ECOSYSTEM-BASED ADAPTATION (EBA) IN SOUTH ARICA

GUIDELINES






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GUIDELINES FOR ECOSYSTEM- BASED (EBA) IN SOUTH AFRICA

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EXECUTIVE SUMMARY

Ecosystem-based Adaptation (EbA) is the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change (CBD, 2009; DEA & SANBI, 2016). Ecosystem-based Adaptation (EbA) represents a coherent approach for adaptation to climate change that makes use of the role that well-functioning ecosystems play in achieving positive societal and development outcomes.

The EbA approach has been recognised especially (but not only) for its potential to support poor and rural communities who are relatively more directly dependent on natural resources and ecosystem services in adapting to climate change. EbA interventions also have the potential to be relatively cost-effective and adaptive in the long-term when compared to adaptation solutions that rely strictly on engineering and hard infrastructure. The co-benefits of EbA can contribute towards a broader set of socio-economic and development goals, including job creation, poverty reduction and rural/peri-urban development.

The Strategic Framework and Overarching Implementation Plan for Ecosystem-based Adaptation (hereafter, South African EbA strategy) was developed as a core component of South Africa's overall approach to climate change adaptation to enable a long-term, just transition to a climate-resilient society and economy. It identified the need for 'EbA Guidelines' for designing EbA interventions in a South African context and providing a consistent understanding of EbA by policy makers, practitioners and funders.

SOUTH AFRICA IS OF THE VIEW THAT AN EBA GUIDELINE DOCUMENT WOULD ALLOW THE COUNTRY TO GIVE EFFECT TO ITS EBA STRATEGY AND CAPITALISE ON THE OPPORTUNITIES INHERENT IN ITS CORE INTENTIONS.

This guideline document identifies four cornerstones of EbA practice, and positions these as the fundamental values of the EbA approach, namely that:

- EbA interventions are **adaptation responses to current and future impacts of climate change**
- EbA interventions **make use of biodiversity and ecosystem services**
- EbA interventions result in **people being more resilient** to climate change
- EbA interventions are contextualised in a paradigm of **sustainable development**

A set of 7 principles, with a subset of criteria, and 11 safeguards are defined that will help to ensure the beneficial outcomes that EbA promises for both people and nature, within the context of climate change adaptation. A preliminary monitoring and evaluation framework is presented that requires integration with South Africa's climate change M&E procedures, once these are finalized. This framework would support both the ongoing sustainability of EbA projects, and would interact with research guidelines to build a strong evidence base for the approach.

Four prospective user groups are highlighted namely project and programme planners and implementers, policy-makers, funders, and researchers. Guidance on key questions and steps for planning and implementing EbA are provided for each group in the form of flowcharts which reference relevant sections of the guideline document.

The full use of these guidelines relies on building capacity in EbA planning and implementation in all target groups. This includes making a convincing case that investing in EbA is worthwhile, and ensuring that prospective users are able to understand and apply the principles, safeguards, and the M&E Guideline. For many user-groups overcoming perception and implementation barriers relating to the value and applicability of EbA will be crucial to the unlocking EbA actions.

1. BACKGROUND, OBJECTIVES AND RATIONALE

1.1. Introduction

Adapting to the adverse effects of climate change is becoming increasingly important for maintaining livelihoods and for ensuring sustainable development. South Africa has developed a Strategic Framework and Overarching Implementation Plan for Ecosystem-Based Adaptation that seeks to promote coordination of adaptation action at scales from the local to the national level, and to optimise synergies across sectors. The potential benefits of effective adaptation are well recognised by role players at all levels of government, in the private sector, and even by individuals with the capacity to respond. South Africa's response to the multiple challenges presented by climate change is set out in the National Climate Change Response (NCCR) White Paper (2011). Importantly, the NCCR White Paper highlights the value of well-functioning ecosystems in helping society to adapt to climate change, and in supporting opportunities for broader development goals.

Ecosystem-based adaptation (EbA) presents a coherent approach for utilising the role that well-functioning ecosystems can play in achieving these positive societal and development outcomes. The idea of Ecosystem-based Adaptation originally arose in non-governmental organisation (NGO) and intergovernmental organisation circles as "natural solutions to climate change" and was introduced to the Convention on Biological Diversity (CBD) during the first decade of the new millennium, before being adopted as a potential component of an overall adaptation strategy under the United Nations Framework Convention on Climate Change (UNFCCC). It has been recognised for its potential to support rural poor and/or vulnerable communities– those who are more directly dependent on natural resources and ecosystem services in adapting to climate change. Additionally, in an increasingly urbanising world, many of the key and emerging global risks are becoming concentrated in urban areas (Laros et al., 2013; Revi et al., 2014), and the challenges of poverty, environmental sustainability and climate change are also becoming increasingly urbanised (Roberts et al., 2012). As such, ensuring effective action here becomes essential to successful climate change adaptation at broader scales (Revi et al., 2014). In this regard, EbA may offer opportunities for transformative and cost-effective trajectories towards more 'climate-smart' urban states (Roberts et al., 2012); potentially helping to improve the health and well-being of residents by improving quality of life, business opportunities and supporting food production (i.e. Culwick & Bobbins, 2016; Shackleton et al., 2017). The co-benefits of EbA contribute towards a broader set of socio-economic and development goals, including job creation, poverty reduction and appropriate rural/peri-urban development. Where efficient use of limited resources is a policy imperative, the incentive for providing for multiple beneficial outcomes and multi-functional infrastructure, is particularly important.

With the recognised opportunities for a wide range of co-benefits from EbA, South Africa's biodiversity sector climate change strategy provided a clear motivation for the development of a coordinated programme of work on EbA, as part of an overall adaptation strategy envisaged in the NCCR White Paper. In response to the NCCR White Paper, the 2013 Long Term Adaptation Scenarios (LTAS) Flagship Research Programme highlights the "potential for ecological infrastructure to provide adaptation benefits and assist in achieving development aspirations across sectors [through] mainstreaming into policy planning and implementation…[thus] building the resilience of South Africa's natural systems, working landscapes and open spaces to support economic sectors and local livelihoods under future climate conditions" (DEA, 2013:17). The process to develop Climate Change Adaptation Plans for South African's biomes further identified a number of Adaptation options including EbA. The Strategic Framework and Overarching Implementation Plan for Ecosystem-based Adaptation was subsequently developed in an effort to establish the programme of work on EbA in South Africa.

1.2. Rationale: Making the case for EbA guidelines

The 2nd South African Environment Outlook (SAEO) emphasises that biodiversity loss and impacts on ecosystem health have intensified and the declining status of ecosystems have become a serious cause for concern. Furthermore, these losses are often felt disproportionately by the urban and rural poor, who are most exposed to the effects of pollution and who rely directly on the natural environment for their livelihoods (NBSAP: DEA, 2005;

2015). It is also reported that the impacts of climate change will further accentuate social and ecological vulnerability and limit capacity to adapt to changes in ecosystem functioning. Establishment of appropriate climate change adaptation strategies for the socio-economic and biophysical environments linked to the national development initiatives such as the National Climate Change Response White Paper therefore cannot be overemphasised.

The South African Strategic Framework and Overarching Implementation Plan for EbA (hereafter, the EbA Strategy; DEA & SANBI, 2016) emphasises the role of EbA as part of overarching climate change adaptation (after CBD, 2009). Consequently, EbA is not viewed as separate from other forms of climate change adaptation in South Africa. The national position on EbA sets out to integrate ecosystem services and traditional biodiversity conservation considerations formally into climate change adaptation responses, and explicitly emphasises human well-being and adaptation co-benefits of healthy ecosystems, linking these to long-term social and economic resilience at all scales. South Africa is of the view that an EbA guideline document would allow the countryto give effect to its EbA strategy and capitalise on the opportunities inherent in its core ntentions.

An argument could be made that the introduction of over-explicit guidelines for EbA run the risk of disincentivising EbA or slowing its implementation, to the detriment of progress in implementing adaptation more generally. Equally, there are concerns that a lack of clear guidelines could allow opportunity for the superficial repackaging of conventional approaches as 'EbA-relevant', i.e. those that are only development or biodiversity focussed without the human-centric long-term climate change adaptation context (Doswald et al., 2014; Seddon et al. 2016). From a South African perspective, the EbA Strategy and this document aims to preclude misinterpretation and misapplication of EbA, to encourage beneficial synergies between biodiversity, ecosystem services and socio-economic resilience, and to support adaptation planning more generally within a sustainable development context. This emphasis aligns well with international perspectives on socio-economic and ecological dynamics, i.e. Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), highlighting the interactions between nature, nature's contributions to people and a good quality of [human] life (Pascual et al., 2017).

The factors determining the design and implementation of EbA will be locally contextualised and EbA priorities will differ according to circumstances, adaptive context, and governance scales (Andrade et al., 2011; Midgley et al., 2012; Travers et al., 2012). As such, this document does not assume an accepted 'EbA Archetype' (Roberts et al., 2012). Rather it provides guidance for designing and assessing the eligibility of EbA interventions in a South African context.

1.3. Purpose of the Guideline and approach taken

The overall objective of this document is to, provide clarity about the scope of EbA, the principles that define it, criteria for identifying appropriate EbA projects, safeguards to maximise the chances of successful outcomes and processes for user groups to develop or enhance interventions. Central to this objective, is the positioning of biodiversity and ecosystem services as central to a national climate change adaptation response.

The Guideline is intended for use when undertaking adaptation planning nationally, applying, *inter alia*, when designing projects and research programmes, when assessing eligibility for EbA funding (i.e. Andrade et al., 2012), and when determining opportunities for convergence with existing government policies and programmes of work.

In the approach taken here, *EbA cornerstones*, *core principles* (high-level), *criteria* (requirements), and relevant *safeguards* (measures to prevent and mitigate undue harm/negative consequences) are set out to support the design and implementation of EbA interventions, with the aim of ensuring that these are consistent with international and national best practices (Box 1).

A series of processes in the form of flowcharts is also provided to support prospective users (see Section 5).

Box 1: Definitions and elaboration on guiding standard terminology

Cornerstones: Conceptual framing describing the fundamental values and functional ideals that underpin the EbA approach at the highest level. EbA practice is anchored within these overarching assertions, with EbA the result of the synergy between the [cornerstone] set.

Principles: Deconstruct the overarching cornerstones into high-level standards that govern and guide the behaviour of EbA practice. Principles set out the expectation for EbA practice, articulating the ideals of the cornerstones into more specific achievement qualities.

Criteria: Requirements that must be met to achieve Principles. Criteria define the core characteristics of each Principle with high specificity, further articulating the ideals of the cornerstones into practical attributes to be captured during project design and implementation.

Safeguards: Measure taken to protect/prevent/mitigate undesirable outcomes that may result from [inappropriate] EbA implementation.

1.4. Methodology

The EbA Strategy was developed through extensive consultation with EbA stakeholders including anticipated users. The extensive consultation process included a range of experts in academia, sectoral government departments, academic institutions, NGO's, and research institutions to support the development and refinement through four drafts.

1.5. Anticipated Users

Ecosystem-based adaptation (EbA) is to be implemented as part of South Africa's overall climate change adaptation strategy, in support of a long-term, equitable transition to a climate-resilient economy and society. Realising this vision requires the participation and support of stakeholders from across science-policy-practice environments. Four broad user groups ('users' hereafter) can be delineated:

- Project and programme planners and implementers, including in civil society, the private sector and government,
- Policy-makers interested in including EbA in new or existing policies or strategies,
- Current and prospective funders of EbA interventions and research, and
- Researchers interested in undertaking EbA related research.

The need for additional or more refined guidance that targets user groups more explicitly (for example local government or the private sector) would need to be assessed as part of the implementation of this guideline and in further consultation with such user groups. A process for the regular review and revision of this guideline and its broader application would be an important element of South Africa's long term adaptation strategy.

Individually, and through collaboration, each of these anticipated user groups would contribute to achieving the EbA vision and four priorities of the EbA Strategy (DEA & SANBI, 2016:8), which are as follows:

- Effective coordination, learning and communication [within the public and private sector stakeholders] mobilises capacity and resources for EbA
- Research, monitoring and evaluation provides evidence for EbA's contribution to a climate resilient economy and society
- Integration of EbA into policies and plans supports overall climate change adaptation,

- Implementation projects demonstrate the ability of EbA to deliver a wide range of co-benefits

The EbA Strategy emphasises the need to align and collaborate with existing initiatives, many of which involve projects implemented independently of national policy context, i.e. by NGOs and civil society. Clear guidance on how best to align with governmental and non-governmental partners will help to capitalise on many opportunities for South Africa in pursuing climate resilience through EbA. Convergence with national strategy more generally is important for EbA practice, and EbA principles are embedded in many of the adaptation response actions and various Flagship Programmes. South Africa has invested significantly in programmes prioritising win-win solutions for utilising social and natural capital, promoting poverty reduction and employment opportunities, and supporting healthy and resilient ecosystems. Within these programmes there may be opportunities to align with EbA objectives in order to deliver and enhance the range of co-benefits they offer (DEA & SANBI, 2016).

The EbA Strategy emphasises the role of multiple users in achieving EbA outcomes. This document should support effective implementation through both the consistent interpretation and application of EbA principles and desired outcomes, and through EbA 'learning-by-doing' using shared learning processes and dissemination of best-practice EbA. The implementation of EbA can also enhance current biodiversity mainstreaming efforts, adding further impetus and sustainability to these efforts. The anticipated users of the EbA Strategy should be encouraged to play a critical role in providing opportunities to learn from and strengthen best practice EbA, through contributing to an evidence-based approach for EbA. Such a role would help to support further EbA-relevant policy refinement. Users could also contribute to enhancing EbA by prioritising cross-sectoral opportunities, an effort that would benefit by research-action partnerships.

The full use of these guidelines will depend on building capacity in EbA planning and implementation in all targeted user groups. Capacity building would include making a convincing case that investing in EbA is worthwhile, and ensuring that prospective users are able to understand and apply the principles, safeguards, and the M&E Guideline. For many user-groups overcoming perception and implementation barriers relating to the value and applicability of EbA will be crucial to the unlocking EbA actions.

2. CORNERSTONES, PRINCIPLES AND CRITERIA FOR ECOSYSTEM-BASED ADAPTATION (EBA) IN SOUTH AFRICA

2.1. Defining EbA and its cornerstones

Ecosystem-based Adaptation (EbA) is the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change (CBD, 2009; DEA & SANBI, 2016). Any initiative, whether new or a modification of an existing initiative, must demonstrate clean intention to meet this objective (intentionality).

