

National Climate Change Adaptation Strategy

Republic of South Africa

Version UE4

24 October 2018



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

Contents

1. Introduction	7
2. Context.....	8
2.1. International Context	8
2.2. African Context	9
2.3. National Context	10
2.4. Climate Change Context	11
3. Strategic Focus	12
3.1. Vision	12
3.2. Principles and key elements of adaptation and climate resilience	13
3.3. Strategic Objectives	14
3.4. Strategic Interventions	14
3.5. Strategic Outcomes.....	14
3.6. Linkages between strategic objectives, interventions and outcomes	16
4. Reduce Vulnerability and Build Adaptive Capacity.....	17
4.1. Introduction.....	17
4.2. Scale of Interventions	17
4.3. Actions	18
5. Early warning systems	22
5.1. Introduction.....	22
5.2. Status Quo.....	22
5.3. Actions	24
6. Risk and Vulnerability Assessment Framework.....	26
6.1. Introduction.....	26
6.2. Status Quo.....	26
6.3. Actions	27
7. Adaptation Planning and Mainstreaming.....	28
7.1. Introduction	28
7.2. Status Quo	28
7.3. Actions	29
8. Research	31
8.1. Introduction.....	31
8.2. Status Quo	31
8.3. Actions	31
9. Awareness and Capacity Building	34
9.1. Introduction	34
9.2. Status Quo	34

9.3. Actions	35
10. Governance and Legislation	37
10.1. Introduction	37
10.2. Status Quo	37
10.3. Actions.....	39
11. Finance	42
11.1. Introduction	42
11.2. Status Quo	42
11.3. Actions.....	43
12. Monitoring and Evaluation.....	45
12.1. Introduction	45
12.2. Status Quo	45
12.3. Actions.....	48
13. Implementation Framework.....	49
14. Annex A: Proposed Key Messaging for Climate Change Adaptation Communication and outreach programme	59
15. Annex B: Indicators for monitoring and evaluation of the NAS strategic outcomes	61
References.....	64

Definitions¹

Term	Definition
Adaptation	The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.
Adaptive capacity	The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.
Climate change	Refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use.
Ecosystems	An ecosystem is a functional unit consisting of living organisms, their non-living environment and the interactions within and between them. The components included in a given ecosystem and its spatial boundaries depend on the purpose for which the ecosystem is defined: in some cases they are relatively sharp, while in others they are diffuse. Ecosystem boundaries can change over time. Ecosystems are nested within other ecosystems and their scale can range from very small to the entire biosphere. In the current era, most ecosystems either contain people as key organisms, or are influenced by the effects of human activities in their environment.
Greenhouse gas	The gaseous constituents of the global atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.
Mitigation	A human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs). This report also assesses human interventions to reduce the sources of other substances which may contribute directly or indirectly to limiting climate change, including, for example, the reduction of particulate matter emissions that can directly alter the radiation balance (e.g., black carbon) or measures that control emissions of carbon monoxide, nitrogen oxides, Volatile Organic Compounds and other pollutants that can alter the concentration of tropospheric ozone which has an indirect effect on the climate.
Resilience	The ability of a social, economic or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation and the capacity to adapt to stress and change.

¹ These definitions have been taken from IPCC, 2014: Annex II: Glossary [Mach, K.J., S. Planton and C. von Stechow (eds.)]. In: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, pp. 117-130.

Vulnerability The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

Abbreviations

ACDI	Africa Climate and Development Initiative
AFIS	Advanced Fire Information System
AR5	IPCC Fifth Assessment Report
ARC	Agricultural Research Council
CAPS	Curriculum and Assessment Policy Statement
CBD	Convention on Biological Diversity
COGTA	Department of Cooperative Governance and Traditional Affairs
COP	Conference of the Parties
CSAG	Climate System Analysis Group
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture, Forestry and Fisheries
DAO	Desired Adaptation Outcome
DBSA	Development Bank of Southern Africa
DEA	Department of Environmental Affairs
DFI	Development Finance Institution
DOH	Department of Health
DRDLR	Department of Rural Development and Land Reform
DST	Department of Science and Technology
DWS	Department of Water and Sanitation
EWT	Endangered Wildlife Trust
GCF	Green Climate Fund
GEF	Global Environment Facility
GFCS	Global Framework for Climate Services
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit

GRR	Global Risks Report
IDP	Integrated Development Plan
IGCCC	Intergovernmental Committee on Climate Change
IKI	Germany's International Climate Initiative
IPCC	Intergovernmental Panel on Climate Change
Kfw	German government-owned development bank
LGCCSP	Local Government Climate Change Support Program
LTAS	Long Term Adaptation Scenarios
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MTEF	Medium Term Expenditure Framework
NAVRF	National Adaptation Vulnerability and Resilience Framework
NBI	National Business Initiative
NCCAS	National Climate Change Adaptation Strategy
NCCC	National Committee on Climate Change
NCCRP	National Climate Change Response Policy
NDC	Nationally Determined Contribution
NDMC	National Disaster Management Centre
NDP	National Development Plan
NEMA	National Environmental Management Act
NFCS	National Framework for Climate Services
NFDRS	National Fire Danger Rating System
NGO	Non-governmental Organisation
NICD	National Institute of Communicable Diseases
NPC	National Planning Commission
SADC	Southern African Development Community
SAFFG	The South African Flash Flood Guidance
SALGA	South African Local Government Association
SANAP	South Africa's National Adaptation Plan
SANBI	South African National Biodiversity Institute

SAWS	South African Weather Service
SDF	Spatial Development Framework
SDGs	Sustainable Development Goals
SPI	Standardised Precipitation Index
SWWS	Severe Weather Warning System
TNC	Third National Communication
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WAMIS	Wide Area Monitoring Information System
WEF	World Economic Forum
WWF	World Wildlife Fund

Acknowledgements

The National Climate Change Adaptation Strategy (NCASS) involved numerous people and organisations, and was characterised by a spirit of collaboration and cooperation across organisational and disciplinary boundaries. The Department of Environmental Affairs (DEA) would like to thank the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) for technical assistance.

The DEA would also like to thank all the national departments, provincial departments, municipalities, research and academic institutions, non-government organisations, community-based organisations, business, and civil society that have participated and provided technical expertise and key inputs to the development of the NCCAS.

DEA would also like to acknowledge the NCCAS Task Team, NCCAS Reference Group and the NCCAS Project Management Team who contributed their time and energy to the development of this strategy.

