechanism for ensuring coastal ecosystems are not degraded and that mitigation and adaptation potential thereof is maximised. A number of tools and platforms that can be used to determine the potential of coastal ecosystems to mitigate and adapt to climate change exist, including [Global Mangrove Watch](#) (Global Mangrove Alliance, 2011), [Mangrove Restoration Potential Map](#) (The



Nature Conservancy, University of Cambridge, & IUCN, n.d.), [Global Map of Marshes](#) (UNEP WCMC Global, 2018), [Global Map of Seagrass](#) (UNEP WCMC Global, 2018), and CI's Blue Carbon Ecosystem Map (for access contact CI).

Conservation South Africa (CSA) has also recently published a [soil carbon map](#) (Venter, Hawkins, Cramer, & Mills, 2020) based on long-term data for below ground soil carbon from a variety of sites nationally. This is a high-resolution map (30m spatial resolution) that can provide detailed information about the potential across South Africa to sequester and store carbon whilst restoring our rangelands and accumulating both adaptation and mitigation benefits from nature. The map highlights national, and global areas that should be prioritised for repeat sampling. Information from the map is currently being integrated into the revision of the carbon sink atlas (DEFF, n.d.).

GHG emissions reduction potential of rangeland restoration approaches needs to be explored further through long-term monitoring of its impact on soil, and above ground carbon, as well as emissions from livestock, and potential re-wilding as part of natural climate solutions (Sitters, Kimuyu, & Young, 2020).



Most people are aware of changes in their environment, but some need support to understand how their actions affect the natural resources that they rely on, and what they can do to help nature help them adapt. Non-governmental organisations, such as Conservation South Africa (CSA), an affiliate of Conservation International (CI), in collaboration with communities, play a central role in protecting nature, and implementing EbA and EbM projects, be it to recognise the potential of coastal ecosystems, such as seagrasses and mangroves, or biodiversity conservation through stewardship programmes for example Stewardship in rangelands as an EbA and EbM approach, as described below.

4.1 HOW IT WORKS / One approach that CSA uses to implement EbA in rangelands is to engage in Conservation Agreements (CAs) with communal farmers to support them in protecting nature in return for incentives. Conservation actions and incentives are identified with participating farmers (called stewards) based on what they can do to improve their farming, particularly their grazing practices, and what is needed to support them. For example, in Namaqualand, in the Northern Cape Province, planned grazing is needed to rest rangelands and restore wetlands,

and farmers need livestock medicines, more climate-resilient breeds of sheep and goat, better access to markets and training, to help farmers become more resilient to climate change. As part of the stewardship approach, youth empowerment, and employment programmes are under way as well as enterprise development, mentorship and funding.

During the Conservation Agreements process, CSA unlocked opportunities for innovative financing mechanisms to ensure that stewardship was impactful and long lasting. The innovative financing mechanisms enabled communal farmers, including women, and youth, to overcome barriers in accessing funds for conservation. The mechanisms also enabled them to properly govern the Steinkopf-Bulletrap Cooperative (SBC) (Box 3), develop enterprises (for example, Robert Richards' handmade Kraalbos soap (Box 4)), and access markets without further intervention from CSA, in the form of funding. All of these approaches, support these communities to have access to additional opportunities that can also buffer them from impacts of climate change and enhance their ability for sustainable production.



4.2 IMPACT / After implementing the CAs, most stewards¹ noted an observable improvement in the condition of rangelands² because they planned their grazing and kept their livestock numbers at or below the recommended threshold. Their livestock were free of internal and external parasites. Grazing became greener and more abundant. Livestock became healthier and heavier. The more resilient

breeds reached market ready weights earlier³. Stewards had better market access to sell their livestock at better prices (particularly the more resilient breeds⁴), and generated an income⁵ which catered for their families. They saved money on livestock medicine, so had money to put away for emergencies or spend on other expenses.