Expressed another way, EbA interventions integrate services from biodiversity and ecosystems, benefits for people and climate change adaptation responses in the context of sustainable development. EbA interventions thus include four cornerstones (Figure 1), all of which must be met for interventions to qualify as being EbA:

- EbA interventions are adaptation responses to current and future impacts of climate change
- EbA interventions make use of biodiversity and ecosystem services
- EbA interventions result in people being more resilient to climate change
- EbA interventions are contextualised in a paradigm of sustainable development

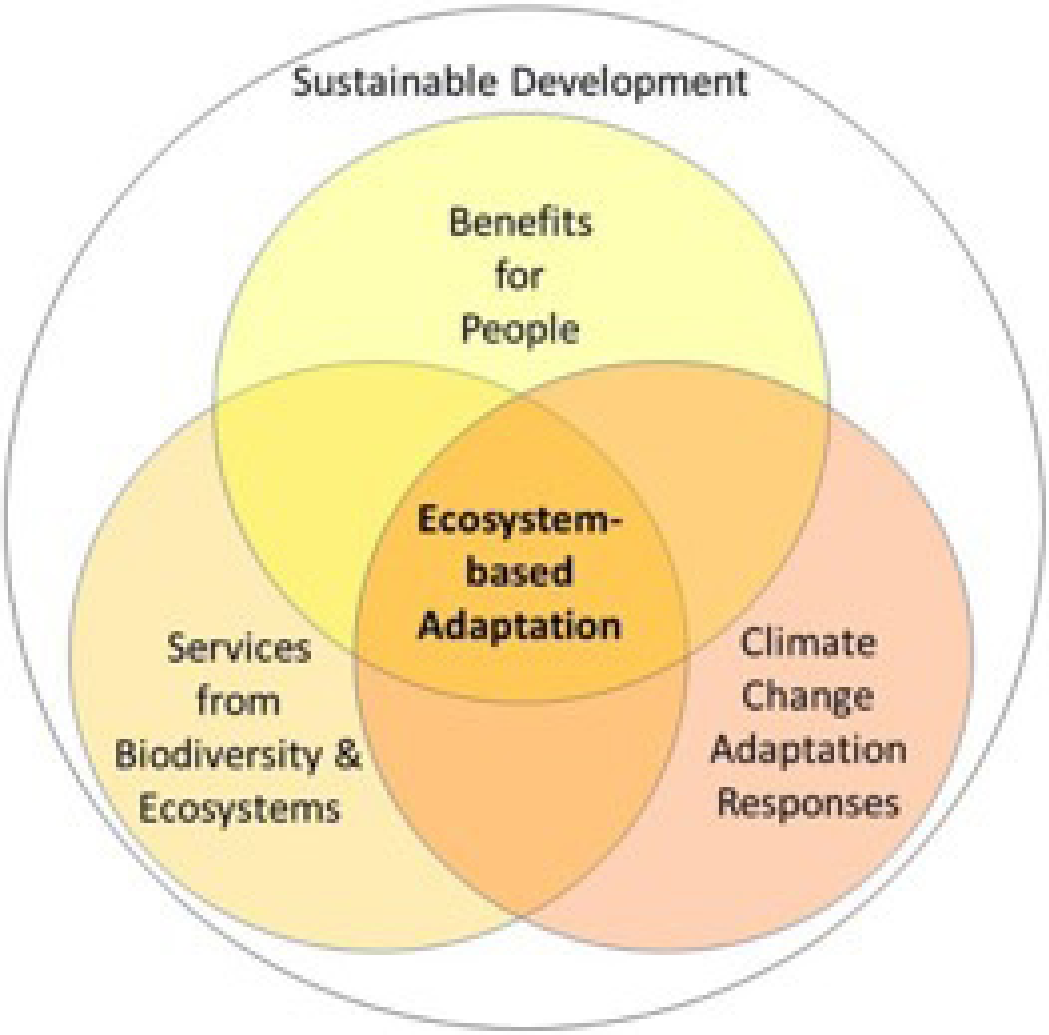

***Figure 1**. Ecosystem-based Adaptation (EbA) interventions integrate services from biodiversity and ecosystems, benefits for people and climate change adaptation responses, in the context of sustainable development (adapted from Midgley et al., 2012)*

2.2. Guiding principles

The seven guiding principles that are set out below (Box 2) expand the cornerstones of EbA and make the conceptual values and ideals of EbA more explicit. They aim to ensure that the conceptual values and ideals of EbA at the highest level can be more narrowly articulated to assist with practice. The principles (adapted and synthesised from Prutch et al., 2010; Andrade et al., 2011; 2012; Midgley et al., 2012; Spearman & Dave, 2012; Travers et al., 2012; Huq et al., 2013), centre on four main themes:

1.1. i) Building resilience (Principles 1, 2 and 7)
1.2. ii) Inclusivity (Principles 3 and 4)
1.3. iii) Scale (Principle 5), and
1.4. iv) Effective management (Principle 6).

The principles listed in Box 2 below explore these themes in more detail. They are numbered sequentially for convenience, but the order they are presented in does not suggest priority rankings, and rather they should all be considered as equally important to achieve effective EbA as envisioned by the EbA Strategy. Examples of co-benefit synergies for EbA case-studies are shown in Box 3.

Box 2: Principles and criteria for achieving effective EbA

PRINCIPLE 1: **EBA INTERVENTIONS SUPPORT RESILIENT AND FUNCTIONAL ECOSYSTEMS THAT ENSURE AND ENHANCE ECOSYSTEM SERVICES.**

- Criterion 1.1 EbA interventions must maintain or improve ecosystem functioning and integrity with the understanding that healthy, intact ecosystems are better able to maintain functional integrity under a range of climate futures.
- Criterion 1.2 EbA interventions must leverage resilience in natural, near-natural, transformed or restored ecosystems without impacting adversely on biodiversity or compromising the ecological integrity of the broader ecosystem.

PRINCIPLE 2: **EBA INTERVENTIONS SUPPORT PEOPLE IN ADAPTING TO CLIMATE CHANGE AND CLIMATE VARIABILITY.**

- Criterion 2.1. EbA interventions must result in tangible benefits to people within the context of climate change adaptation.
- Criterion 2.2. EbA interventions support socio-economic benefits that go beyond improving adaptive capacity.

PRINCIPLE 3: EBA INTERVENTIONS ARE PARTICIPATORY, INCLUSIVE, AND TRANSPARENT.

- Criterion 3.1 EbA interventions must be designed to be inclusive and to consider the needs of and impacts of climate change on marginalised groups.
- Criterion 3.2 EbA interventions are cognisant of the disproportionate impacts of climate change on women and are designed with this in mind.
- Criterion 3.3 EbA interventions are designed, developed and implemented through participatory processes.
- Criterion 3.4 EbA interventions are supported by capacity building processes.

PRINCIPLE 4: EBA INTERVENTIONS ARE KNOWLEDGE AND EVIDENCE-BASED AS INFORMED BY THE BEST AVAILABLE SCIENCE AND ROBUST INDIGENOUS AND LOCAL KNOWLEDGE.

- Criterion 4.1 EbA interventions must use credible, scale relevant climate scenarios.
- Criterion 4.2 EbA interventions are based upon credible, locally relevant impact and vulnerability scenarios.
- Criterion 4.3 EbA interventions support learning networks, communities of practice and the co-generation of knowledge.
- Criterion 4.4 EbA interventions support robust M&E and learning processes.
- Criterion 4.5 EbA project cycles assess and evaluate thresholds and trade-offs.
- Criterion 4.6 EbA project cycles permit flexible adjustment of interventions as informed by the best available information.

PRINCIPLE 5: EBA INTERVENTIONS ARE CONTEXTUALISED WITHIN BROADER NATIONAL AND REGIONAL POLICY AND LANDSCAPE PROCESSES AND ARE DESIGNED TO BE SCALABLE AND REPLICABLE.

- Criterion 5.1 EbA interventions are cognisant of broader landscape processes and ecosystem services, and recognise that some EbA service benefits may only become apparent at larger scales such as watersheds or biomes.
- Criterion 5.2 EbA interventions are implemented as part of integrated climate change adaptation strategies. As such, they are aligned with national and sub-national enabling frameworks and mainstreamed into relevant plans, polices and practice at multiple scales.
- Criterion 5.3 Scalability and sustainability is explicitly considered in EbA interventions.

PRINCIPLE 6: EBA INTERVENTIONS STRIVE TO BE INTEGRATIVE AND TO PROMOTE TRANSDISCIPLINARITY AND MULTI-SECTORALITY THROUGHOUT THE PROJECT LIFECYCLE.

- Criterion 6.1 EbA interventions are sectorally cross-cutting and require the collaboration, coordination, co-operation of multi-stakeholder groups and operational role-players, including that of institutional stakeholders.
- Criterion 6.2 EbA interventions support cross-sectoral adaptation and governance across scales.
- Criterion 6.3 Where relevant, EbA interventions make use of complementary natural, engineered, social and systemic solutions

PRINCIPLE 7: EBA STRIVES TO ACHIEVE CO-BENEFITS AND SYNERGISTIC OUTCOMES.

Synergies between adaptation and mitigation outcomes have long been sought and incentivised where feasible. EbA generally revolves around ecosystem management and thus may be relevant to carbon sequestration and related local changes in climate forcing such as albedo changes, especially where restoration or reforestation interventions are being considered.

- Criterion 7.1 EbA interventions promote positive co-benefit synergies, e.g. job creation, income generation, climate change mitigation (Box 3).

Box 3: Examples of co-benefit synergies for EbA case-studies (extracted from UNFCCC, 2011: 16; their Table 1)

	Co-benefit example				
ADAPTATION MEASURE	**ADAPTATION FUNCTION**	**SOCIO-CULTURAL BENEFIT**	**ECONOMIC**	**BIODIVERSITY**	**MITIGATION**
Restoration of degraded wetlands	• Maintenance of nutrient and water flow, quality, storage and capacity; • Protection against floods or storm inundation	Sustained provision of: • Livelihoods, • Recreation • Employment opportunities	Increased: • Livelihood generation • Potential revenue from recreational activities • Sustainable use • Sustainable logging of planted trees	• Conservation of wetland flora and fauna through maintenance of breeding grounds and stopover sites for migratory species	• Reduced emissions from soil carbon mineralisation and increases emissions of methane
Mangrove conservation	• Protection against storm surges, sea level rise and coastal inundation	• Provision of employment options (fisheries and prawn cultivation) • Contribution to food security	• Income for local communities through marketing of mangrove products (fish dyes, medicines)	• Conservation of species that live or breed in mangroves	• Conservation of carbon stocks, both above ground and below ground
Conservation of medicinal plants used by local and indigenous communities	•Local medicines available for health problems resulting from climate change or habitat degradation, e.g. malaria, diarrhoea, cardiovascular problems	• Local communities have an independent and sustainable source of medicines • Maintenance of local knowledge and traditions	• Potential sources of income for local people	• Enhances Medicinal plant conservation • Local and traditional knowledge recognised and protected	• Environmental services such as bees for pollination of cultivated crops
Sustainable management of grassland	•Protection against floods •Maintenance of soil structure	• Recreation and tourism	• Income generation for local communities through products made from grass • Forage for stock animals	• Forage for grazing animals • Provide diverse habitats for animals that are predators and prey	• Maintenance of carbon storage in soil

Original Source from which UNFCCC, 2011 extracted Table 1: Convention on Biological Diversity. Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. Technical Series No. 41. Montreal: Convention on Biological Diversity.

2.3. EbA Safeguards

Safeguards are intended to support EbA implementation within the overarching context of the EbA core guiding principles. Safeguards assure that EbA self-screening and self-assessment through monitoring and evaluation are in-line with core guiding principles.

The safeguard guidelines listed hereafter adapt and synthesise international safeguard best practice from the Adaptation Fund (AF) of the United Nations Framework Convention on Climate Change (UNFCCC) (Adaptation Fund, 2016), the Green Climate Fund (GCF) of the UNFCCC (Green Climate Fund, 2011) and UNFCCC REDD+ (Rey et al., 2013). They do not include an exhaustive review of these documents, nor repeat the detail contained within the originals, and instead are intended to highlight relevant safeguards for ensuring compliance with good practice EbA. Table 1 illustrates how safeguards are aligned with and could support the EbA Principles.

Safeguard 1: All EbA projects shall have a robust monitoring and evaluation system, ensuring that (i) any social and environmental risks impacts that may result from the project have been clearly identified and assessed at the earliest stage in project design, (ii) appropriate measures have been taken to avoid, and if not possible, mitigate these risks throughout implementation, (iii) the measures taken to avoid/mitigate risks are themselves monitored and reported throughout project lifecycles.

Safeguard 2: EbA projects must complement or be in line with the appropriate national environmental legislative and regulatory frameworks, such as National Biodiversity Strategy and Action Plan (NBSAP), and the National Adaptation Strategy amongst others.

Safeguard 3: EbA projects must complement relevant International Agreements and Conventions that South Africa is party to, such as Sustainable Development Goals (SDGs), Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), United Nations Office for Disaster Risk Reduction (UNISDR) and Ramsar Convention amongst others.

Safeguard 4: EbA projects shall not result in the degradation of natural habitat, loss of indigenous biodiversity or the introduction of invasive species. EbA projects will not result in the unjustified conversion of natural habitat, and take general measures to promote and enhance biodiversity and ecosystem services, including considerations of soil conservation and possible degradation of productive lands.

Safeguard 5: EbA projects shall promote fair and equitable access to benefits. EbA projects will not exacerbate existing inequities, particularly with respect to marginalised or vulnerable groups. EbA projects and programmes shall meet National labour standards, protecting participants against exploitative practices, discrimination and work that is hazardous to well-being.

Safeguard 6: EbA projects must promote active participation of local communities, and there shall be adequate opportunities for informed involvement.

Safeguard 7: **EbA projects will respect the rights of local communities**, including access to and use of physical and cultural heritage.

Safeguard 8: EbA projects will not result in unsustainable resource use nor unjustified increase in drivers of climate change, and will meet applicable international and national standards for maximising energy efficiency and minimising material resource use.

Safeguard 9: **EbA projects will not result in unintended adverse impacts on biodiversity or people, or the displacement of risks** from one area to another as a result of project implementation.

Safeguard 10: EbA projects must promote transparent governance by supporting rights to Access to Information, providing interested stakeholders with information in a timely manner, and supporting the further collection and dissemination of knowledge.

Safeguard 11: EbA projects must consider appropriate indigenous and local knowledge where available in addition to robust science to ensure that interventions reflect both the best available evidence and current local and indigenous understanding in order to minimise unintended consequences of implementation.