1. Introduction

South Africa is experiencing significant effects of climate change particularly as a result of increased temperatures and water variability. The observed rate of warming has been 2 °C per century or even higher - more than twice the global rate of temperature increase for the western parts and the northeast (DEA 2017a, 72). There is evidence that extreme weather events in South Africa are increasing, with heat wave conditions found to be more likely, dry spell durations lengthening slightly and rainfall intensity increasing. Climate zones across the country are already shifting, ecosystems and landscapes are being degraded, veld fires are becoming more frequent, and overused natural terrestrial and marine systems are under stress (DEA 2017a). According to the IPCC Fifth Assessment Report (AR5) climate change is likely to increase the frequency and magnitude of many extreme events and will certainly increase the risk of slow-onset events such as sea level rise and drought (IPCC 2013). Climate change has the potential to redress the gains made on the Millennium Development Goals (MDGs), and impede the country's ability to achieve the Sustainable Development Goals (SDGs) and also poses risks to opportunities for socioeconomic development. There is increasing international recognition that strong and sustainable socioeconomic development can reduce vulnerability to climate change and ensure resilience. Adaptation to climate change presents South Africa with an opportunity to transform the economy, strengthen the social and spatial fabric, and become more competitive in the global marketplace.

The National Climate Change Adaptation Strategy (NCCAS) provides a common vision of climate change adaptation and climate resilience for the country, and outlines priority areas for achieving this vision. The NCCAS's vision draws on South Africa's National Climate Change Response Policy (NCCRP) (DEA 2011), the National Development Plan (NDP) (NPC 2011), the adaptation commitments included in its Nationally Determined Contributions (NDC), sector adaptation plans, provincial adaptation plans and local government adaptation plans.

The NCCAS is an important step forward for South Africa, as it:

- Acts as a common reference point for climate change adaptation efforts in South Africa in the short to medium-term, providing guidance across all levels of government, sectors, and stakeholders affected by climate variability and change.
- Provides a policy instrument which national climate change adaptation objectives for the country can be articulated to provide overarching guidance to all sectors of the economy.
- Facilitates the degree to which development initiatives at different levels of government and business integrate and reflect critical climate change adaptation priorities, and thus inform resource allocation by the various stakeholders towards climate change resilience.
- Guides stronger coherence and coordination on climate change adaptation activities between different institutions and levels of government.
- Supports South Africa in meeting its international obligations by defining the country's vulnerabilities, plans to reduce such vulnerabilities and leverage opportunities, outlining the required resources for such action, whilst demonstrating progress on climate change adaptation.

The NCCAS serves as South Africa's National Adaptation Plan and fulfils South Africa's commitment to its international obligations as outlined in the Paris Agreement under the

United Nations Framework Convention on Climate Change (UNFCCC). The NCCAS will be used as the basis for meeting South Africa's obligations in terms of the adaptation commitments outlined in the NDC. The NCCAS is a ten-year plan that will be reviewed every five years.

The NCCAS is divided into sets of strategic objectives, strategic interventions and strategic outcomes with associated actions. The document is directed not only at national government departments, but speaks to South African society as a whole, including the key relevant sectoral institutions, provincial and local governments, and non-governmental entities including the private sector, the research community and civil society.

2. Context

The purpose of this chapter is to contextualise the NCCAS within the international climate change regime and leverage alignment with South African policies, legislation and other strategic frameworks. Furthermore, it highlights the projected climatic changes South Africa is expected to experience and some of the key impacts on different sectors.

2.1. *International Context*

The 2018 edition of the Global Risk Report by the World Economic Forum highlights environmental risks such as extreme weather events, natural disasters, and the failure to respond to climate change effectively, as among the top risks to the globe in terms of impact and likelihood. Climate change is ranked third behind inequality and unfairness and risks of conflict (WEF 2018, 9-11). There are a number of global agreements and decisions that South Africa has participated in that aim to respond to and prepare for the impacts of climate change.

In particular, South Africa is a Party to the United Nations Framework Convention on Climate Change (UNFCCC) which aims to achieve the 'stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [human induced] interference with the climate system' (UN 1992, 4). Under the UNFCCC, it is envisaged that: 'Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner' (UN 1992, 4). The two key Conference of Parties (COPs) to the UNFCCC that prioritised the importance of climate change adaptation were COP16 held in Cancun in 2010 and COP21 held in Paris in 2015. COP16 resulted in the adoption of the Cancun Adaptation Framework, which placed climate change adaptation on the same level of importance as climate change mitigation for the first time. It also established the National Adaptation Plan process (UNFCCC 2011, 4-7). The Cancun Adaptation Framework laid the foundation for the Paris Agreement, an outcome of COP21. The Paris Agreement elevates the importance of climate change adaptation through the establishment of a 'global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change' and provides extensive guidance on how countries should approach adaptation as a priority (UN 2015a Article 7). As a signatory, South Africa is required to compile a set of Nationally Determined Contributions (NDCs) which outline the country's contributions to the global goals to reduce national greenhouse gas emissions

and adapt to the impacts of climate change (UN 2015a Article 7). South Africa's goals outlined in its NDC document are:

- Goal 1: Develop a National Adaptation Plan, and begin operationalization as part of implementing the NCCRP for the period from 2020 to 2025 and for the period 2025 to 2030;
- Goal 2: Take into account climate considerations in national development, sub-national and sector policy frameworks for the period 2020 to 2030;²
- Goal 3: Build the necessary institutional capacity for climate change response planning and implementation for the period 2020 to 2030;
- Goal 4: Develop an early warning, vulnerability and adaptation monitoring system for key climate vulnerable sectors and geographic areas for the period 2020 to 2030, and reporting in terms of the National Adaptation Plan with rolling five-year implementation periods;
- Goal 5: Development of a vulnerability assessment and adaptation needs framework by 2020 to support a continuous presentation of adaptation needs; and
- Goal 6: Communication of past investments in adaptation for education and awareness as well as for international recognition (DEA 2015a p3-6).

In the same year that the Paris Agreement was signed, the 2030 Agenda for Sustainable Development was adopted, along with a set of 17 Sustainable Development Goals (SDGs). The SDGs support the Paris Agreement as climate change is specifically highlighted under SDG 13: 'Take urgent action to combat climate change and its impacts', and features across many of the other SDGs, because of its cross-cutting nature (UN 2015b, Goal 13). SDG 13 specifically mentions targets relating to strengthening resilience and adaptive capacity which align directly with the adaptation goal in the Paris Agreement (UN 2015b, Goal 13). In addition, The Sendai Framework for Disaster Risk Reduction 2015-2030, adopted on 18 March 2015, notes that climate change is one of the 'underlying disaster risk drivers', and that climate change can exacerbate the seriousness of a disaster (UNISDR 2015, p10). Preparing for climate related disaster and building resilience are key priorities in the Sendai Framework.

Another international agreement that contributes to the global climate change adaptation response is the decision on Biodiversity and Climate Change that was adopted in 2016 at the Conference of the Parties to the Convention on Biological Diversity (CBD) in Cancun (UNEP 2016, 34). The Decision encourages all Parties to take into account the importance of protecting biodiversity, preserving ecosystems, and using ecosystem-based approaches, when developing their NDCs. It also encourages the integration of ecosystem-based approaches into climate change adaptation, mitigation, disaster risk reduction and other strategic plans (UNEP 2016, 34). Finally, the Global Framework for Climate Services (GFCS) was developed to help guide nations, especially those most vulnerable, to prepare and adapt to climate change through the development and use of science-based climate information in policy, planning and practice (WMO, GFCS 2016).