BOX 3: An example of a co-operative as a vehicle for implementing EbA

In 2018, CSA facilitated the registration of the Steinkopf-Bulletrap Cooperative (SBC) as a formal organisation. The SBC assists communal farmers (including those that are not participants of the stewardship programme) to keep their livestock healthy through vaccinations, and better access to medicine. This has given them the opportunity to sell their livestock to formal markets at better prices. It also brought farmers together to learn from each other, and learn through training, to become more aware of what they can do to protect their rangelands, and adapt to climate shocks such as droughts.

BOX 4: An example of an enterprise developed through CSA's stewardship programme

Robert Richards' handmade Kraalbos soap began after the SKEPPIES fund (established in 2006 to provide small scale funding for businesses that value conservation) helped him to buy machinery. Kraalbos is the first of all shrubs to grow on bare land that has been left exposed by overgrazing. It helps nature come to life again, but is poisonous to livestock so farmers used to remove the whole shrub. Robert's successful soap enterprise has shown farmers the economic value of Kraalbos, if they only harvest the tips of the shoots to sell to Robert as one of the main ingredients for his soap.



¹ To collect data and assess the impact of the stewardship programme, socio-economic surveys were conducted in 2017, 2018 (after two years of implementation of the CAs), and 2020 (two years after the CAs ended).

² When participating stewards were asked how they knew that their rangelands were in better condition they gave one or more of the following responses: livestock condition; more grazing available; the veld is greener; growth of plants improved; and/or more flowers.

³ In 2017, semi-indigenous lambs were sold after 6 months, whereas commercial lambs were sold after 8 months.

⁴ In 2017, semi-indigenous lambs were sold at R32.00 per kilogram, whereas commercial lambs were sold at R29.00 per kilogram.

⁵ Between 633 stewards, across the three landscapes that CSA works in, R10 824 052 was earned through livestock auctions.

05/ CALL TO ACTION

Actions for policy makers to integrate nature into South Africa's revised Nationally Determined Contributions (NDC), and enhance ambition for climate change adaptation, and mitigation through nature include the following:

1

Harness nature to achieve the 1.5°C goal /

Enhance overall ambition of the NDC towards achieving the 1.5°C global goal by harnessing the mitigation potential of including nature as part of the solution, through both the GHG emissions reductions of Ecosystem-based Mitigation (EbM) and co-benefits of Ecosystem-based Adaptation (EbA). We encourage the adjustment of the lower limit to meet the 1.5°C temperature goal globally and the upper limit at least the 2°C goal. Nature has the potential to contribute cost-effective mitigation potential of at least 73 Mt CO₂e per year through 2030, with maximum emissions reductions of up to 109 Mt CO₂e per year. If integrated into the NDC revision, GHG reductions through EbM could assist South Africa in further raising its ambition level to be consistent with the goals of the Paris Agreement, specifically enabling a target of 344-414 Mt CO₂e emissions in 2030. In order to achieve this, it is critical to incorporate the Energy and AFOLU sectors into EbM approaches within the NDC.

2

Include specific Ecosystem-based Adaptation (EbA) projects /

Include specific EbA projects such as land restoration and stewardship programmes in the revised NDC. Stewardship activities include working with farmers, and other land stewards to enhance their resilience to adverse climate impacts, boost rural livelihood development, and reduce GHG emissions from rangelands and agriculture, through incentivising and providing training to implement approaches such as improved grazing practices, reducing emissions from enteric fermentation, rewilding and restoring rangelands, avoiding the conversion of grasslands, and building alternative economies from for example alien invasive value chains (wattle, biochar etc.). Other land restoration projects should focus on re-establishing, conserving and protecting marine and coastal ecosystems including the three blue carbon ecosystems (mangroves, salt marshes and seagrass) and coral reefs. NDCs should include reference to National EbA priority maps for setting of targets for achieving EbA action.