Table 1. *Alignment of core EbA principles and relevant safeguards*

	PRINCIPLE 1: FUNCTIONAL & RESILIENT ECOSYSTEMS	PRINCIPLE 2: REDUCED HUMAN VULNERABILITY	PRINCIPLE 3: INCLUSIVE & PARTICIPATORY	PRINCIPLE 4: KNOWLEDGE- & EVIDENCE-BASED	PRINCIPLE 5: CONTEXTUALISED & REPLICABLE	PRINCIPLE 6: INTEGRATIVE & CROSS-SECTORAL	PRINCIPLE 7: CO-BENEFITS AND SYNERGIES
Safeguard Principle 1: All EbA projects shall have a robust monitoring and evaluation system	•	•	•	•	•	•	•

	PRINCIPLE 1: FUNCTIONAL & RESILIENT ECOSYSTEMS	PRINCIPLE 2: REDUCED HUMAN VULNERABILITY	PRINCIPLE 3: INCLUSIVE & PARTICIPATORY	PRINCIPLE 4: KNOWLEDGE- & EVIDENCE-BASED	PRINCIPLE 5: CONTEXTUALISED & REPLICABLE	PRINCIPLE 6: INTEGRATIVE & CROSS-SECTORAL	PRINCIPLE 7: CO-BENEFITS AND SYNERGIES
Safeguard Principle 2: EbA must complement or be in line with the appropriate national environmental legislative and regulatory frameworks	•	•	•		•	•	•
Safeguard Principle 3: EbA projects must complement relevant International Agreements and Conventions that South Africa is party to	•	•	•		•	•	•
Safeguard Principle 4: EbA projects will not result in the degradation of natural habitat, loss of indigenous biodiversity or the introduction of invasive species	•		•		•	•	•
Safeguard Principle 5: EbA projects shall promote fair and equitable access to benefits		•	•			•	•
Safeguard Principle 6: EbA projects must promote active participation of local communities		•	•	•	•	•	•
Safeguard Principle 7: EbA projects will respect the rights of local communities		•	•	•		•	•
Safeguard Principle 8: EbA projects will not result in unsustainable resource use, nor increases in drivers of climate change	•						•
Safeguard Principle 9: EbA projects will not result in the displacement of risks	•	•	•		•	•	
Safeguard Principle 10: EbA projects must promote transparent governance		•	•	•	•	•	
Safeguard Principle 11: EbA projects must consider appropriate indigenous and local knowledge where available in addition to robust science	•	•	•	•	•	•	•

2.4. Monitoring and Evaluation for EbA

2.4.1. Monitoring and Evaluation for Adaptation – National Context

The Department of Environmental Affairs (DEA) is in the process of drafting a national Monitoring and Evaluation (M&E) protocol for climate change adaptation and tracking South Africa's progress towards climate resilience on a by-sector basis. The proposed M&E protocol tracks the effectiveness of specified adaptation priorities, embedded in policies, plans and actions, comparing 'progress summaries' over time (i.e. for successive reporting periods). A national M&E adaptation protocol will make reporting on climate change adaptation more relevant to the on-going, planned and future adaptation work on-going across the three spheres of government. As such, M&E systems designed for EbA at national and sub-national scales should be cognisant of this national M&E context, as delivering on adaptation priorities nationally will be achieved through the collective action of adaptation operations across all spatial scales (i.e. national and/or provincial and/or municipal), with overall progress a cumulative M&E score of adaptation effectiveness.

Because EbA is an emerging practice, the monitoring and evaluation (M&E) of EbA has not yet been widely applied (McKinnon & Hole, 2015). Considerations that are particularly relevant for the M&E of EbA have been synthesized by Spearman and Dave (2012:22), as summarised in Annex 2. It will be important to coordinate the development of M&E approaches for EbA in a way that aligns with national climate change M&E, and to do this as part of the process of regular review and revision of this guideline document. Additionally, efforts should be made to ensure that the M&E of EbA interventions is long term and systemic, and not limited to the time frames and scales of project based EbA interventions.

3. OPPORTUNITIES FOR ENHANCING THE EBA PROGRAMME OF WORK IN SOUTH AFRICA

Improving convergence between South Africa's existing programmes of work and EbA can be achieved through application of the cornerstones, principles, criteria and safeguards described in Section 2. When revising existing non-EbA initiatives for an EbA context, clear intentionality to meet EbA objectives (i.e. to help people to adapt to the adverse effects of climate change) must be demonstrated.

3.1. Convergence with SANBI's existing programme of work

The EbA Strategy outlines a number of existing national level programmes of work that could demonstrate convergence and contribute to the achievement of the EbA strategy with appropriate alignment (DEA & SANBI, 2016).

SANBI's Climate Change Programme Strategy (2011/12-2015/16) prioritises research on ecosystem-based solutions to support societal responses to climate change, and **SANBI's programmes of work in Mainstreaming Biodiversity, Ecological Infrastructure and Municipal Support,** emphasise dual ecological and societal benefits, and the critical role that biodiversity can play in supporting robust development pathways and contributing to human well-being, i.e. integration of biodiversity into land-use planning for cost-effective, long-term service delivery; supplementing and/or substituting built infrastructure and extending its lifespan and thereby reducing the need for additional investment; supporting conservation strategies and restoration projects through stewardship programmes that provide a diversity of livelihood and biodiversity protection benefits (https://www.sanbi.org/biodiversity-science).

3.2. Convergence with DEA's existing programme of work

DEA's Environmental Programmes, implemented under the auspices of the Expanded Public Works Programme (EPWP), may also meet EbA objectives with appropriate realignment. Nationally, there is a strong basis for focusing effort on the most valuable services provided by ecosystems, such as water supply, carbon sequestration, and fire protection; using these as 'umbrella services' to support a suite of societal benefits while achieving various environmental protection goals (Turpie et al., 2008). DEA's "Working for/on – " Environmental Programmes (https://www.environment.gov.za/projectsprogrammes#workingfor) align well with this principle, e.g. ensuring

water supply (Working for Water), assuring water quality and regulation (Working for Wetlands), supporting functional watershed services (Working for Ecosystems), supporting coastal rehabilitation and sustainable harvesting practices (Working for Coast), and reducing disasters associated with fire risk (Working on Fire) (Barendse et al., 2016); restoring ecological infrastructure while supporting societal goals of poverty alleviation through job creation; a suggested win-win strategy for both ecological restoration and socio-economic developmental priorities (McConnachie et al., 2013).

Within these programmes of work, EbA-relevancy is obvious, but missing is a consideration of 'future-proofing' the programmes more generally. Within the broader context of South Africa's adaptation to a variable and uncertain future, this requires an explicit consideration of climate change to be made at the highest level of Programme planning. It requires more explicitly guiding programme effort towards (i) those most vulnerable to climate change impacts, (ii) areas most at risk and/or critical in terms of supporting an ecosystem's ability to adapt to climate change, and (iii) demonstrating tangible benefits to people, that go beyond only economic employment opportunities (~ "EbA co-benefits" within the context of realised EbA; see Box 3 examples). A more explicit reframing within the context of the EbA cornerstones (Figure 1), will likely provide opportunities for existing elements of these programmes to meet EbA practice requirements; making them more robust to the uncertainty associated with climate change and variability, and potentially unlocking additional funding opportunities associated with EbA.

3.3. Convergence with the programme of work of National Sector Departments

The development of sector plans by Departments is neither formally synchronised nor fully complete. As a consequence, there remains a substantial opportunity both to explore EbA relevance to individual sectors at an early stage of sectoral adaptation planning, and to develop ways through which EbA approaches might increase inter-sectoral synergies in adaptation responses. There are also strong potential synergies between EbA approaches and adaptation-mitigation synergies and trade-offs that require further work. A programme of work could be usefully developed that aims to identify these inter-sectoral and adaptation-mitigation synergies, and builds the expertise necessary to elaborate them to planning and implementation stages.

3.4. Convergence with the programme of work of Municipalities

In comparison to the situation with Sector Departments, adaptation planning in Municipalities is not formally synchronised but much further from complete, with the exception of some larger metropolitan centers. An active programme involving municipalities has been developed through the "Let's respond" Toolkit of the Local Government Climate Change Support Program (LGCCS), an initiative of the Department of Environmental Affairs and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The opportunity to explore EbA relevance to individual municipalities at an early stage of municipal level adaptation planning is thus very significant. Similar to the situation with Sectoral Departments, there are also strong potential synergies between EbA approaches and adaptation-mitigation synergies and trade-offs that require further work. The Department of Rural Development and Land Reform (DRDLR) Climate Change training programme toolkit is an example of such an opportunity. A programme of work could usefully be developed that aims to identify these, and builds the expertise necessary to elaborate them to planning and implementation stages.

4. IMPLEMENTING EBA IN SOUTH AFRICA

4.1. Actions for identifying, developing and implementing new EbA projects and programmes

The following actions are suggested as an initial framework to guide best practice, and should be taken into account when conceptualising new EbA projects in South Africa. They are broadly based on the IUCN's standards for EbA practice internationally (see Andrade et al., 2011; 2012; Jiménez-Hernández, 2016), but have been further contextualised within the EbA Strategy overarching overall or broad objectives. They are intended to facilitate, inform and focus projects within the framing of the high-level Principles of EbA (i.e. Section 2), but

are not overly prescriptive in that well-motivated individual project circumstances are taken into account. The guidelines promote an integrated approach to EbA, with the ultimate goal of supporting overall adaptation and building resilience for the socio-ecological systems in which EbA interventions will be housed (i.e. Jiménez-Hernández, 2016).

The actions described below are most directly applicable to EbA interventions being implemented at local scale. These can be adapted to larger scale projects with adjustments, for example, to broaden target stakeholders and level of socio-economic detail.

Action 1: Assessment of EbA feasibility, and design of an appropriate implementing structure This action assesses the feasibility of EbA within the relevant spatial and socio-economic context, and undertakes the preliminary project planning and design to match this context.	• Identify and engage the core expertise required, with particular regard to suitable multi-disciplinary expertise, to address cross-cutting social, economic, political and ecological factors for EbA scoping, design, and implementation. • Identify the target social-ecological systems, and determine their relevant spatial extent (ideally through defining boundaries). • Determine the location of the EbA project within this social-ecological system, and the adaptation services that are to be incorporated (i.e. ecosystem services that are valuable in terms of building resilience to climate change and variability, e.g. water supply, flood control etc.; Jiménez-Hernández, 2016). • Scope the socio-political factors in the area and whether target site/s, associated communities, and existing institutional arrangements will support EbA. • Scope potential non-climatic factors (i.e. land-ownership contentions, existing land claims, mining claims, development rights), that may affect social and ecological vulnerability, and the longevity and success of the EbA intervention. • Scope the climatic threats and their likely social-ecological impacts with and without the EbA intervention.
Action 2: Gather data necessary to describe the geographical and social-ecological profile of project site/s, and to develop EbA goals This stage provides the quantitative understanding of the social and ecological context of the target project site. The data collected and expertise drawn upon should be both science-based and derive from participatory processes. These include local knowledge on climate change impacts and variability, as well identifying stakeholder priorities for EbA outcomes.	• This action should focus on four activities (adapted from Jiménez-Hernández, 2016): • Stakeholder mapping. • Social-ecological landscape analysis and boundary setting. • Climate risk projection and mapping. • Analysis of institutional and policy environment.
2.1 Stakeholder mapping Stakeholder mapping will facilitate participation of relevant actors, at scales appropriate to the project. Stakeholder mapping should include assessment of local actors, i.e. resident communities, but also relevant actors in the wider landscape, including municipal, provincial and national public sectors actors when appropriate. Regardless of the scale, multi-stakeholder and equitable engagement is required for EbA throughout project lifecycles, and this requires clear intentionality in identifying and including affected and/or relevant stakeholders to the project.	• Identify and convene actors from the EbA target site and its larger context, including local and national experts for EbA. • EbA workshops can be themed around (i) stakeholder identification and stakeholder interests, (ii) landscape mapping and ecosystem services evaluation, (iii) vulnerability and risk profiling, (iv) appraisal of institutional arrangements and screening of relevant policy, and (v) determining appropriate M&E protocols. This process will assist in the assessment of scaling trade-offs in stakeholder needs, and the identification of potential 'winners and losers' to specific changes to the landscape, or those that may arise as a result of EbA interventions.
2.2 Social-ecological landscape analysis and boundary setting, including assessment of landscape change trends and projections In addition to providing the contextual understanding of the target landscape, this information will help identify whether the ecosystem will continue to maintain function and structure, and thereby continue to provide adaptation services if current rate of landscape change, and current land-use pressures are maintained or escalate:	• Collate and synthesise available information and knowledge from different disciplines and sectors on important socio-ecological system components of the target landscape. • Identify key ecosystem services through appropriate ecosystem service mapping. This analysis may be provided through expert-GIS mapping, as well as through participatory community mapping of resources. Resource mapping will help determine how key biodiversity features and ecosystem services are acknowledged, managed and valued by users, at a scale appropriate to the project. A combined approach will provide a spatial overview of the landscape change and landscape utilisation pressures, as well as the value ascribed to certain landscape areas, features and/or services by local users. • Map, model and evaluate the multiple flows of identified ecosystem services to the diverse users and sectors through scale, aligning to national and sub-national levels. • Evaluate information on ecosystem services and climate change impacts to identify knowledge gaps for additional research and to direct monitoring and evaluation priorities.