2.2. African Context

Africa is likely to experience changes in climate earlier than other regions, and therefore adaptation measures are urgently required on the continent. Africa's Adaptation Gap 2: Technical Report (2013) notes that the costs of adaptation in Africa could increase to USD 100 billion/year by 2050 in a world that experiences more than 4 degrees Celsius warming

by 2100. Increased funds from developed countries for adaptation in African countries would help to fund these costs. However, finances for adaptation are required from continental and national levels as well (AMCEN, UNEP, Climate Analytics, African Climate Finance Hub 2013, iv).

The SADC Climate Change Strategy and Action Plan (2015) emphasises the need for enhanced climate change adaptation responses in Africa due to the wide range of pressing vulnerabilities. The CCSAP aims to coordinate regional and national climate change responses in Africa, and to 'climate proof' SADC's policies, strategies and protocols (SADC 2015).

2.3. National Context

Although the South African post-apartheid political and policy landscape looks markedly different from its apartheid predecessor, the legacy of apartheid is still very evident from a developmental vantage point. South Africa remains a dual economy with one of the highest Gini Coefficients in the world, perpetuating both inequality and exclusion. South Africa's most pressing challenges, as outlined in the NDP diagnostic report, include poverty, unemployment and inequality (NPC nd). The South African economy is dependent on primary sectors such as agriculture and mining, particularly minerals extractives, which are natural resource dependent and energy intensive, with energy generation being very important as it is also subject to climate variability and change. Therefore, changes in climate are predicted to exacerbate these challenges, as climate change will have direct impacts on South Africa's natural resources and infrastructure, affecting food security and health, threatening water resources, and impacting on development. These impacts will be especially felt by the poor, as they will be more exposed to them and have fewer resources to cope with these impacts. Climate change is therefore predicted to result in further widening of the gap between the rich and poor (Ziervogel G, New M, van Garderen E, Midgeley G et al. 2014; Chikulo BC 2014).

The National Development Plan (NDP) of South Africa seeks to eliminate poverty, deliver environmental protection and promote economic development by 2030. However, the NDP does not test the sensitivity of achieving these goals in light of climate change and variability. Finance set aside for development needs to incorporate climate change so that infrastructure and communities are resilient to future climate impacts. Furthermore, climate change needs to be mainstreamed into budgetary processes in all spheres of government.

South Africa has, however, made progress in developing a plan that responds to and prepares for the impacts of climate change. The National Climate Change Response White Paper (NCCRP), published in 2011, prioritizes both climate change mitigation and adaptation in moving towards a climate-resilient and lower-carbon economy and society (DEA 2011). The overarching approach to adaptation, as identified in the NCCRP, focuses on the development of adaptation responses that are flexible to changing conditions, that take local context and local knowledge into account and that are informed by rigorous research. The NCCRP identifies a set of key adaptation related sectors including water, health, human settlements, agriculture and commercial forestry, biodiversity and ecosystems, and disaster risk reduction and management, and advocates the inclusion of climate change into plans for these sectors (DEA 2011). Since the development of the NCCRP, considerable progress has been made in developing adaptation policies, plans and

strategies in various sectors and spheres of government, including the development of climate adaptation plans in local and provincial government.

A sector where significant strides have been made in the integration of climate change adaptation is disaster management. The Disaster Management Amendment Act, 2015 (Act No. 16 of 2015), is a critical piece of legislation that directly responds to climate change adaptation. The Amendment Act assigns responsibility to national, provincial and local government to invest in disaster risk reduction and climate change adaptation interventions for their respective jurisdictions. Each organ of state is required to develop disaster management plans that include climate change risks and responses.

2.4. Climate Change Context

A summary of projected future changes in climate in South Africa are provided in the table below. These projections have been taken from the Third National Communication to the UNFCCC (DEA 2017b).

Category	Projected Climate Changes
Temperature	<ul style="list-style-type: none"> ● Under low mitigation: temperatures to increase drastically. <ul style="list-style-type: none"> ○ 2080-2099 period: Temperature increases greater than 4 °C across South Africa. Increases greater than 6 °C possible in western, central and northern interior. ○ Increases in the number of heat-wave days and very hot days. ● Under high mitigation: temperatures in the interior could be constrained between 2.5 to 4 °C.
Rainfall	<ul style="list-style-type: none"> ● More uncertainty in rainfall projections than in temperature projections. ● Under low mitigation: <ul style="list-style-type: none"> ○ South Africa to experience drier conditions overall. ○ Extreme rainfall events to increase over the interior. ● Under high mitigation: Different projections <ul style="list-style-type: none"> ○ Large number of projections predict generally wetter conditions over the central and eastern interior. ○ Other projections predict generally drier conditions.

The table below summarises the vulnerability of key socio-economic sectors in South Africa to climate change (DEA 2017b).

Sector	Sensitivity analysis	Exposure Analysis		
	Current stresses to the systems	Climatic driver	Impacts	Area
Agriculture and Forestry	<ul style="list-style-type: none"> ● Land use and change ● Water stress ● Invasive alien plants 	↓ rainfall	Reduction in yields	KwaZulu-Natal, Mpumalanga, Western Cape
		Δ rain distribution	Impacts on crop production	National

Sector	Sensitivity analysis	Exposure Analysis		
	Current stresses to the systems	Climatic driver	Impacts	Area
		↑ heat waves	Pressure on water resources	National
C o a s t a l zone	<ul style="list-style-type: none"> • Direct wave impacts • Coastal flooding / inundation • Erosion and under-scouring • Land use change 	<ul style="list-style-type: none"> • Intrusion of saltwater • Loss / changes to coastal wetlands • Higher (ground) water levels and limited soil drainage • Flooding of low-lying areas and erosion 		
Health	<ul style="list-style-type: none"> • Quadruple burden of disease • Poor housing, infrastructure and service delivery • Change in distribution of diseases • Catastrophic events may affect the health of the population. 	<ul style="list-style-type: none"> • A changing climate can have a myriad of impacts on the health sector. • There is a lack of understanding of the linkages between climate and health in South Africa (e.g. quantitative link between high temperatures and mortality). 		
Terrestrial Ecosystems	<ul style="list-style-type: none"> • Habitat fragmentation • Land use change • Invasive alien plants 	<ul style="list-style-type: none"> • ↑ temperature and extremes • Δ in rainfall and distribution • Changes in fire 	<ul style="list-style-type: none"> • Changes across the biomes through the alteration of habitats, species distribution, and ecosystems functioning. 	
Urban and Rural Settlements	<ul style="list-style-type: none"> • Deficit in infrastructure and provision of services 	<ul style="list-style-type: none"> • Different human settlement types and locations having varying vulnerabilities and capacities • Informal settlements and their population are most exposed 		
W a t e r Resources	<ul style="list-style-type: none"> • High water demand: current water usage already exceeds reliable yield • High levels of variability in rainfall, resulting in frequent floods and droughts • Deteriorating water quality in river systems, water storage reservoirs and groundwater 	↓ rainfall	<ul style="list-style-type: none"> • Increase in demand from agriculture, power generation, settlements 	
		↑ intense rainfall	<ul style="list-style-type: none"> • Increased erosion and sedimentation of dams and rivers 	
		↑ temperature	<ul style="list-style-type: none"> • Increased evaporation loss from dams • Effect on biological and microbiological processes 	

3. Strategic Focus

This chapter outlines the vision, strategic objectives, strategic interventions and strategic outcomes of the NCCAS.