3

Enhance ambition in existing national priorities, policies, and programmes /

Enhance ambition for climate change adaptation, and mitigation reflected in existing national priorities, policies, and programmes such as Working on Wetlands, Working for Water, and Working on Fire, for long-term efforts to reach their full climate change adaptation, and mitigation benefit. Recommendations for this have been provided in a recent [case study](#) by CSA (IIED, n.d.), including the need for long-term biophysical, and socio-economic monitoring for EbA, as well as inclusion of EbA, and EbM training in the Natural Resource Management (NRM) programmes.

4

Include ocean, and coastal ecosystemss /

Include the conservation, restoration and protection of marine and coastal ecosystems into sectoral targets and activities in South Africa's revised NDC, focusing on carbon sinks such as mangroves, saltmarshes, and seagrasses that provide both mitigation and adaptation benefits. Include actions and targets, such as the restoration, conservation and sustainable management of seagrass forests and mangroves in South Africa's revised NDC. The following tools and platforms can provide guidance on targets that can be set for carbon sequestration through these actions [Global Mangrove Watch](#), [Mangrove Restoration Potential Map](#), [Global Map of Marshes](#), and [Global Map of Seagrass](#). In addition, marine ecosystems such as coral reefs should be conserved, restored and protected, for their adaptation value among many other co-benefits.

6

Include the Agriculture, Forestry and other Land Use (AFOLU) sector /

Building on the inclusion of the AFOLU sector in the revised NDC as part of South Africa's GHG inventory, use available tools such as the soil carbon map to set sector-specific targets for South Africa for the land use sector, such as for hectares conserved and restored and/or carbon sequestered, to show ambition, with an aim to increase the overall mitigation target.

5

Consider adding cross-sectoral climate actions to the NDC /

Examples of taking a cross-sectoral approach include: integrating infrastructure planning with conservation goals; promoting sustainable landscape programs between rangelands, forestry and agriculture; developing policies for compensating impacts of infrastructure development on rangelands or wetlands; combining natural and built infrastructure for coastal protection (or green-grey infrastructure), implementing land use planning with ecosystem disaster risk management; or ensuring tree cover for hydropower efficiency.

7

Enhance the National Forests Act and Woodlands Strategy Framework /

Enhance the National Forests Act and Woodlands Strategy Framework to better incorporate climate adaptation and mitigation approaches in South Africa's rangelands and woodlands. These policies should encourage development of adaptive management capacity among forest and land managers, as well as incentivise approaches to increase the resilience of these lands to climate impacts, while reducing GHG emissions arising from current land management practices, such as reducing deforestation and protection and restoration of rangelands with irreplaceable carbon values (Goldstein, et al., 2020; Noon, 2021), especially along the Eastern Cape.

8

Provide long-term monitoring /

As part of the National Monitoring and Evaluation framework, provide long-term monitoring of ecosystem restoration and stewardship approaches (including rangelands, and watersheds) across south Africa's biomes (grasslands, thicket and savanna) for soil carbon benefits to ensure data is continuously updated for future target setting, and to show impact of the land use sector on reducing South Africa's emissions. Emissions from cattle should also be monitored through these stewardship approaches.

10

Support innovative financing mechanisms /

Support opportunities for innovative financing mechanisms for EbA, such as market access, enterprise development, and co-operative development, to ensure that EbA implementation and EbM co-benefits are enabled to build a stronger restoration economy through funding, technology, and capacity building support. Recommendations for this have been provided in a recent case study by CSA on innovative financing (for access to the case study contact CSA).

9

Build the capacity of District Municipalities /

Support activities to build capacity of District Municipalities to not only support implementation of EbA and EbM actions, but to also effectively monitor these activities and feed into the National Monitoring and Evaluation system (National Climate change information system) and refer to this system in the NDC revision.

11

Capture the cost of adaptation, and mitigation /

Ensure true costs of adaptation and mitigation action are reflected in the revised NDC, and if not available, ensure that we work towards cost effectiveness and cost benefit assessments of these actions.



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