2.3 Climate risk projection and mapping Understanding climate variability and future climate change is fundamental to designing appropriate EbA interventions that foster adaptation.	• Obtain climatic projections, focusing on ecologically and socially relevant variables, at appropriate spatial and temporal scales. • Obtain robust science-based data and indigenous/local knowledge on past and current climate variability, as its impacts, particularly for social groups, land-uses and sectors most vulnerable or, in the case of natural systems, those most valuable in terms of increasing resilience and providing adaptation services
2.4 Analysis of institutional and policy environment	• Develop an understanding of the social processes and the governance structures that influence land-use, development planning and natural resource management across scales, i.e. at the project site and programme scale, as well as the broader landscape • Identify national and sub-national policies that may influence landscape management and environmental planning in target areas. This will assist with identifying opportunities for convergence, or potential conflicts, with National and sub-National institutional and policy frameworks needing consideration.
Action 3: Assess vulnerability through integrated and participatory vulnerability assessments (or similar) that help to determine adaptive capacity in both social and ecological systems (see CSA (2015) and Bourne et al. (2016) for best practice approaches at local and regional scales)	• Determine exposure, sensitivity and adaptive capacity of vulnerable social groups, affected communities and ecosystems within the context of climate change. • Assess overall vulnerability of relevant groups, communities and ecosystems. • Identify feedbacks and linkages between ecosystems and people • Assess past and current coping strategies used by communities, in terms of sustainability to climate change, and for their long-term direct and indirect consequences on critical ecosystem services and other processes in the system that may enhance vulnerabilities of certain social groups, i.e. power relationships. This step will be informed by II.3. Participatory scenario exercises with stakeholders may assist considerations of how vulnerable groups, communities and ecosystems might fare under various development, management, and climatic projections (e.g. Capitani et al., 2016). • Document the level of confidence or uncertainty in assessments, including the limitations of the data used and the conclusions that can be drawn.
Action 4: Locate EbA projects within National and sub-National frameworks so as to enhance the long-term chances of success	• Understand national and sub-national [adaptation] enabling frameworks so that EbA interventions contribute to them. Box 4 provides an example for alignment and convergence in goals. • Share results with those coordinating the frameworks, highlighting synergies and opportunities of integration of EbA approaches into these frameworks.
Action 5: Integrate EbA interventions into broader adaptation practices across sectors	• Work towards ensuring that EbA plans are coherent with other sector policies and action plans (i.e. Annexure A3.2), so that EbA outcomes complement broader sustainable development initiatives, using the opportunities in having common goals to build convergence and cross-sectoral partnerships. • Ensure implementation of short-term interventions (e.g. disaster risk adaptation, water availability or interventions that focus on current land-use pressures and climate factors) or those implemented at local scales, do not compromise longer-term adaptation options (e.g. securing water rights or land tenure) or adaption options elsewhere in the wider landscape (i.e. considerations of risk displacement). • Demonstrate positive outcomes at local scales and visible benefits in short-medium term through appropriate M&E (see point VI) to facilitate broader buy-in and enable the up-scaling and mainstreaming of EbA through policy – championing opportunities of good practice EbA into relevant strategies across sectors. • Identify mechanisms to raise awareness about climate change related threats to stakeholders (and/or implementing agencies) and enhance capacity in governance institutions to jointly formulate across-scale adaptation policies.

Action 6: Ensure the sustainability of monitoring and evaluation for adaptive management and learning	• Ensure availability of/ access to sufficient resources for M&E through project lifecycles, especially making allowance for 'learning by doing' approaches for adaptation. • Design M&E for appropriate temporal and spatial scales to capture project effectiveness. • Involve local community in M&E to support capacity development and learning, and to ensure ownership, efficiency and sustainability of monitoring longer-term. • Select indicators that capture both social and ecological outcomes, reflecting the interlinked nature of socio-ecological resilience (See Annexure 2 (Key guidelines for M&E)). • Facilitate sufficient flexibility in M&E systems to permit their adjustment in response to unanticipated outcomes and project uncertainties. • Design M&E systems to capture information relevant for knowledge sharing, dissemination and adaptive learning.

Box 4: Example of a national framework that may be appropriate to guide development planning

The National Development Plan (NDP) 2030 (NPC, n.d.) is the key development policy for South Africa offering a long-term perspective towards development priorities, particularly with regard to EbA Principle 4, i.e. ensuring that EbA is located in appropriate National and sub-National frameworks. The NDP emphasises "Long-term planning to promote biodiversity and the conservation and rehabilitation of natural assets is critical, and should be complemented by a strategy for assessing the environmental impact of new developments as an important component of overall development and spatial planning. Where damage cannot be avoided or mitigated, and where the social and economic benefits justify the development, a commensurate investment in community development and the rehabilitation and conservation of biodiversity assets and ecosystem services is required." (NPC, n.d: 201).

The NDP's Chapter 5 offers 14 guiding principles for development that supports 'environmental sustainability and equitable transition to a low-carbon economy'. These NDP principles are well aligned with the overarching intentions of EbA good-practice, i.e. acknowledging that human well-being is dependent on healthy ecosystems, prioritising least-regret mitigation and adaptation pathways, prioritising active, transparent and accountable participation and implementation lifecycles, and emphasising the building of sustainable communities.

4.2. Guidelines for integrating EbA onto ongoing programmes of work

Integrating existing programmes of work to EbA requires clearly recognising and capturing the concepts of 'intentionality' and 'additionality' in existing operations, i.e. in the sense of achieving social and ecological resilience in the context of climate change adaptation.

These concepts may be captured hierarchically, in two respects:

- Within the context of high-level spatial and temporal priorities for EbA nationally (coordinated by National EbA Lead Agencies).
- Within the context of specific programme mandates (contextualised by programme leads and high-level operational objectives).

At national scales, it would be valuable to identify specific areas within the country that should be prioritised for EbA projects, i.e. as was done for climate change mitigation in the case of the Clean Development Mechanism (CDM) of the UNFCCC's Special Under Developed Zones (SUZs) which highlights areas within a country that should be targeted for emissions reduction projects. Box 4 suggests one such possible methodology (there may be others which may be appropriate) through which the National Lead Agencies, DEA and SANBI, and supported by the National EbA Coordinating Steering Committee (CSC) (see DEA & SANBI, 2016: 37) could identify and help coordinate EbA activities nationally, providing high-level spatial guidance on where ongoing programmes of work may align with national [EbA] priorities. This would address concerns around 'piece-meal' / ad hoc EbA foci and allow for a coordinated national approach.

Within the EbA Strategy, allowance has been made within the 2017/2018 period for specific coordination activities, and spatial (and temporal) prioritisation for EbA would further support the objectives of cross-sectoral coordination.

A similar methodology could also be applied at programme level; utilising and downscaling national data to local sites to guide considerations of social and ecological vulnerability and climate change within the context of

programme objectives. This would assist in identifying priority areas to reduce vulnerability and build resilience to climate change (i.e. EbA goals), while still within the context of specific programme mandates.

4.3. Guideline for EbA research and/or research that supports EbA

The Environment Sector Research, Development & Evidence framework (R, D & E) (2012) has identified that an evidence-based approach to policy and decision-making is critical for achieving sustainable development objectives. This is coordinated nationally through the National Biodiversity Research & Evidence Strategy 2015-2025(NBRES) so as "to provide the knowledge and evidence base for informed policy and decision-making relating to the management of South Africa's biodiversity and its benefits to society" (DEA, 2016:17). Thus, EbA research should be aligned with the NBRES and associated implementation plan/s.

Within the NBRES, the following core biodiversity areas from the R,D & E framework are highlighted as requiring a better knowledge and evidence-base and identified as priorities to guide additional research so as to support actions and track progress - many of which are in support of, and supported by, good-practice EbA (Figure 2 & Table A1.1):

- Slowing the rate of habitat loss and habitat degradation
- Reducing the threat status of South Africa's indigenous species
- Reducing land degradation and desertification
- Reducing and reversing declines in ecosystem health
- Rehabilitation and restoration of ecosystems
- Improving the status of freshwater and marine ecosystems, including transformed wetlands and estuaries
- Decreasing the spread of invasive alien species
- Minimising overharvesting of indigenous species

Focused EbA research aligns well with the national research prerogative around the development of a comprehensive evidence-base to support EbA policy and practice, as the fairly recent emergence and adoption of EbA means that several theoretical assumptions, aspects relating to its implementation, and likely effectiveness, remain under-researched. While it is possible to justify EbA on the current incomplete knowledge base, it is important to improve the knowledge base to provide more credible evidence for the approach.

Research has highlighted knowledge gaps that if addressed would improve the likelihood of successful implementation of future EbA projects. Amongst these gaps are a lack of effective monitoring mechanisms that could assess the effectiveness and cost-efficiency of EbA projects in comparison to other adaptation approaches (Doswald et al., 2014; Roberts et al., 2012; Hill, 2015). Also required is a better understanding of how EbA projects can contribute to sustainable development under a range of different social, political and financial contexts (Ziervogel *et al*, 2014; Hill, 2015).

In South Africa, additional vulnerability assessments are needed to guide what areas are most vulnerable and would benefit from EbA (Midgley et al., 2012), and for EbA practice more generally, research has indicated the importance of participatory planning, implementation and project monitoring for reducing misunderstanding amongst the diverse stakeholders involved with EbA initiatives, and for ensuring the sustainability of implementation (IUCN, 2014). In this regard, there is evidence that EbA research would benefit from strengthening the connections between professional 'expert' and non-professional participants (i.e. Theobald et al., 2015), allowing opportunity for citizen science and indigenous knowledge to participate in addressing EbA data-gaps (i.e. Wamsler et al., 2016). Finally, EbA projects would benefit from improved communication to encourage peer learning, capacity building and improved policy relevance.

Successful EbA outcomes in South Africa are therefore dependent on a considered programme of research. Using the simple EbA conceptualisation (presented in Figure 1) makes it possible to identify three important EbA-related research areas that can each contribute to the transdisciplinary type of approach needed for EbA (Figure 2), and that will support the broader national R, D & E strategic objectives. Each of these EbA-related research

areas has an established track record that has been built up prior to the adoption of EbA, and which therefore have a longer history of research. These are biodiversity benefits for people, climate change adaptation strategies for people, and biodiversity resilience to climate change. While each of these research areas remains important in its own right in supporting EbA, EbA development requires transdisciplinary research linking these three areas (Figure 2). This guideline summarises in Table A1.1, examples of critical areas of interdisciplinary research required that emerges from this perspective.

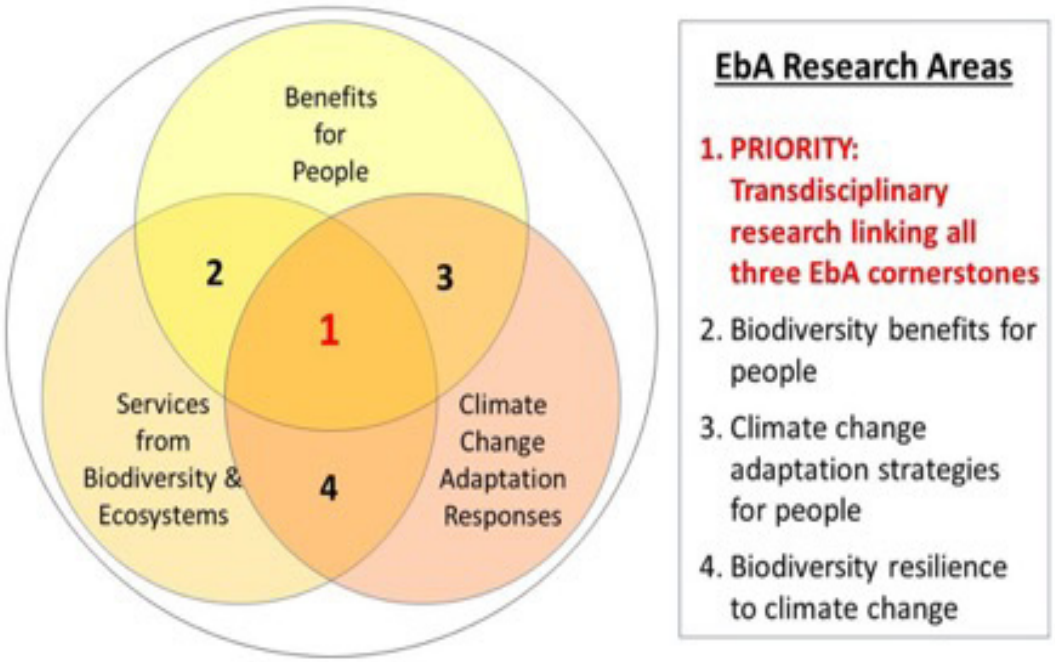

***Figure 2**: Important conceptual areas for research to support EbA. Of greatest priority is 1) transdisciplinary research that links all four EbA cornerstones. Other important areas include 2) biodiversity benefits for people 3) climate change adaptation strategies for people; and 4) biodiversity resilience to climate change. An indicative list of areas for EbA related research is included in Annexure 1. The research areas emerged through the consultative process that supported the development of the guideline, and are intended to be considered in support of the broader national R, D & E strategic objectives.*

5. PROCESSES FOR USER GROUPS

In this section of the guideline, processes are set out for each of the anticipated user groups. The processes are intended to guide would be users through the sections of the guideline document in a step-by-step manner, and in so doing, to simplify the process. For each group, guidance is given for those considering new initiatives, as well as for those seeking to adapt existing initiatives to become aligned with EbA.

It is expected that many of the anticipated user groups will not be familiar with the concept of EbA, or its value, and that a series of capacity building interventions may be needed to explain the meaning, relevance and opportunities associated with EbA.

5.1. Processes for Project and Programme Managers

Project and programme managers are understood to be personnel employed within the public and private sectors who are engaged in the planning, development and implementation of projects or programmes that lend themselves to alignment with EbA.

Working with these project and programme managers will be key to building a base of EbA interventions, and potentially scaling up the EbA programme exponentially if EbA is mainstreamed into existing projects and programmes. By integrating EbA into their interventions, project and programme managers stand to gain by climate

proofing their interventions, delivering additional benefits to local communities and potentially unlocking additional sources of funding.

Suggested key questions and steps for prospective EbA project and programme managers are shown in Figure 3; these provide guidance for those starting new initiatives as well as for those seeking to adapt existing non-EbA initiatives. Project and program managers would begin by asking the question “Does my project or program qualify as EbA?”. If yes, and if the project or program is being developed from scratch, it needs to cover all four of the EbA cornerstones. If yes, and it is an existing project or program, then its qualification as EbA can occur only if it is revised to cover all four of the EbA cornerstones, and if a clear intention to achieve an EbA outcome can be demonstrated. Following this, a process of assessing how to strengthen EbA outcomes by aligning with the cornerstones and principles should be followed, followed by full consideration of how adherence to the safeguards will be achieved to avoid adverse outcomes or maladaptation. Finally, implementation will be initiated by following the required actions as laid out in Section 4.1: “Actions for identifying, developing and implementing new EbA projects and programmes”.