3.1. Vision

To transition to a climate resilient South Africa, which will follow a sustainable development path, guided by anticipation, adaptation and

recovery from a changing climate and environment to achieve our development aspirations.

3.2. Principles and key elements of adaptation and climate resilience

The guiding principles for the implementation of the NCCAS are outlined below:

Title	Description
A country-driven approach	The development and implementation of the NCCAS will be driven by South Africa and the NCCAS will be coordinated with national sustainable development objectives, plans, policies, programmes.
Based on best available science and traditional knowledge	The development and implementation of the NCCAS will be based on best available science on observed climate and projected climate changes as well as relevant traditional knowledge on climate impacts and potential responses.
Participatory	A wide range of stakeholders, including government, communities, civil society organisations, research community and private sector actors will be involved in the development and implementation of the NCCAS.
People-centred	The development and implementation of the NCCAS will place people and their needs at the forefront and serve their physical, psychological, developmental, cultural and social interests equitably.
Equity (refer to equity principle as outlined in the Policy)	The development and implementation of the NCCAS should support and promote equity in South Africa.
Gender-sensitive	The development and implementation of the NCCAS will promote the participation of women, take gender differences in vulnerability to climate change into account, address the needs and priorities of both women and men and will not exacerbate gender inequalities.
Consideration of vulnerable groups	The development and implementation of the NCCAS will promote the participation of vulnerable groups and build resilience and adaptive capacity of the most vulnerable people.
Environmental support for climate adaptation	The development and implementation of the NCCAS will promote the protection of ecosystems and biological diversity that are required to support South Africa's adaptation to climate change.
Address capacity gaps	The development and implementation of the NCCAS will promote the development of capacity in climate change adaptation throughout South Africa.
Facilitate mainstreaming of adaptation	The development and implementation of the NCCAS will promote the integration of adaptation in the policies and planning of sectors as well as all three spheres of government.
Continuous, progressive, iterative process	The NCCAS will have a strong Monitoring and Evaluation (M&E) System and further iterations of the NCCAS will be influenced by outcomes of M&E.

3.3. Strategic Objectives

As different departments and spheres of government continue to develop and strengthen their own comprehensive adaptation strategies, it is critical that they all reflect a shared vision. A common reference point is needed to help align ongoing efforts across the country. This document - South Africa's NCCAS - is intended to be the cornerstone for climate change adaptation in the country and to reflect a unified, coherent, cross-sectoral, economy-wide approach to climate change adaptation. It outlines priority areas for adaptation, both to guide adaptation efforts and to inform resource allocation. The strategic objectives of the NCCAS are as follows:

- Objective 1: Build climate resilience and adaptive capacity to respond to climate change risk and vulnerability.
- Objective 2: Promote the integration of climate change adaptation response into development objectives, policy, planning and implementation.
- Objective 3: Improve understanding of climate change impacts and capacity to respond to these impacts.
- Objective 4: Ensure resources and systems are in place to enable implementation of climate changes responses.

3.4. Strategic Interventions

The strategic interventions of the NCCAS are presented below. Each intervention has a dedicated Chapter to outline the envisaged actions associated with the intervention.

- Intervention 1: Reduce human and economic vulnerability, ensure resilience of physical capital and ecological infrastructure and build adaptive capacity.
- Intervention 2: Develop a risk, early warning, vulnerability and adaptation monitoring system for key climate vulnerable sectors and geographic areas.
- Intervention 3: Develop a vulnerability and resilience methodology framework that integrates biophysical and socio-economic aspects of vulnerability and resilience.
- Intervention 4: Facilitate mainstreaming of adaptation responses into sectoral planning and implementation.
- Intervention 5: Promote research application, technology development, transfer and adoption to support planning and implementation.
- Intervention 6: Build the necessary capacity and awareness for climate change response.
- Intervention 7: Establish effective governance & legislative processes to integrate climate change in development planning.
- Intervention 8: Enable substantial flows of climate change adaptation finance from various sources.
- Intervention 9: Develop and implement an M&E system that tracks implementation of adaptation actions and their effectiveness

3.5. Strategic Outcomes

The NCCAS outlines strategic outcomes towards achieving the vision of the transition to a climate-resilient South African. These are outlined below:

- Outcome 1.1: Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability.
- Outcome 2.1: An early warning and monitoring system for key climate vulnerable sectors and geographic areas developed and implemented.
- Outcome 3.1: An adaptation vulnerability and resilience framework developed and implemented across 100% of key adaptation sectors.

- Outcome 4.1: Effective adaptation planning that covers at least 80% of the South African sectors identified in the NCCAS.
- Outcome 4.2: Achieve a 100% coverage of climate change considerations in sectoral operational plans.
- Outcome 5.1: Increased research output and technology uptake to support planning and implementation.
- Outcome 6.1: Capacity building and awareness for climate change response enhanced.
- Outcome 7.1: Adaptation governance defined and legislated through the Climate Change Act once approved by parliament
- Outcome 7.2: Institutional support structures for climate change adaptation strengthened
- Outcome 7.3: Enhanced public-private-civil society collaboration and stewardship
- Outcome 8.1: Adequate financial resources for national adaptation priorities from national fiscus and international sources
- Outcome 9.1: A national M&E system developed and implemented