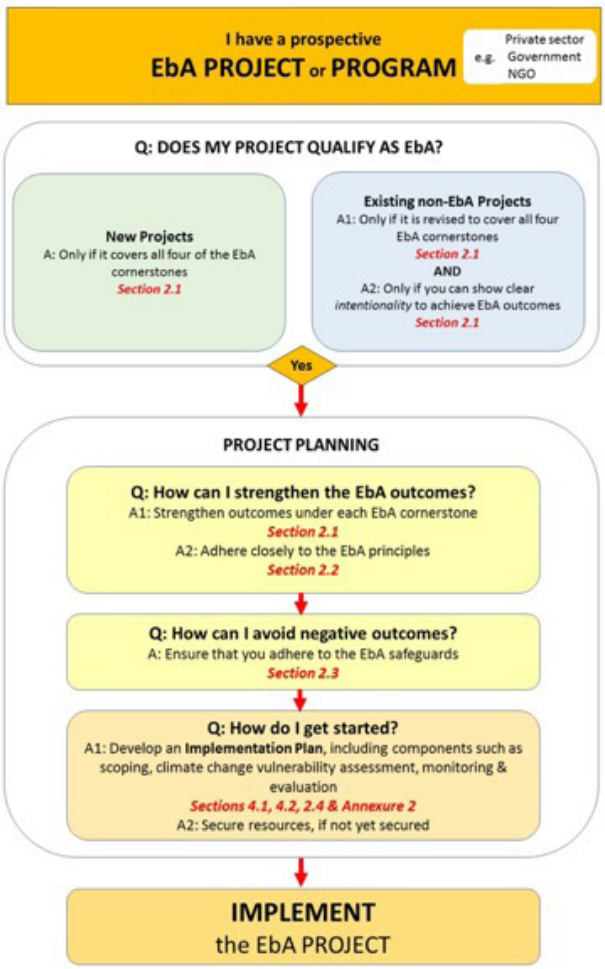

Figure 3. *Flow diagram showing suggested steps for prospective EbA project and programme managers, including those considering both starting new initiatives and adapting existing non-EbA initiatives. Steps include recommended questions, responses, and associated reference sections in these guidelines.*

5.2. Processes for Policy Makers and Influencers

Policy makers are understood to be technical, legal and strategic personnel primarily employed at national level or at high levels in the NGO and private sectors, including climate negotiators, who are engaged in developing climate change policy or providing policy guidance and technical analysis. Policy influencers are those who influence these processes.

Further work is needed to close the gap in being able to communicate EbA messages to policy makers, so that their interest in participating in and supporting the EbA programme of work is sparked.

Opportunities that could be realised through this group include the mainstreaming of EbA into relevant polices and frameworks and the catalytic cross sectorial integration, connections and collaborations that this could unlock. Working with policy makers is also important to unlock EbA at scale, and will be important for landscape level and national and subnational enabling.

Suggested key questions and steps for prospective EbA policy makers are shown in Figure 4; these provide guidance for those starting new initiatives as well as for those seeking to adapt existing non-EbA initiatives. Policy makers would begin by asking the question "Can the prospective EbA initiative be included in the relevant policy or strategy under consideration?". If yes, and if the policy or strategy is being developed from scratch, it needs to cover all four of the EbA cornerstones. If yes, and it is an existing policy or strategy, then its inclusion can occur only if it is revised to cover all four of the EbA cornerstones, and if a clear intention to achieve an EbA outcome can be demonstrated. Following this, a process of assessing how to strengthen EbA outcomes by aligning with the cornerstones and principles should be followed, followed by full consideration of how adherence to the safeguards will be achieved to avoid adverse outcomes or maladaptation. Finally, implementation will be initiated after exploring linkages with other related adaptation actions, and adopting best practices.

Figure 4. *Flow diagram showing suggested steps for prospective EbA policy makers and strategy developers, including those considering both starting new initiatives and adapting existing non-EbA initiatives. Steps include recommended questions, responses, and associated reference sections in these guidelines.*

5.3. Processes for potential Funders of EbA

Indicative users of this procedure are personnel engaged in designing funding for or assessing the funding potential of EbA research, projects and programmes. Such personnel are to be found within funding agencies, sectoral departments, at multiple levels of government, and within the NGO and business sectors. Importantly, this group does not only include those who are funding new projects or new research, but also those who are funding initiatives or research that could have EbA co-benefits were the EbA lens to be applied.

Opportunities that could be realised through this group include the unlocking of investments for EbA, through both new projects and through the climate-proofing of existing investment portfolios,

Suggested key questions and steps for prospective EbA funders are shown in Figure 5; these provide guidance for those starting new initiatives as well as for those seeking to adapt existing non-EbA initiatives. Potential EbA project funders would begin by asking the question “Could EbA become a funding priority within my specific context?”. If yes, and if the funding initiative is being developed from scratch, it needs to cover all four of the EbA cornerstones. If yes, and it is an existing funding initiative, then its enhancement to include EbA can occur only if it is revised to cover all four of the EbA cornerstones, and if a clear intention to achieve an EbA outcome can be demonstrated. Following this, a process of assessing how to strengthen EbA outcomes by aligning with the cornerstones and principles should be followed, followed by full consideration of how adherence to the safeguards will be achieved to avoid adverse outcomes or maladaptation. Finally, implementation will be initiated after scoping the EbA landscape for related adaptation funding actions, following research guidelines for funding EbA research, and including funding windows that prioritise each of the four cornerstones.

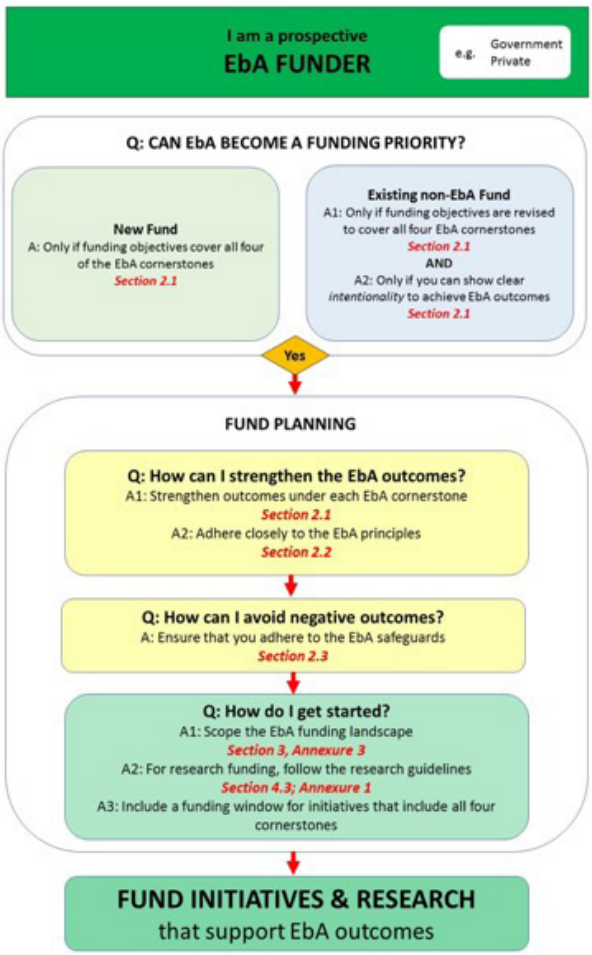

Figure 5. *Flow diagram showing suggested steps for prospective EbA funders, including those considering both starting new initiatives and adapting existing non-EbA initiatives. Steps include recommended questions, responses, and associated reference sections in these guidelines.*

5.4. Processes for EbA Researchers

Given the relative novelty of the EbA concept and its somewhat uneven interpretation across several stakeholder groups, including user groups, there is ample opportunity for focused research to support several aspects of EbA. In addition, there are several ongoing research foci at national level that would benefit from incorporating and/or testing EbA criteria. A major focus is likely to be the NRF/DST funded Global Change Grand Challenge, which is a significant funing vehicle for climate change related research, integrated within the broader study of human impacts on the environment and relationships with human society and its sustainable development. This major programme is in a period of review and redesign, and thus offers scope for a focused input from this process.

Opportunities that could be realised through this group are a deeper understanding of the application of EbA interventions on the context of socio-ecological systems, and the development of robust monitoring and risk assessment tools and methodologies. There is an enormous opportunity for trans-disciplinary research in this regard, and for the inclusion of EbA in the curriculum of higher learning programmes.

Indicative users of this procedure are research planners and funders, research managers, and researchers in EbA relevant fields. Such personnel are located at institutions of higher learning, within sector departments and in the private sector.

Suggested key questions and steps for prospective EbA researchers are shown in Figure 6; these provide guidance for those starting new initiatives as well as for those seeking to adapt existing non-EbA initiatives. Potential EbA researchers would begin by asking the question “Does my research qualify as EbA?”. If yes, and if the research initiative is being developed from scratch, it needs to cover all four of the EbA cornerstones. If yes, and it is an existing research initiative, then its enhancement to include EbA can occur only if it is revised to cover all four of the EbA cornerstones, and if a clear intention to achieve an EbA outcome can be demonstrated. Following this, a process of assessing how to strengthen EbA outcomes by aligning with the cornerstones and principles should be followed, followed by full consideration of how adherence to the safeguards will be achieved to avoid adverse outcomes or maladaptation. Finally, implementation will be initiated after following the EbA research guidelines and securing resources.

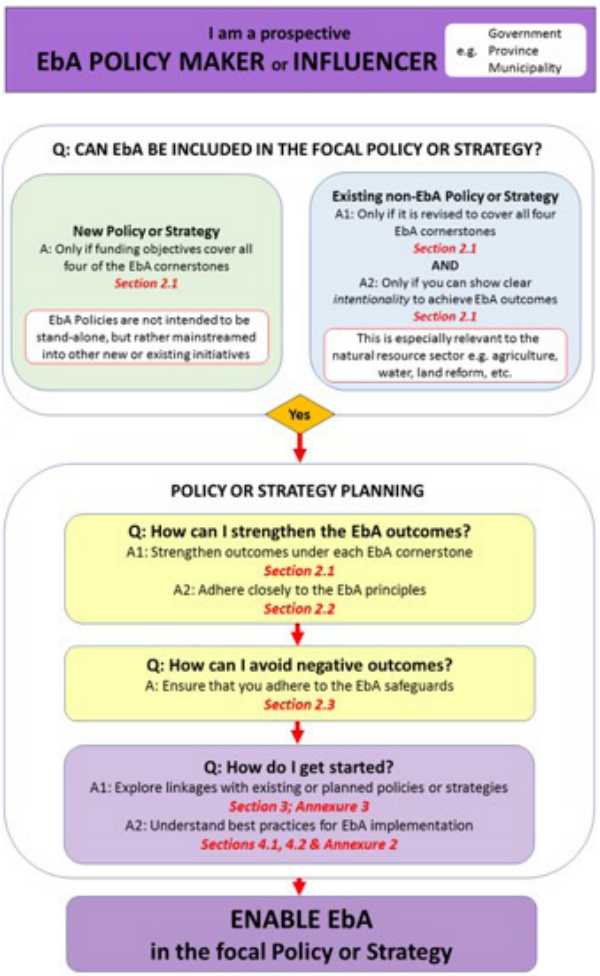

Figure 6. *Flow diagram showing suggested steps for prospective EbA researchers, including those considering both starting new initiatives and adapting existing non-EbA initiatives. Steps include recommended questions, responses, and associated reference sections in these guidelines.*

6. CONCLUSION

In conclusion, while EbA is an emerging adaptation focus, the process of developing this document shows that it is both possible and desirable to provide a guideline to encourage the consistent application of the approach. Clear opportunities for EbA programme enhancement and project development have been identified, and it is apparent that South Africa has the potential to fast track a number of EbA projects at a range of spatial scales.

The aspiration in the development of this guideline is that its use will encourage the development of a national effort in EbA that is well integrated into adaptation responses at all relevant spatial scales, and will build the resilience of South African society to the ongoing and further anticipated impacts of climate change. There remains a need to remove barriers to participation and to enable the implementation of the guideline with targeted training and capacity building, in line with the EbA Strategy. Furthermore, there is a need to periodically update and revise this document in the context of better synchronised and coordinated adaptation and mitigation strategy development and implementation.

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ANNEXURE 1: SUMMARY OF RESEARCH QUESTIONS RAISED

At the national stakeholder workshop that was held on 23 February 2017, a series of research questions were identified and proposed by participants. These are summarised in Table A1.1 below and included in their original form in the text that follows.

Table A1.1: *Indicative key areas for EbA related research*

	RESEARCH AREA	EXAMPLES OF RESEARCH QUESTIONS AND/OR TOPICS
MULTI-DISCIPLINARY RESEARCH LINKING ALL 3 CORNERSTONES	Valuation and economic issues	• What are the benefits and costs of EbA interventions? • What are the incentives that can help to drive EbA implementation?
	Implementation	• How can non-EbA projects best be converted into EbA? • Which circumstances yield the best or most reliable outcomes? • How can projects be made sustainable in the long term? (including themes such as; values around EbA; stewardship; legacy impacts; ownership and maintenance).
	Monitoring and Evaluation	• What are the key indicators to measure EbA effectiveness? • Development of an evidence base on the outcomes of EbA initiatives • What are the livelihoods benefits for EbA?
	Policy and Planning	• How to integrate EbA into different sectors e.g., urban, agriculture, health & biodiversity. • How to best integrate EbA across scales of governance, including a specific focus on local municipalities and how EbA considerations may be mainstreamed and/or operationalised into development planning at this scale? • Specific studies of cross-sectoral EbA, e.g. involving food security; pest management; drought or flood mitigation; invasive alien species control; bush encroachment. • Alignment between EbA and existing policies. • How can EbA projects contribute to poverty alleviation and job creation?
	Legal	• How best to integrate EbA with insurance considerations • Liability for outcomes of EbA projects
	Capacity building	• What are the key capacity gaps for implementing EbA? • What learning materials are needed (formal or informal)? • How can the value of ecosystem services be better communicated? • How can different types of knowledge (including indigenous knowledge, local ecological knowledge, citizen science) that engage/originate from non-scientists be [better] utilised to help address EbA research and practice needs?
	Synergies and trade-offs between co-benefits	• Integrating EbA with Ecosystem-based Mitigation. • How can trade-offs be optimised?
2.	Biodiversity benefits for people	• What are the ecosystem services provided by focal ecosystems and in focal areas?
3.	Climate change adaptation strategies for people	• How is climate change impacting livelihoods, and what are the projected scenarios? • How is climate change impacting land use?
4.	Biodiversity resilience to climate change	• Development of a framework to assess biodiversity/ecosystem resilience to climate change • What are the limits of ecosystem resilience to climate change impacts? • Impacts of changes in water supply on biodiversity • Resilience of wetland ecosystems to climate change • [Research on] Identification of desired future states and the circumstances under which they are preferred, with appropriate 'backcasting' to identify strategies for achieving those states • Conservation interventions to build resilience, e.g. corridors • Do natural or near natural systems produce different benefits to artificial systems?

Research questions as recorded on cards by participants and grouped by the facilitators:

1. Overarching group: What are the links between humans and ecosystem reliance

2. Policy convergence

2.1. Relate EbA to specific service delivery output – where are the “hooks”/synergies
2.2. Research on how EbA is being incorporated into multi-sectoral plans
2.3. Do we have relevant policies that addresses climate change
2.4. Alignment with existing policy interventions in affected landscapes

3. Biodiversity considerations research

3.1. Adaptation to changes in water supply and impact on biodiversity
3.2. Resilience of wetland ecosystems to climate change - to what extent
3.3. Drought/Flood mitigations through EbA
3.4. [Research on] Biodiversity corridors and EbA
3.5. Biodiversity adaptation at ecoregion scale
3.6. Effectiveness of DEA NRM as EbA – what do we [need] to do differently?
3.7. How EbA research can contribute to understanding plant & animal phenological traits vis a vis impacts on eco-system services
3.8. What is/are the critical thresholds for ecosystem service resilience in EbA space?
3.9. What are the best ways to enhance EbA: hard infrastructure relationships?
3.10. Does natural/near natural produce different benefits to artificial systems?

4. Valuation research

4.1. Investigate the financial cost of ignoring adaptation efforts
4.2. Research on Costing [effects?] urbanisation on ESS/landscapes
4.3. Biodiversity valuation
4.4. Costing of restoration versus doing nothing

5. Monitoring & Evaluation Research

5.1. Political commitments must also reach out to the local scale and engage, e.g. farmers, municipalities & NGOs with Gov Depts in finding solutions to local problems
5.2. What are the key indicators to monitor the effectiveness of EbA projects
5.3. Need knowledge based research on EbA {?effectiveness)
5.4. Links to how sustain EbA projects beyond funding
5.5. [Research on] Trade-offs btn humans and biodiversity – what are acceptable thresholds
5.6. What is the relationship btn EbA action and benefit
5.7. Is there a resilience framework that can be used to measure the extent of ecosystem resilience/which framework can be used [?to scale]

6. Knowledge transfer & capacity research

6.1. What capacity gaps stop/get in the way of implementation of EbA?
6.2. Put more emphasis on the source & ecosystem service “underlying assets” – is what people understand

7. Socio-economic benefits & opportunities research

7.1. Green innovation with socio-economic impacts – may also apply in monitoring , linking to appropriate tech
7.2. Screen jobs from EbA
7.3. The effectiveness of EbA on CC adaptation
7.4. Extent of community ‘buy-in’ beyond their livelihood gain – what is this/enhances this
7.5. Research on livelihood benefits of EbA
7.6. How can EbA projects contribute to poverty alleviation
7.7. The impacts of CC on local communities and sustainable livelihoods – understanding SA scenario
7.8. What are the socio-economic impacts & benefits of EbA
7.9. Evidence of community benefits

8. Land use management research

8.1. How EbA research can assist in addressing or understanding alien invasive spp. distribution
8.2. Alien invasive spp. control and rehabilitation through EbA
8.3. Look at the different EbA approaches to bush encroachment
8.4. Changes in land-use strategies due to impact of climate (rainfall, temperature etc.)

9. Agricultural research:

    9.1. EbA opportunities in agricultural sector
    9.2. EbA is important in my area especially in rural areas for grazing and agricultural system; water is a limiting factor.
    9.3. EbA Benefits for agricultural & food security

ANNEXURE 2: KEY GUIDELINES FOR MONITORING AND EVALUATION (M&E) BEST PRACTICE

These guidelines are primarily based upon Spearman & Dave, 2012:22, but where other sources are used, these are noted in the description.

- EbA M&E frameworks should consider the quality and characteristics of the project planning context as a robust baseline for future M&E. M&E frameworks should consider learning from broader adaptation planning processes (i.e., identifying factors from other processes that could possibly lead to maladaption and learning from these with regard to how these factors have been previously addressed. Similarly, existing M&E tools may offer opportunities for EbA, with appropriate review (Table A 2.1)
- EbA M&E frameworks should clearly outline specific evaluative questions that the project's M&E system will be able to answer throughout the project life-cycle (e.g. Figure A2.1). Questions should be specified for each stage of the implementation time-line. These include evaluative questions related to: i) effectiveness (biodiversity, ecosystem services, livelihoods benefits), ii) relevancy to, and compliance with national policy and international conventions, iii) efficiency (cost, scalability), iv) sustainability (project outcomes, local buy-in, financial) and v) management performance (transparency, communications, decision-making structures)

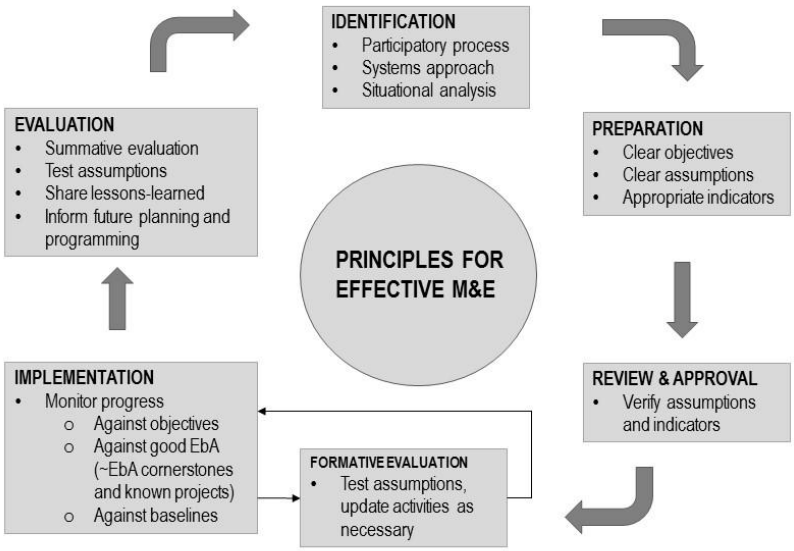

Figure A2.1: *Framework for M&E guiding each stage of EbA project cycle (Travers et al., 2012:14)*

- EbA M&E frameworks must ensure that chosen indicators address a specific driver of climate change relevant vulnerability as being directly tied to ecosystems and/or ecosystems services.
- EbA M&E frameworks consider using existing indicators (from other ongoing efforts such as government surveys, other existing data in specific sectors or exiting adaptation efforts) that are reliable and readily available during the project timeframe.
- EbA M&E frameworks consider existing [adaptation] M&E frameworks, and integrate wherever possible
- EbA M&E frameworks need to consider local capacity as the key to monitoring short-, intermediate- and long-term effects of the project/programme,
- EbA M&E frameworks need to be realistic about to what the degree to which the M&E system can illustrate the interventions' contribution to adaptation and to longer-term development goals
- EbA M&E frameworks need to monitor the context of surrounding activities that may affect EbA outcomes. EbA M&E

must recognise the differences in and the relative importance of monitoring for socio-economic changes, behavioural changes, policy changes alongside the climatic changes, ecological changes, and other bio-physical changes that occur during the project and (have the potential to) influence results.

- EbA M&E frameworks need to support flexible management and reporting processes. EbA M&E frameworks should recognise EbA approaches as both a process and an action. Processes enable improvements in adaptive capacity—assets, functions, behavioural change, awareness, better policies or strategy options longer-term, while actions directly reduce sensitivity and/or exposure to climatic variability, events, and [account for] incremental changes.
- EbA M&E must incorporate and account for multiple types of information to capture progress towards adaptation, using appropriate qualitative and quantitative data (scientific, technical, non-technical, narratives or anecdotes of observed change (e.g. Wilder & Walpole, 2008) as the basis for defining the effectiveness of an intervention in a particular context. A focus on either 'type' of data discounts the value of other forms of evidence, as for example, relying on indicator-based, quantitative methods neglects contextual information that may define causal links between observed changes and intervention activities, while capturing only rich narrative data may not provide the necessary empirical evidence (Wilder & Walpole, 2008).
- EbA M&E frameworks should support 'learning by doing', clearly reporting on the learning process and capturing failures as part of the knowledge generation process of EbA. Demonstrating transparency and communicating failures in reporting supports EbA accountability and better EbA practice going forward.

Table A2.1. *Existing M&E tools compatibility with EbA (extracted from Spearman and Dave (2012:13 – 15); where additional information is included, original sources have been added; also, refer to Spearman and McGray (2011) for more detail and examples of M&E tools used in case studies from broader climate change adaptation practice, Stem et al (2005) for those used in conservation practice, and Wilder & Walpole (2008) detailing participatory, non-indicator based and narrative-based M&E approaches).*

M&E TOOL	TOOL CHARACTERISTICS	COMPATIBILITY WITH EBA	INCOMPATIBILITY WITH EBA
Outcome mapping: e.g. Earl et al., 2001; Smutylo, 2005	• Focuses on the behaviour, actions or relationships of boundary partners (individuals, groups of stakeholders, organisations) influencing or being influenced by the project • Forces project team to be specific about actors targeted, change expected and strategies employed • Collectively maps out desired changes	• Participatory and inclusive decision-making processes • Looks beyond outputs to outcomes/long-term changes • Captures both processes and results, including progress markers to capture quality of change • Complements rigorous scientific analysis of adaptation options	• May not capture the specific links between particular ecosystems and human exposure and/or sensitivity • May require parallel monitoring systems to capture technical and non-technical components • Is likely to still require other M&E tools to meet reporting requirements

M&E TOOL	TOOL CHARACTERISTICS	COMPATIBILITY WITH EBA	INCOMPATIBILITY WITH EBA
Most Significant Change: e.g. Wilder & Walpole, 2008	• non-indicator-based monitoring method • systematically collecting the anecdotal evidence of change that may be missed by conventional monitoring techniques • • provides evidence for the impact of a project as a whole, through 'significant stories of change' • significant stories are systematically selected and passed between the layers of an organisation • and feedback is provided to project stakeholders, so enabling • both upward and downward accountability	• Participatory and inclusive decision-making processes • Captures changes in community awareness, attitudes or behaviour, improvements in social cohesion or well-being, or increased empowerment – factors that can be linked to resilience outcomes of EbA • approach is highly malleable and is adapted to fit the local situation • well-suited to projects that are complex with divergent outcomes, have many sites and organisational layers, are participatory and focused on social change, and have regular contact between field teams and communities • stories of change within broad categories relating to project objectives but are not so restrictive that unexpected outcomes and impacts are overlooked • Complements rigorous scientific analysis of adaptation options	• can be difficult to • convince people of the value of collecting unfamiliar forms • of data • time consuming, and thus, potentially costly, to establish and implement. Changes • individuals capturing stories • act as 'brokers of meaning', potentially influencing stories according personal biases or interpretations to what they perceive to be 'required' by the • project, The need for translation may hinder verification of stories by others at a later stage. • Require parallel monitoring systems to capture empirical data
Impact and Response Matrix: e.g. World Bank, 2010	• systematically identifies expected positive and negative impacts climatic changes, the chosen responses needed to address impacts and how the pilot projects that would be the basis of the intervention, would support appropriate response • systematically links project activities to climate impacts, illustrating which pilot or project activities address/support which expected impacts	• • Simple and straightforward for communication purposes • Utilises (best available) scientific evidence as a basis for decision-making • Can account for a variety of possible climate 'impact'/effect categories	• Is likely to still require other M&E tools to meet reporting requirements • May be difficult to integrate ecosystems if not already part of initial planning strategies
Conceptual modelling: e.g. Margoluis et al., 2009	• Visually depicts the context within which a project is operating within, focusing on factors present that may influence outcomes • Determines actions that may best influence site factors and those that should be monitored to assess changes with implementation • Sets out scope, conservation target, direct threats, contributing factors, strategies, goals, and objectives • Sets the stage for an intervention in the scope of a specific natural system	• Could be used to complement ecosystems-service mapping, results chains, and other M&E tools • Can be used as a communication tool for a broad set of stakeholders	• May prove difficult to identify a core set of indicators for ecosystems • Cannot apply easily to climate hazards and shocks in the system unless regularly revisited • May require additional M&E tools/ methods to meet reporting requirements

M&E TOOL	TOOL CHARACTERISTICS	COMPATIBILITY WITH EBA	INCOMPATIBILITY WITH EBA
Theory of Change (TOC): e.g. Conservation International, 2013; http://www.theoryofchange.org; McKinnon & Hole, 2015.	• maps the relationship project's long-term goal and the intermediate and early changes that are required to bring it about • Illustrates project components and inter-linkages between them required to meet short, medium and long-term objectives, through clear explanation of the process through which changes occur • Identifies key assumptions about underlying conditions • Can be used at different stages of project management cycle: i) strategic planning, ii) validation of existing plans, iii) communication of project priorities, iv) evaluation of progress	• Offers a process-oriented approach to complement result-oriented scientific evidence • Supports planners in taking a holistic and long-term perspective to interventions strategies • Illustrates both expected processes and results • Can be used as a communication tool for a broad set of stakeholders • Illustrates contributions to development impacts beyond the reach or the life of the project • Helps planners identify and test the relevance of indicators	• Difficult to account for moving baselines unless TOC is regularly revisited • May require additional tools/ methods to meet reporting requirements • Quality of understanding links between ecosystems, climate change and human well-being depends on expertise and information available
Performance Measurement Framework (PMF): e.g. James, 2001	• Outlines expected outputs, outcomes and impact indicators; baseline; targets; data sources; emphasises methods and frequency of collection; responsibilities	• Encourages planners to set clear objectives and targets and the methods and responsibilities to reach them • Can complement several other M&E tools/approaches (such as outcome mapping, theory of change) and integrate various sources of information • Commonly used for reporting and accountability requirements	• Does not necessarily capture • dynamic and complex systems, i.e. ecosystems, accurately or adequately, unless frequently revisited • Relies on good quality information in design stages; may be difficult to integrate new information • A focus on monitoring may overlook evaluation
Logical Framework (Logframe): e.g. Stem et al., 2005; DIFID, 2011.	• Outlines expected outputs, outcomes, and impact indicators; baseline values; • data sources; emphasises milestones and assumptions • Provides clear structure for project planning, linking activities to indicators and assumptions	• Encourages planners to set clear objectives and milestones toward targets, and coinciding assumptions behind the logic model/results chain • Can complement several other M&E tools/approaches (such as outcome mapping, theory of change) and integrate various sources of information • Commonly used for reporting and accountability requirements, can be used for learning purposes	• Does not necessarily capture dynamic and complex systems, i.e. ecosystems, accurately or adequately, as assumes change occurs in logical, linear manner • Rigid structure may limit flexibility and adaptation as new knowledge is gained • Relies on good quality information in design stages; may be difficult to integrate new information