3.6. Linkages between strategic objectives, interventions and outcomes

Objective	Intervention	Outcome
Objective 1: Build climate resilience and adaptive capacity to respond to climate change risk and vulnerability.	Intervention 1: Reduce human, economic, environment, physical and ecological infrastructure vulnerability and build adaptive capacity.	Outcome 1.1: Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability.
	Intervention 2: Develop a risk, early warning, vulnerability and adaptation monitoring system for key climate vulnerable sectors and geographic areas.	Outcome 2.1: An early warning and monitoring system for key climate vulnerable sectors and geographic areas developed and implemented.
Objective 2: Promote the integration of climate change adaptation response into development objectives, policy, planning and implementation.	Intervention 3: Develop vulnerability and resilience methodology framework that integrates biophysical and socio-economic aspects of vulnerability and resilience.	Outcome 3.1: An adaptation vulnerability and resilience framework developed and implemented across 100% of key adaptation sectors
	Intervention 4: Facilitate mainstreaming of adaptation responses into sectoral planning and implementation.	Outcome 4.1: An effective adaptation planning that covers at least 80% of the South African sectors identified in the NCCAS. Outcome 4.2: Achieve a 100% coverage of climate change considerations in sectoral operational plans.
Objective 3: Improve understanding of climate change impacts and capacity to respond to these impacts.	Intervention 5: Promote research application, technology development, transfer and adoption to support planning and implementation.	Outcome 5.1: Increased research output and technology uptake to support planning and implementation.
	Intervention 6: Build the necessary capacity and awareness for climate change response.	Outcome 6.1: Capacity building and awareness for climate change response enhanced.
Objective 4: Ensure resources and systems are in place to enable implementation of climate changes responses.	Intervention 7: Establish effective governance & legislative processes to integrate climate change in development planning.	Outcome 7.1: Adaptation governance defined and legislated through the Climate Change Act once approved by parliament.
		Outcome 7.2: Institutional support structures for climate change adaptation strengthened.
		Outcome 7.3: Enhanced public-private-civil society collaboration and stewardship.

	Intervention 8: Enable substantial flows of climate change adaptation finance from various sources.	Outcome 8.1: Adequate financial resources of national adaptation priorities from national fiscus and international sources.
	Intervention 9: Develop and implement an M&E system that tracks implementation of adaptation actions and their effectiveness.	Outcome 9.1: A national M&E system developed and implemented.

4. Reduce Vulnerability and Build Adaptive Capacity

Reduce human, economic, environment, physical and ecological infrastructure vulnerability and build adaptive capacity.

4.1. Introduction

South Africa is already experiencing the negative effects of climate change and is expected to suffer significant consequences in the future. To promote adaptation to these impacts it is necessary to take measures to reduce human and economic vulnerability as well as to reduce the vulnerability of physical and ecological infrastructure to climate change. In addition, it is necessary to build the adaptive capacity of individuals and society to respond to climate change impacts. Since climate change impacts vary depending on vulnerability and adaptive capacity those individuals and communities that are most vulnerable to climate change should be identified for priority support.

The key outcome for this strategic intervention is: *Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability* (Strategic Outcome 1.1).

Scaling up and replicating adaption interventions that have been considered effective can be an efficient and effective way to reduce vulnerability and build adaptive capacity. Scaling up and replicating adaption interventions will increase the impact on the community at large.

4.2. Scale of Interventions

There are a wide range of adaptation projects that are currently being implemented in South Africa by different stakeholders in different sectors. Some of the existing projects may not be acknowledged as ‘climate adaptation projects’, but contribute towards building adaptive capacity and reducing vulnerability. Stakeholders that have been key implementers of climate adaptation projects include: government role players such as DEA, provincial and local governments, and state entities such as SANBI, non-governmental organisations (NGOs) and business among others (DEA 2017b).

In the water sector, adaptation projects include water conservation and demand management projects, such as the implementation of rainwater harvesting tanks and water saving awareness programmes. Some of the large water conservation projects have included the working for water and working for wetlands programmes which involve the removal of alien trees and protection of water resources (DEA 2017b).

In the agriculture sector, adaptation projects have focused on building the resilience and capacity of farmers to prepare for the expected changes in climate. Some projects have focused on specific infrastructure solutions, whilst others have focused on disseminating knowledge and information. Small-scale farmers in vulnerable areas have mostly been targeted for these projects. Climate-smart agriculture has been a particular method of farming that has been promoted as a sustainable way of increasing production and minimising greenhouse gas emissions (DEA 2017b).

Biodiversity projects have focused on the restoration and rehabilitation of ecosystems. A common approach that has been used is ecosystem-based agriculture which involves restoring ecosystems and by doing so reducing the vulnerabilities of communities. Another approach that has been used in some adaptation projects is biodiversity stewardship which involves communities and landowners as custodians of important resources and areas of biodiversity (DEA, SAWS 2016).

Many of the health and climate change projects have focused on investigating the complex relationships between climate change, diseases such as HIV/AIDS, and food security. Improving health care can help to build the resilience of communities to better be able to cope with climate change impacts (DEA 2016a).

Climate-proofing settlements and infrastructure and developing local early warning systems for communities have been some of the adaptation projects implemented in the disaster sector. Disaster risk reduction has also been prioritised in many local government strategic plans (DEA 2016a).

4.3. Actions

The actions to achieve this outcome are outlined below:

Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability

Action	Description
1.1.1 Support the agricultural sector to implement more efficient climate-smart and conservation agriculture practices.	This will involve setting up programmes to provide support to the sector to implement climate-smart and conservation agricultural practices. These are sustainable agricultural practices that work with the environment and help to increase productivity, build resilience of farmers to stresses, and lower carbon emissions.
1.1.2 Support the agricultural sector to use and manage water more sustainably.	This will involve the promotion and subsidisation of water conservation technologies.
1.1.3 Promote the expansion of food garden programmes outside of land classified as agricultural land or farmland to reduce food insecurity and hunger.	This will involve the promotion of urban agriculture, including community and household food gardens, in areas not classified as agricultural. Growing food will help to reduce the potential food security risks associated with changes in climate.

Action	Description
1.1.4 Adopt climate resilient approaches to natural resource management to restore and maintain ecosystem goods and services.	This will involve using climate-smart and ecosystem-based approaches to restore ecological integrity of natural resources and improve community resilience to climate change.
1.1.5 Protect and conserve South Africa's most vulnerable ecosystems and landscapes.	This will involve identifying vulnerable ecosystems that need further protection from impacts of climate change. Enforced action is required against illegal harvesting of coastal and offshore fish stock, ecosystem-based approaches are also recommended to ensure the recovery of freshwater and marine fish stocks. Monitoring and controlling alien invasive species that benefit from climate change will reduce the risk of biodiversity loss.
1.1.6 Monitor and control the spread of alien invasive species that benefit from climate change.	This will involve conducting research into identifying the alien invasive species that will benefit from climate change and developing responses to prevent these species from spreading. Different stakeholders in the biodiversity sector need to work together continuously to control the spread of these species and minimise the risk of biodiversity loss.
1.1.7 Ensure that climate change projections are integrated into long-term biodiversity management plans.	This will involve ensuring that climate change projections are integrated into long-term biodiversity management plans so that the implications of climate change are considered.
1.1.8 Capacitate and operationalise South Africa's National Disaster Management Framework to strengthen proactive climate change adaptive capacity, preparedness, response and recovery.	This will involve conducting an assessment of gaps and needs with regard to the National Disaster Management Framework to identify elements of the framework that have not yet been achieved. In particular all Disaster Management Centres will need to integrate climate change within their terms of reference.
1.1.9 Ensure that national, provincial and local disaster management plans address climate change.	This will involve the inclusion of climate change impacts in disaster management plans in national, provincial and local spheres.
1.1.10 Create a more adaptive electricity system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas.	This will involve encouraging the development of an adaptive and decentralised electricity system so that the system is more resilient to climate disruptions.
1.1.11 Support small-scale fishers to become more climate resilient through use of early warning systems and sea-safety training.	This will involve the development of sea-safety and early warning systems training programmes targeted at small-scale fishers.