M&E TOOL	TOOL CHARACTERISTICS	COMPATIBILITY WITH EBA	INCOMPATIBILITY WITH EBA
Scenario planning: e.g. Peterson et al., 2003; Biggs et al., 2011; Rao et al., 2013; Walker et al., 2013; Addison et al., 2015	• Represents possible future scenarios in the target system • Can represent likely future climatic effects and/or vulnerabilities (in the absence of an intervention), or possible adaptation outcomes/project impacts under specific climate / expectations • Allows multiple sequences of project implementation to be considered, with expected outcomes identified for each • Support evaluation of policies and specific actions in terms of how they initiate and allow project to respond under different implementation futures	• Enables planners to account for multiple possible conditions under which (or sequences in which) the project may be implemented • Allows for incorporation of multiple perspectives about future • Able to incorporate as much or as little climatic data, from various sources, as the planner chooses • Inclusion of economic analysis (i.e. Rao et al., 2013) of different scenarios of the future will incorporate cost implications of different project implementation options / contrasting EbA to other adaptation choices • •Complementary to existing conservation and ecosystems planning tools (ClimateWizard, EcoMetrix)	• Requires time and resources to consider multiple possible sequences of project implementation and likely climatic scenarios • May require additional M&E tools/ methods to meet reporting requirements
Indexed scale/ Ranking: e.g. Vulnerability Reduction Assessment: Droesch et al., 2008; Adaptive Capacity: Sietchiping, 2006	• Outlines range of all possible outcomes of one or more indicators in the design phase (standardizes possible results) • Provides subjective rankings/ scores for (un) desirable change, (such as level of vulnerability), or objective ranges of changes (water table level), there by forming the basis of targets	• Encourages planners to think through and identify all possible outcomes during design stages • Focuses activities on achieving results tied to a range of changes in each parameter of measurement (indicators, objectives) • Compatible with various sources of technical and nontechnical information, qualitative and quantitative	• May not be useful for capturing results and lessons learned outside of factors considered in the design phases • Does not necessarily capture dynamic and complex systems, i.e. ecosystems, accurately or adequately, unless frequently revisited and revised • Relies on good quality information in design stages; may be difficult to integrate new information

ANNEXURE 3: LEGISLATIVE CONTEXT

South Africa has signed and ratified a large number of international conventions and treaties including the Convention on Biological Diversity (CBD) in 1995 and Sustainable Development Goals (SDGs), and is committed to sustainable development and international co-operation on matters relating to the environment, development and human rights. The country is committed to responding to the SDGs, and EbA interventions have the potential to address multiple SDGs simultaneously.

SDG goals 13 and 15 of particular relevance, namely to “Take urgent action to combat climate change and its impacts” and to “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”. Many other SDGs have some degree of relevance and require consideration as appropriate1 .

The need to avoid, minimise and remedy the disturbance of ecosystems and loss of biological diversity forms part of the National Environmental Management Act 107 of 1998 (NEMA)’s sustainable development principle. The goal of the National Biodiversity Strategy and Action Plan (NBSAP) is thus to “conserve, manage and sustainably use biodiversity to ensure equitable benefits to the people of South Africa, now and in the future” (DEA, 2015:1). In achieving this goal, the EbA strategy has a strong focus on mainstreaming and integration, institutional effectiveness, co-operative governance and partnerships.

In terms of the National Strategy for Sustainable Development (NSSD 1) sustainability vision, the maintenance

of healthy ecosystems and natural resources are preconditions for human well-being. As such sustaining ecosystems and using natural resources efficiently as well as "responding effectively to climate change" are strategic priorities for the country in paving a more sustainable development path. Furthermore, resource conservation is identified in the NSSD 1 as one of the 9 priority areas of the Green Economy transition.

1 For example: SDG 14 – Life below water: By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans (14.2); SDG 11 - Sustainable Cities and Communities: By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels ; SDG 6 - Clean water and sanitation: By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes; SDG 2- Zero Hunger: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality (1.4) (see: https://sustainabledevelopment.un.org/)

A3.2 Overview of key decisions on multilateral environmental agreements that South Africa is party to

In developing a guideline for Ecosystem-based Adaptation intended to be used in identifying and implementing projects, it is important to be cognisant of Multilateral Environmental Agreements (MEA's) across the biodiversity and conservation, socio-economic and climate change adaptation sectors. Below is a brief highlight of key MEA's that continue to give direction through Conference of the Parties (COP) or Convention Resolutions or Decisions aimed at conserving and managing biodiversity and ecosystems.

(i) United Nations Framework Convention on Climate Change (UNFCCC)

- In this regard, the UNFCCC COP decision 1/CP.16 "invites Parties to enhance action on adaptation by building resilience of socio-ecological systems, including through economic diversification and sustainable management of natural resources" (UNFCCC, 2011b).
- Ecosystem-based approaches for adaptation to climate change have been considered under the UNFCCC's Nairobi Work Programme (NWP) for some time, for example through Action Pledges made by NWP partner organizations;
- In response to a request by SBSTA 34 in June 2011, the UNFCCC secretariat developed, in the context of the NWP, a compilation of information on ecosystem-based approaches to adaptation (FCCC/SBSTA/2011/INF.8) which was presented at SBSTA 35 in December 2011; (UNFCCC, 2011b)
- A database on ecosystem-based approaches to adaptation was subsequently made available on the NWP website to provide examples of ecosystem-based approaches to adaptation, supplementing the information in the compilation document.

(ii) Convention on Biological Diversity (CBD)

- Decision X/33 invites member countries to recognise that ecosystems can be managed to limit climate change impacts on biodiversity and help people adapt to the adverse impacts of climate change; (CBD, 2010)
- Decision XI/16 urges Parties and invites other Governments organizations to "take note of extreme weather events, to support the implementation of ecosystem restoration for the mitigation and management of the impact of extreme weather events and for ecosystem-based adaptation to climate change"; (CBD, 2012).
- Decision XI/18 encourages Parties and other Governments to "consider reviewing land-use planning with a view to enhancing ecosystem-based adaptation to climate change; (CBD, 2012b)
- Decision XII/20 encourages Parties and invites other Governments to "promote and implement ecosystem-based approaches to climate change related activities and disaster risk reduction." (CBD, 2014).

(iii) United Nations Convention to Combat Desertification (UNCCD):

- Article 10 of the UNCCD, which provides for the formulation of national action programmes (NAPs), aimed at tackling desertification while also addressing poverty reduction and vulnerability to climate change in affected developing countries.
- Its 10-year Strategic Plan (2008–2018) which has an objective to reduce the vulnerability of ecosystems affected by

land degradation and climate change (UNCCD, 2007);

- Sustainable land management (SLM), which is a key element in the implementation of the UNCCD strategic objectives (UNCCD, 2009);
- Sustainable Development Goal 15 and its Target 15.3 which urges countries to "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" including those relating to climate change mitigation and adaptation (Assembly, 2015).

(iv) Convention on Wetlands of International Importance (Ramsar Convention):

Resolution XII.13 adopted during Ramsar COP 12 affirms the need to develop management plans that integrate the principles of ecosystem-based management against hazards including those that might be as a result of climate change (RAMSAR, 2015);

Resolution XII.13 also requested its Scientific and Technical Review Panel to compile guidance on wetland EbA concerning DRR in order to present practical policies and guidance which can be initiated by governments, for the management and wise use of wetlands to build resilience.

(v) United Nations Environment Program (UNEP)

- Among the UNDP-supported EbA projects are the following:
  - assessing vulnerabilities and adaptation services of critical ecosystems;
  - helping to integrate the findings of the vulnerability assessments into national decision-making, planning and adaptation practices; and
  - promoting ecosystem based-adaptation and planning to help ensure that development efforts are protected from negative impacts of climate change (climate-proofing), including through knowledge sharing, capacity building and technology transfer.
  - Resolution 1/8 on EbA, adopted by the United Nations Environment Assembly (UNEA) of the UNEP in 2014 encourages countries to include and improve EbA and community-based adaptation in their national policies, including those on climate change adaptation, food security and sustainable management of forests.

(vi) United Nations Development Program (UNDP):

- Among the UNDP-supported EbA projects are the following:
  - Reducing disaster risk from wildfire hazards associated with climate change in South Africa;
  - Reducing climate change-induced risks and vulnerabilities from glacial lake outburst floods in the Punakha-Wangdi (Bhutan) and Chamkhar (Pakistan) Valleys; and
  - Restoring and rehabilitating ecosystems in anticipation of climate change impacts in the Seychelles to reduce coastal erosion and protection.

(vii) Post-2015 Hyogo Framework of Action for Disaster Risk Reduction (DRR):

The post-2015 Hyogo Framework of Action for DRR under the United Nations Strategy for Disaster Reduction (UNISDR) emphasises that ecosystem degradation amplifies disaster risk and that greater focus needs to be placed on anticipating long-term risk scenarios (ISDR, 2005);

The Framework also calls for the implementation of concrete measures to prevent the creation of new risks, such as investing in strengthening the sustainable use and management of ecosystems.

(viii) International Union for the Conservation of Nature (IUCN)

Created in 1948, IUCN has evolved into the world's largest and most diverse environmental network. The International Union for Conservation of Nature (IUCN) is a membership Union uniquely composed of both government and civil society organisations. It provides public, private and non-governmental organisations with the knowledge and tools that enable human progress, economic development and nature conservation to take place together (website). At its World Conservation Congress in 2012 in Jeju, Republic of Korea, the IUCN:

- endorsed the definition of EbA provided in the 2009 report of the CBD's Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change.
- recognized that an ecosystem-based approach to climate change adaptation is also relevant to the conservation and sustainable use of species.
- called on IUCN Members and other interested parties to promote EbA in their climate change adaptation work, including through conservation and sustainable management actions that protect and restore the resilience and adaptive capacities of ecosystems.
- acknowledged that EbA is best implemented as part of an overall adaptation strategy that takes into account the multiple social, economic and cultural co-benefits for local communities.
- called on donor countries and financial institutions to recognize EbA as a sustainable and potentially cost-effective adaptation option, which can complement or substitute for other modes of adaptation and which is readily available to the rural poor.

(ix) Paris Agreement

The Paris Agreement was adopted on 12 December 2015 at the 21st session of the Conference of the Parties to the UNFCCC CoP21. South Africa has ratified the Agreement, a universal, legally-binding framework for internationally coordinated effort to hold the increase in the global average temperature to well below 2 °C above pre-industrial levels while pursuing efforts to limit the temperature increase to 1.5 °C (UNFCCC, 2015). Unlike the Kyoto Protocol, the Paris Agreement depends on voluntary targets to meet mitigation contributions through "nationally determined contributions (NDCs)". These represent each country's highest possible ambition towards mitigation, recognising the common but differentiated responsibilities and respective capabilities of countries in the light of different national circumstances (UNFCCC,2015).

While EbA is not explicitly mentioned in the Agreement, it does emphasise an approach that aligns with EbA, and the supporting science conference prior to the Paris COP, EbA concepts were prominent:

- The Agreement emphasises that "adaptation action should follow a country-driven, gender responsive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems" (Article 7.5; UNFCCC,2015).
- It emphasises the need to take into account "vulnerable people, places and ecosystems" in prioritising national adaptation efforts (Article 7.9; UNFCCC, 2015).
- Emphasises that each signatory shall (…) engage in adaptation planning and (…) implementation (…) which may include … (7.9c) The assessment of climate change impacts and vulnerability (…) taking into account vulnerable people, places and ecosystems, and … (7.9e) Building the resilience of socioeconomic and ecological systems, incl. through economic diversification and sustainable management of natural resources (Article 7.9; UNFCCC, 2015).

(x) The New Urban Agenda

The New Urban Agenda was adopted at the 68th Plenary Meeting of the 71st Session of the General Assembly, held on 23 December 2016 (UN, 2017). It is not binding, but provides guidance for achieving the Sustainable Development Goals in urban settings, providing the support for actions to address climate change. It sets a new global standard for sustainable urban development, redressing the manner in which cities and human settlements are planned, designed, financed, developed and governed to address inequalities, promote inclusive and sustainable economic growth, and foster social and ecological resilience.

- Although EbA is not explicitly mentioned in the Agenda, the linkages between environmental protection, sustainable environmental management and urban resilience are emphasised throughout the document, promoting the preservation of ecological and social function, particularly with regard to ecosystem services and improving resilience to climate change.

(xi) The Durban Adaptatation Charter

The Durban Adaptation Charter was launched at the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) 17 in December 2011 (www.durbanadaptationcharter.org; DAC,

2012). It commits Local Governments to local climate action in their jurisdiction that will assist their communities to respond to and cope with climate change risks thereby reducing vulnerability. It complements existing local government climate change initiatives, such as the Mexico City Pact (signed prior to COP16/CMP6) and the associated carbon Climate Registry, providing a holistic vision for transforming the world's cities through local governments towards 'climate smart' urbanisation.

Although the Durban Adaptation Charter does not explicity address EbA, it does commit to the following which resonate with adoption of an EbA approach:

- Understanding climate risks through conducting impact and vulnerability assessments
- Prepare and implement integrated, inclusive and long-term local adaptation strategies designed to reduce vulnerability.
- Promote the use of adaptation that recognises the needs of vulnerable communities and ensures sustainable local economic development.
- Prioritise the role of functioning ecosystems as core municipal green infrastructure.
- Promote multi-level and integrated governance and advocate for partnerships with sub-national and national governments on local climate action.

ANNEXURE 4: LITERATURE REVIEW

Appropriate national and international documents on Ecosystem-based Adaptation principles and criteria were reviewed with a view to informing the South African EbA guideline document. Those that were utilised directly here are cited in the reference list. This review builds on the extensive literature review conducted to support the document "Strategic Framework and Overarching Implementation Plan for EbA in South Africa, 2016-2021". South Africa recognises the findings of the Intergovernmental Panel on Climate Change (IPCC) that climate change is a current reality with anthropogenic causes (Government of South Africa, 2011). South Africa has already observed a changing climate between 1960 and 2010. There have been higher mean annual temperatures, higher minimum and maximum daily temperatures, more frequent hot extremes and fewer cold extremes, as well as more variable rainfall with a trend towards more intense rainfall events and longer dry spells (DEA, 2013). Modelled future predictions display a level of uncertainty, but even the most conservative models predict a 1 – 3 degree Celsius (°C) rise in temperatures by 2050 (Government of South Africa, 2011), with temperatures in Africa projected to rise faster than the global average during the 21st century (Niang et al., 2014). Under a high warming scenario, i.e. Representative Concentration Pathway (RCP) 8.5, mean annual temperatures could reach between 3 – 6°C by the end of the century, with the rate of increase in minimum temperatures greater than that of the maximum (Niang et al., 2014). Significant warming of as much as 5 – 8°C may be expected for the interior parts of South Africa by mid-century, with concurrent drier conditions in the western and southern parts of the country, and wetter conditions in the east (DEA, 2013).

Climate change has already had, and is predicted to have, a range of important impacts on biodiversity and ecosystems (IPCC,2014). The best observed natural responses to climate change are changes to the geographic ranges, seasonal activities, migration patterns and abundances of species across the terrestrial, freshwater and marine environments (IPCC, 2014). Species with narrow ranges and limited dispersal abilities, including locally endemic species, are likely to be most severely impacted by climate change (CBD, 2009; IPCC, 2014). All of these changes will result in changes to the structure and function of ecosystems, as individual species responses alter the abundance and composition of ecological communities (CBD, 2009). In South Africa, research has shown that the effects of climate change on biodiversity are likely to have variable impacts on the different biomes. According to the original NBSAP , the spatial biodiversity assessment of South Africa's 440 terrestrial ecosystems showed that 34% are threatened (DEAT, 2005), which was revised to 40% by the most recent National Biodiversity Assessment (NBA: Driver et al., 2011) It is reported that, of these, 9% are critically endangered, 11% are endangered and 19% are vulnerable, primarily from the Indian Ocean Coastal belt, Grassland, Fynbos and Forest biome, and at considerable risk of further transformation due to being concentrated in production landscapes (Driver et al., 2011). The National Freshwater Ecosystem Priority Areas (NFEPA; Nel et al., 2011), identifies that approximately 45% of remaining wetland area in South Africa is heavily or critically modified,

due to damming, draining and bulldozing of wetlands, whilst approximately 65% of the country's main rivers are in poor condition (this decreases to 53% if main rivers and tributaries are considered together). Nationally, 82%, 65% and 57% of estuarine, wetland and river ecosystem types are threatened (either critically endangered, endangered or vulnerable) (Nel et al., 2011) Under climate change, the climatic area that is suited to each biome might change, resulting in changes to the size, composition or location of the biomes (Midgley et al., 2002; Von Maltitz & Scholes, 2006; Midgley & Thuiller, 2010), with freshwater ecosystems likely to be particularly impacted by rising temperatures and shifting rainfall patterns, – and yet healthy, intact freshwater ecosystems are critical for ensuring resilience to climate change and mitigating its impact on human wellbeing (Nel et al., 2011).

In South Africa, ecosystems that are important to the delivery of a suite of important services to humans are termed 'ecological infrastructure'. Ecological infrastructure can be considered as the natural asset from which ecosystem services flow (SANBI, 2016). Ecological infrastructure is the nature-based equivalent for built infrastructure that provides valuable services to people. It can be particularly important for the provision of fresh water, climate regulation, soil formation and disaster risk reduction. Ecological infrastructure includes, for instance, healthy mountain catchments, rivers, wetlands, coastal dunes, and nodes and corridors of functioning ecosystems, which together form a network of interconnected structural elements in the landscape (SANBI, 2013). In the case of transformed landscapes and/or urban areas, where ecological infrastructure has become degraded; here, additional green infrastructure (e.g. roof gardens, bioswales, constructed wetlands, permeable paving, urban tree canopies, urban parks and/or public green spaces) – through its ability to mobilise ecosystem services – can support the proper functioning of remnant natural systems (Culwick & Bobbins, 2016). In South Africa, green infrastructure has been found to contribute to [urban] livelihoods and wellbeing, through providing provisioning and cultural services, and enhancing spiritual and mental wellbeing (Shackleton et al., 2017).

Climate change can affect the functioning of ecological infrastructure and disrupt the ecosystem services it provides, with resulting implications for the well-being of human communities that rely on these services. This will disproportionately affect the urban and rural poor communities (CBD, 2009; IPCC, 2014;), who rely most directly on ecosystem services for water and food security and/or occupy marginal lands, but are also, through socio-economic circumstances, often excluded from utilising modern technology and innovations that would help them adapt (CBD, 2009). As a result, climate change could affect resource-dependent livelihoods and low-income households, aggravate human conflicts (IPCC, 2014), and amplify existing inequalities and equity issues (i.e. Reckien et al., 2017)

Climate change adaptation seeks to increase the resilience of both natural and human systems to climate change. Resilience is defined as "the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation" (IPCC, 2014). Resilience may be considered as the ability to cope with climate change, and occurs at the opposite end of a spectrum in which 'vulnerability' implies the inability to cope (OECD, 2006).

The linkages between biodiversity and ecosystem services mean that actions taken to improve natural resilience to climate change are also likely to improve social resilience to climate change. "Intact, well-functioning ecosystems, with natural levels of biodiversity, are usually more able to continue to provide ecosystem services and resist and recover more readily from extreme weather events than degraded, impoverished ecosystems" (CBD, 2009). Increasing the resilience of natural ecosystems to climate change may include expanding protected areas in areas where ecosystems are expected to show stability under climate change, and focussing on corridors in regions where climate change is expected to create ecosystem level changes (Driver et al., 2012). An important element of enhancing natural resilience to climate change is to reduce non-climatic stressors, such as land degradation, that may compound climate change effects (CBD, 2009).

According to the CBD, EbA is defined as "the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change" (CBD, 2009). EbA uses the range of opportunities for the sustainable management, conservation, and restoration of ecosystems to provide services that enable people to adapt to the impacts of climate change. When restoration is not possible, it may

allow for the development of new areas, i.e. constructed systems, able to deliver services to support adaptation (i.e. Roberts et al., 2012; Culwick & Bobbins. 2016). It aims to maintain and increase the resilience and reduce the vulnerability of ecosystems and people in the face of the adverse effects of climate change, and is most appropriately integrated into broader adaptation and development strategies" (CBD, 2009)

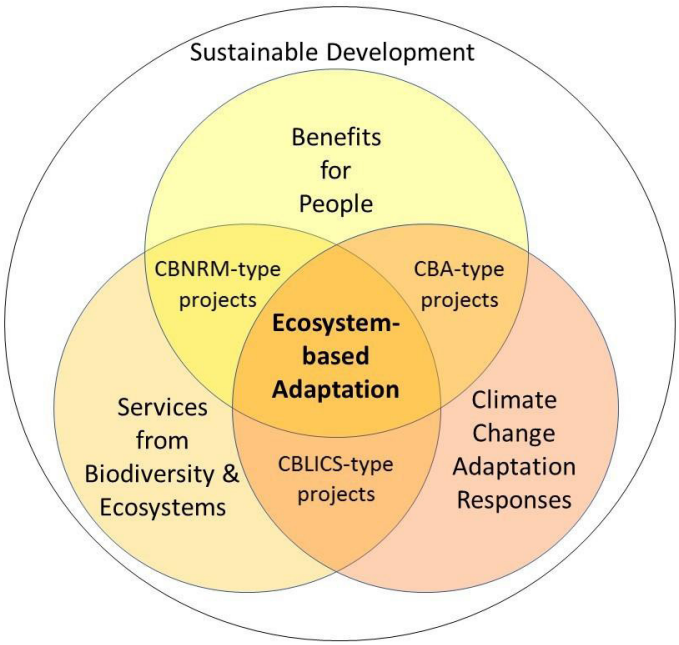

Figure A4.1: *Ecosystem Based Adaptation (EbA) is distinguished from other approaches by the integration of services from biodiversity and ecosystems, benefits for people, and climate change adaptation responses (adapted from Midgley et al., 2012)*

Drawing on the linkages between ecosystem services, climate change and biodiversity, EbA is an approach to sustainable development that contributes to three outcomes whilst minimising trade-offs: socio-economic benefits, climate change adaptation and ecological benefits (Figure A4.1; Driver et al., 2012; Midgley et al., 2012). The intersection of these three spheres is what makes EbA different to other approaches, such as Community-based Adaptation (CBA), Climate change integrated land use strategies (CLICS) or Community-based Natural Resource Management (CBNRM), which focus only on integrating any two of the three spheres (Box 5). The position of EbA at the intersection of these three spheres means that it is likely to have a wide range of co-benefits in addition to climate change adaptation, including conservation of threatened species, livelihood benefits, sustainable utilisation of natural resources and the maintenance of essential ecosystem services such as water and food security (CBD, 2009).

Box 5: Description of approaches pairing only two cornerstones (extracted from Midgley et al., 2012; where additional information has been included, i.e. not in the original source, additional citations have been added)

CBNRM-type projects: Community Based Natural Resource Management is the management of natural resources by all concerned stakeholders. Communities managing the resources have the legal rights, the local institutions, and the economic incentives to take substantial responsibility for sustained use of these resources. CBNRM emphasises self-governance and community development through voluntary participation and group ownership for long-term solutions to problems of natural resource use (Fabricus, 2009). Example: Co-management of harvestable resources (e.g. fisheries) and protected areas.

CLICS-type projects: Climate Change-Integrated Conservation Strategies are climate-resilient conservation plans that often result in spatial and related types of planning products (Hannah et al., 2002a,b). These differ from traditional conservation planning strategies in that climate change is systematically captured in both management and protected area selection parameters, emphasising mechanisms that respond to the uncertainties posed by climate change, within the context of regional cooperation (Hannah et al 2002a). CLICS-projects guide planning for ecosystem service corridors and protected areas that are resilient to climate change. Example: Vulnerability mapping and development of plans for conservation corridors and protected area expansion.

CBA-type projects: Community-Based Adaptation projects work to empower people to plan for and cope with climate change impacts by focusing on community-led processes grounded in the priorities, needs, knowledge and capacities of communities. The incorporation of local and scientific knowledge of climate change helps build a better understanding of risk and uncertainty into development planning activities and livelihood interventions (Reid et al., 2009). Example: Flood protection strategies that support local communities to construct settlements outside of flood lines or with engineering innovations.

EbA can enhance the effectiveness of climate change adaptation strategies in the important role it plays in protecting infrastructure and improving human security (CBD, 2009). EbA also has the potential to be more cost-effective than other options for climate change adaptation when assessed across a suite of interlinked social, ecological and economic criteria (CBD, 2009; TEEB, 2009; Rogers et al., 2012), provided that the broader co-benefits of EbA implementation are included to discount costs (Black et al., 2017). The potential range of co-benefits that may be achieved contribute to cost effectiveness by 1) allowing integrated funding with other projects and 2) achieving a wider range of outcomes, thus improving the cost-benefit ratio. This also means that EbA is a more accessible strategy to [support adaptation of] the rural and urban poor (i.e. through direct involvement in EbA projects, but also through guiding pathways towards pro-poor adaptation (Laros et al., 2013)), who are most vulnerable to climate change and may be unable to institute technological adaptation approaches (IPCC, 2014; CBD, 2009).

There is a growing number of EbA projects around the world (Table A4.1). The UNFCCC maintains a database that lists 54 EbA case-studies, in more than 50 countries on six continents. Further practical EbA examples are currently compiled under the PANORAMA initiative (http://www.panorama.solutions/en/explorer/grid/1042)

Table A4.1: *Countries implementing Ecosystem-based Adaptation projects, as per the UNFCCC database http://www4.unfccc.int/sites/nwp/pages/Search.aspx; UNFCCC, 2011)*

Armenia	Costa Rica	Hungary	Mongolia	Romania	Sudan
Australia	Czech Republic	India	Mozambique	Russian Federation	Sweden
Belize	Ecuador	Indonesia	Netherlands	Rwanda	Switzerland
Bolivia	El Salvador	Japan	New Zealand	Samoa	Tanzania
Brazil	Fiji	Jordan	Nicaragua	Senegal	Thailand
Cambodia	Gambia	Kenya	Panama	Serbia	Ukraine
Canada	Grenada	Madagascar	Papua New Guinea	Slovak Republic	United Kingdom
Cape Verde	Guatemala	Malaysia	Peru	Solomon Islands	United States
China	Guinea Bissau	Mauritania	Philippines	South Africa	Zimbabwe
Colombia	Honduras	Mexico	Poland	Sri Lanka	

In South Africa, EbA projects are being implemented in many provinces. The National Climate Change Response Database, hosted by the Department of Environmental Affairs, lists 190 climate change adaptation projects, many of which claim to be EbA projects and need to be evaluated as such. The Adaptation Network also maintains information about South African EbA projects. Although several case studies are well documented, an updated database of EbA projects would help to better understand all the EbA activities that are being undertaken throughout the country.

Through the implementation of EbA projects globally and locally, important lessons have been learned about what is successful (i.e. UNFCCC, 2011; Midgley et al., 2012; IUCN, 2014; Hill, 2015). Importantly, it has become clear that there are limits to what EbA should be expected to achieve – EbA is not a silver bullet that always offers a superior adaptation solution. Whilst EbA is a powerful mechanism to address a number of climate change, biodiversity and socio-economic issues, it may often be best integrated with other approaches to address the vulnerabilities of natural and human systems. In particular, there are crucial thresholds to ecosystem resilience that need to be considered, beyond which adaptation is unlikely to be successful (CBD, 2009; Roberts et al., 2012). Ecosystems can only provide a certain suite of ecosystem services and their ability to do so is diminished as they become degraded and fragmented, and even healthy, functioning ecosystems have thresholds beyond which they are unable to withstand climate shocks.

The National Climate Change Response White Paper (2011) emphasises the importance of EbA as part of an overall adaptation strategy. It sets out South Africa's response to climate change in terms of two objectives – one focusing on improving resilience and one focusing on reducing emissions1. The White Paper makes the following reference to EbA: "Stressed ecosystems will compromise one of the key responses available to the country to adapt to climate change: using ecosystem services to help society adapt to climate change, known as 'ecosystem-based adaptation'2. It goes on to set out priorities for both mitigation and adaptation responses. In terms of adaptation, the White Paper notes that a "key feature of adaptation responses is that they have a much stronger local context than do mitigation responses and their benefits appear much faster…" The White Paper also notes that adaptation responses hold the potential to contribute significantly to job creation and other sustainable development goals. As one type of adaptation response, EbA is particularly well-placed to support these contributions. EbA should be seen as a particularly important adaptation response for water, agriculture and forestry, biodiversity, sustainable human settlements and disaster risk management. EbA is also embedded in many of the adaptation response actions, the Near-Term Priority Flagship Programmes in the White Paper, as well as emphasised as a mechanism to support disaster risk reduction, at all levels, in the National Disaster Management Act Amendment of 2015.

Individual small-scale projects have been pioneering the implementation of EbA in the South African context. These have been undertaken by a variety of stakeholders, including government, NGOs and the private sector. These are not always referred to as EbA projects and lack the broader co-ordination and strategic planning necessary to contribute towards the broader outcomes of EbA. However, by acknowledging the lessons that have been learnt, and making provision to fill the identified knowledge gaps, there are likely to be a number of opportunities to replicate these projects and take these projects to scale.

1 "Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity; Make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

2 Government of South Africa, 2011:28

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