Action	Description
1.1.12 Investigate the potential effects of an expanded forestry sector on water availability.	This will involve conducting research on the potential effects of an expanded forestry sector on water availability within the context of climate change impacts on water availability.
1.1.13 Support the integration of climate-smart and ecosystem-based approaches in forestry practices.	This will involve the integration of climate-smart and ecosystem-based approaches in forestry training curricula
1.1.14 Launch an enhanced climate change public health flagship programme to build a healthier, more resilient population.	This will involve the development of an evidence-based white paper on National Climate Change and a Health Flagship Programme as well as establishing key implementation nodes in provinces and municipalities.
1.1.15 Develop climate change-related disease monitoring systems.	This will involve the development of climate change-related disease monitoring and surveillance systems.
1.1.16 Equip and capacitate healthcare facilities to manage climate change-related health effects.	This will involve continued capacity building of healthcare workers to provide them with the skills to respond to and manage climate change related incidences. It will also include equipping the healthcare infrastructure.
1.1.17 Develop guidelines on environmentally responsible mining practices that promote climate adaptation.	This will involve the development of guidelines to promote environmentally responsible mining practices that contribute towards climate change adaptation. The aim is to ensure that mining operations as well as mine closures consider surrounding ecosystems that will help to build resilience to climate change. The guidelines should take learnings into account from global case studies.
1.1.18 Plan for the effects of climate change on infrastructure.	This will involve incorporating climate change into asset management plans to ensure climate adaptive infrastructure.
1.1.19 Invest in high-quality, climate resilient, public infrastructure.	This will involve investing in high quality, climate resilient public infrastructure, including transport infrastructure, that will withstand disasters and have an extended lifespan.
1.1.20 Ensure that water management institutions incorporate adaptive management responses.	This will involve providing continued support and advice to water management institutions on how to incorporate adaptive management responses.
1.1.21 Develop a list of resilience-building projects that can easily be replicated.	This will involve developing a list of recent successful resilience-building programmes and projects that can easily be replicated in other areas or sectors. This action stresses the importance of learning from successfully implemented programmes to identify key elements that have provided best results in resilience-building in order to replicate them in similar environments.

Action	Description
1.1.22 Identify individuals and communities at most risk from climate change within local municipalities and deliver targeted climate change vulnerability reduction programmes for these individuals and communities.	This will involve the identification of at-risk individuals and communities within local municipalities. Based on this identification targeted vulnerability reduction programmes can be designed and delivered.
1.1.23 Investigate the potential for expanding sectors and kick-starting new industries that are likely to thrive as a direct or indirect result of climate change effects.	This will involve identifying climate change impacts that will bring about new industries and opportunities and then piloting sector specific projects with high opportunity potential. The process will kick off with the design of these projects and carry through to compiling lessons derived from final evaluation of the project.

5. Early warning systems

Develop a risk, early warning, vulnerability and adaptation monitoring system for key climate vulnerable sectors and geographic areas.

5.1. Introduction

South Africa experiences a wide range of weather and climate related disasters that are projected to worsen with climate change. Some of these disasters include drought, severe storms, flooding and heat waves. These disasters pose risks to human lives, infrastructure, and the economy. Different areas, sectors, and communities will be impacted in different ways, with some being more vulnerable than others. It is critical that early warning systems are put in place to provide those sectors, areas and communities that are particularly vulnerable to the different disasters, with timely information in order to reduce their risk and plan suitable responses.

The National Framework for Climate Services (NFCS), prepared in response to the Global Framework for Climate Services (GFCS), aims to provide a framework to better manage climate risks and hazards by incorporating climate science and prediction services (including the development of early warning systems) into planning, policy and practice (DEA & SAWS 2016).

The key outcome for this strategic intervention is: *An early warning and monitoring system for key climate vulnerable sectors and geographic areas developed and implemented* (Strategic Outcome 2.1).

5.2. Status Quo

The National Framework for Climate Services (NFCS) highlights that recent collaboration between different weather services, emergency services and other organisations has resulted in much improved early warning systems, and a subsequent reduction in damage to infrastructure and loss of life as a result of disasters (DEA & SAWS 2016). The table below highlights some of the national early warning disaster management systems that have been developed to prepare for different types of disaster, including flood, drought and fire (DEA 2015b).

Table: Disaster management warning systems (Source: DEA & SAWS 2016; DEA 2015b)

System name	Function of the system	S y s t e m developers
The South African Flash Flood Guidance (SAFFG) system	The system provides guidance on potential flash flood watches and warnings within 1 to 6 hours.	South African Weather Service (SAWS)
Drought Early Warning systems	Provides information on drought conditions based on the interpretation of satellite and climate data.	National Disaster Management Centre (NDMC)

System name	Function of the system	System developers
The Drought Monitoring Desk	System provides information on long range seasonal forecasts, observed rainfall as well as maps of Standardised Precipitation Index (SPI).	SAWS
National Fire Danger Rating System (NFDRS)	Provides for the prevention of fires.	Council for Scientific and Industrial Research (CSIR)/ Department of Water and Sanitation (DWS)
The Advanced Fire Information System (AFIS)	System locate fires in near real time over Southern Africa.	CSIR
Severe Weather Warning System (SWWS)	Aims to make warnings easy to understand by the public, and focuses on managing disaster at a community level. The system integrates risk knowledge, monitoring and warning, dissemination, and response capability. The SWWS relies on good interactions between SAWS and local disaster management centres.	SAWS
Wide Area Monitoring Information System (WAMIS)	Uses satellite data to provide real-time monitoring and mapping of extreme events such as fires, floods and droughts.	CSIR

Some of the other early warning systems that have been developed to focus on specific sectors by different stakeholders include (DEA 2015b).

Sector	System name	Function of the system	System developer
Agriculture	Umlindi/ Watchman newsletter system (300 subscribers)	Provides information on drought conditions based on the interpretation of satellite and climate data.	Agricultural Research Council (ARC)
Agriculture	Provincial Early Warning Committees	Assist in the implementation of early warning systems. Assist farmers to respond to warnings.	Department of Agriculture, Forestry and Fisheries (DAFF)
Agriculture	Interpretation and dissemination of climate/weather data to farmers	Interprets climate/weather data in laymen's terms and disseminates it to member farmers via email and radio.	AgriSA

Sector	System name	Function of the system	System developer
Health	Early Warning System focused on malaria	Early Warning System focused on malaria	Department of Health (DOH)
Health	Communication of issues related to communicable diseases such as outbreaks	Via online and in-house publications on a regular basis	National Institute of Communicable Diseases (NICD)

5.3. Actions

Although there are a number of national and sector specific early warning systems that have been implemented, there is still room for improvement, particularly around the coordination of early warning systems in the different spheres of government. A network to share information and learnings on early warning systems and different technologies would also be particularly useful. These and other actions to improve South Africa's early warning systems are highlighted below.

5.3.1. An early warning and monitoring system for key climate vulnerable sectors and geographic areas developed and implemented

Action	Description
2.1.1 Improve the climate monitoring and observation network	This will involve identifying existing gaps in the monitoring and observation network and addressing these gaps to ensure that national climate data is reliable, comparable, up to date and accessible.
2.1.2 Develop a national climate information and early warning system	This will involve developing a national climate information and early warning system that can interface with other information systems.
2.1.3 Develop provincial early warning systems for vulnerable geographical areas	This will involve provinces improving or developing early warning systems for risks that have been identified in their respective areas, particularly for vulnerable groups.
2.1.4 Develop municipal early warning systems for vulnerable geographical areas	This will involve municipalities improving or developing early warning systems for risks that have been identified in their respective areas, particularly for vulnerable groups.
2.1.5 Improve/develop national early warning systems for key climate vulnerable sectors and risks.	This will involve developing/improving early warning systems for key sectors, such as agriculture, and risks, such as flooding, in order to provide guidance on responding to climate related risk.

Action	Description
2.1.6 Develop and support a climate change early warning and vulnerability network with the involvement of relevant stakeholders	This will involve setting up a climate change early warning and vulnerability network to promote collaboration and sharing of information on preparing for different climate related risks. Role players should include government and research institutions, as well as community organisations and neighbouring states.
2.1.7 Investigate alternative technologies that can be used	This will involve researching and investigating alternative technologies that can be used in developing effective and efficient early warning systems.

6. Risk and Vulnerability Assessment Framework

1: Develop vulnerability and resilience methodology framework that integrates biophysical and socio-economic aspects of vulnerability and resilience.

6.1. Introduction

Sector departments need to identify and map risks and vulnerabilities that are relevant to their sectors and to use this as a basis to develop a climate change response implementation plan. In addition, provinces and municipalities should undertake climate change needs and response assessments based on the vulnerabilities of the respective provinces and municipalities and use this as a basis to develop a climate change response implementation plan.

Accordingly, there is a need to develop a framework to guide sectors, provinces and municipalities on the process of undertaking and presenting a vulnerability assessment and the development of climate change response implementation plans. This will assist in framing the Risk and Vulnerability Assessment process.

The key outcome for this strategic intervention is: *An adaptation vulnerability and resilience framework developed and implemented across 100% of key adaptation sectors (Strategic Outcome 3.1).*

6.2. Status Quo

Climate change vulnerability assessments and associated climate change response plans have been developed in South Africa for a number of years by national departments, provinces, municipalities and various entities. All the nine provinces in the country have developed risk and vulnerability assessments. In the local sphere of government DEA has supported all district municipalities to develop a vulnerability assessment and a climate change response plan. Many local municipalities have also conducted their own vulnerability assessments and developed an associated response plan.

Despite the various efforts on vulnerability and response plan development there is no agreed vulnerability and resilience methodology framework to provide guidance to this process. As a result, it is not always possible to compare the results of the assessments or aggregate the results in order to provide an overall picture of vulnerability and response across sectors and spheres of government in South Africa.

6.3. Actions

The actions to achieve this outcome are outlined below:

An adaptation vulnerability and resilience framework developed and implemented across 100% of key adaptation sectors

Action	Description
3.1.1 Develop a National Adaptation Vulnerability and Resilience Framework (NAVRF)	This will involve developing an overarching adaptation and vulnerability resilience framework that provides guidance on the development of vulnerability assessments and climate change response plans developed by sectors and spheres of government. Since there is variability among sectors and geographic areas the framework should not be prescriptive. Rather it should provide broad guidance with the aim of promoting improved coherence between assessments and plans as well as allowing for comparisons and aggregation of the results of the assessments and plans. The framework should also provide a platform to assess trade-offs across sectors so as to further inform sector strategies and plans. The process to develop the framework should be done in consultation with various sectors, provinces, local government and other relevant entities. The process should also build on work that has already been done on developing assessments and response plans.
3.1.2 Use the NAVRF to guide sector assessments	This will involve sector departments using the NAVRF as guidance when undertaking initial assessments and developing response plans. Sector departments should also use the NAVRF as guidance when reviewing and revising existing assessments and response plans.
3.1.3 Use the NAVRF to guide provincial assessments	This will involve provinces using the NAVRF as guidance when reviewing and revising existing assessments and response plans.
3.1.4 Use the NAVRF to guide local assessments	This will involve local governments using the NAVRF as guidance when undertaking initial assessments and developing response plans. Local governments should also use the NAVRF as guidance when reviewing and revising existing assessments and response plans.

7. Adaptation Planning and Mainstreaming

Strategic Intervention 4: Facilitate mainstreaming of adaptation responses into sectoral planning and implementation.

7.1. Introduction

Climate change is a cross-cutting issue that impacts on different sectors and contexts in different ways. Adapting to climate change therefore cannot be limited to the environmental sector and must be integrated into planning and implementation processes in different spheres of government, sectors, business and civil society. Developing climate change standalone strategies at different levels is essential to provide strategic guidance on responding to climate change in South Africa. However, if climate change adaptation is not incorporated into the different national sector plans, provincial and local government, and private sector strategic plans, then it will not be prioritised in these spheres.

The key outcomes for this strategic intervention are:

- Effective adaptation planning that covers at least 80% of the South African sectors identified in the NCCAS (Strategic Outcome 4.1)
- Achieving 100% coverage of climate change considerations in sectoral operational plans (Strategic Outcome 4.2)

7.2. Status Quo

All nine provinces have developed climate change response strategies that include climate adaptation interventions. Regarding the local sphere, DEA and the South African Local Government Association (SALGA) facilitated the Local Government Climate Change Support Programme which resulted in the development of climate change response plans for all the district municipalities in South Africa, with associated adaptation interventions. Many local municipalities have also developed their own climate change response plans using the tools from this Programme. Some provinces and municipalities are in the process of integrating elements of their climate change response strategies into their strategic plans. Regarding specific sectors, many of the national departments are currently developing climate change plans for their sectors and in some cases, they are taking steps to integrate these into departmental operational plans. In addition, some private sector businesses have developed climate change response strategies.

7.3. Actions

The actions to achieve the outcomes associated with this intervention are outlined below:
An effective adaptation planning that covers at least 80% of the South African sectors identified in the NCCAS

Action	Description
4.1.1 Draft updated National Climate Change Sector Plans to include climate change adaptation	This will involve ensuring that key sectors have drafted updated national climate change sector plans. Sector plans identified for inclusion of climate change adaptation interventions include: water, agriculture, forestry, fisheries, health, biodiversity and ecosystems, human settlements, and disaster risk reduction and management sectors, as well as, energy, mining, transportation and infrastructure. These sector plans must be reviewed and published every five years.
4.1.2 Draft updated provincial climate change adaptation strategies and associated implementation plans	This will involve each province drafting updated climate change strategies that include adaptation responses and drafting associated implementation plans to guide climate response in their province. These strategies and associated implementation plans should be reviewed and updated every five years.
4.1.3 Draft updated local government climate change adaptation strategies and associated implementation plans	This will involve each municipality drafting updated climate change strategies that include adaptation responses and drafting associated implementation plans to guide climate response in the respective municipality. Local municipalities should use the District municipal plans as resources. These strategies and associated implementation plans must be reviewed and updated every five years.

Achieve a 100% coverage of climate change considerations in sectoral operational plans

Action	Description
4.2.1 Integrate climate change adaptation into Provincial Growth and Development Strategies	This will involve each province ensuring that climate change projects and programmes are reflected in their strategic Provincial Growth and Development Strategies.
4.2.2 Amend Development Planning guidelines to incorporate climate change adaptation considerations	This will involve establishing a working group involving the National Planning Commission, DEA, provincial representatives, and South African Local Government Association to amend existing development planning guidelines, at all levels, to include climate change adaptation.

Action	Description
4.2.3 Integrate climate change adaptation into Municipal Development Planning documents	This will involve each municipality ensuring that climate change projects and programmes are reflected in municipal strategic development planning documents, including Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs).
4.2.4 Mandate that all public infrastructure be planned, designed, operated and managed after explicitly taking current and predicted future climate change impacts into account.	This will involve the Office of the President ensuring that all sectors factor climate change into infrastructure planning and development. It will entail capacity building and training of staff to ensure sufficient technical expertise in this transition.
4.2.5 Mainstream climate change adaptation in business strategic implementation plans	This will involve the provision of support to private sector businesses to incorporate climate change adaptation into their strategic implementation plans.

8. Research

Strategic Intervention 5: Promote research application, technology development, transfer and adoption to support planning and implementation.

8.1. Introduction

Climate change will result in significant physical and socioeconomic effects in South Africa. It is important that decisions made in planning for these effects are based on access to accurate and current data and research. Investment in high-quality climate modelling data and research on the projected impacts of climate change will help reduce risk and enable the development of more effective actions. Currently there are many institutions involved in climate related research in South Africa. However, there is a lack of coordination between the different institutions and no central database or platform where climate related data is shared.

The key outcome for this strategic intervention is: *Increased research output and technology uptake to support planning and implementation* (Strategic Outcome 5.1).

8.2. Status Quo

A wide range of institutions are involved in climate observation, modelling and climate research in South Africa. These include governmental agencies like the South African Weather Services (SAWS) and government departments such as the Department of Science and Technology (DST), academic and research institutions, such as the Climate System Analysis Group (CSAG) and Africa Climate and Development Initiative (ACDI) based at University of Cape Town, and various NGOs and community organisations.

8.3. Actions

The actions to achieve the outcomes associated with this intervention are outlined below:

8.3.1. Increased research output and technology uptake to support planning and implementation

Action	Description
5.1.1 Set up a National Climate Centre in an existing institution	This will involve identifying a suitable institutional home for a National Climate Centre. The National Climate Centre should coordinate the central collation of climate data, information, products and applications, and facilitate climate related research and development in South Africa. Since there are a number of existing institutions that play an important role in climate services in South Africa and already perform some of the functions associated with the proposed centre there is no need to establish a new institution.

Action	Description
5.1.2 Establish an Interactive Online Climate Service Platform	This will involve the development of a specially designed website which will act as a climate service knowledge portal. It will present information, research and data stored and archived in the national climate services database and data from various climate service providers. The platform will allow for various users to access sectoral climate services on the site or to be directed to service providers who can provide customised climate services or products.
5.1.3 Establish a Climate Change Science Advisory Technical Council	This will involve the establishment of an expert advisory group consisting of climate change professionals and economic planning professionals, as well as science and technology advisors. This group will provide advice to the National Climate Centre.
5.1.4 Develop a research roadmap for climate change adaptation	This will involve developing a roadmap for climate change research in South Africa, and will involve identifying areas where new and additional research is required in South Africa, and recommending priorities for research and development funding.
5.1.5 Continue and enhance climate observation and monitoring	This will involve continued investment in and support for capturing climate observation and monitoring data.
5.1.6 Continue to invest in climate change prediction and modelling data	This will involve the continued investment in and support for the development of climate change predictions and modelling.
5.1.7 Continue to invest in research that aims to understand the different impacts of climate change on the environment and society	This will involve continued support for different research institutions that are developing an understanding of the impacts of climate change on the environment and society, as well as the opportunities for different sectors. These include research reports such as the Long Term Adaptation Scenarios (LTAS) which outline adaptation scenarios for South Africa under projected future climate conditions.
5.1.8 Invest in research on the most effective adaptation responses to different climate change impacts	This will involve continued support for research into the most effective adaptation responses and new technological solutions that can be replicated.

Action	Description
5.1.10 Establish a programme to promote research into new climate change adaptation technologies	This will involve establishing a programme to promote research into new climate change adaptation technologies.
5.1.11 Establish a knowledge dissemination programme to encourage research uptake	This will involve establishing a programme to promote the dissemination of new climate change adaptation research knowledge and information on new technologies that have been developed to stakeholders to promote uptake of the research and information.

9. Awareness and Capacity Building

This section presents the approach to implementing *Strategic Intervention 6: Build the necessary capacity and awareness for climate change response*.

9.1. Introduction

The importance of focusing on education in the climate change field is highlighted in the National Climate Change Response White Paper (DEA 2011). Climate change is a challenge that will impact on multiple sectors and requires systematic interventions in order to improve the awareness and capacity of a range of stakeholders. Stakeholders need to understand the causes, impacts, and key vulnerabilities associated with climate change, as well as how to respond to these vulnerabilities (DEA 2011). One of the most effective ways of improving awareness is to mainstream climate change into different education and training curricula at different levels, such as schools and tertiary institutions. Awareness and capacity are also particularly important in all three government spheres so that officials are equipped to guide climate change response in their respective jurisdictions. Since new knowledge is being generated on the impacts of climate change and appropriate responses, awareness and capacity building is required on an ongoing basis.

The key outcome for this strategic intervention is: *Capacity building and awareness for climate change response enhanced* (Strategic Outcome 6.1).

9.2. Status Quo

There are a wide variety of stakeholders that currently provide climate change related education, training, and awareness programmes in South Africa, including NGOs, academic institutions, businesses and government entities. Climate change is also featured in school curricula and tertiary level courses.

At the school level, climate change and sustainability has been included in different subjects from grade 1-12 in the national Curriculum Assessment Policy Statements (CAPS). Climate change education materials have also been developed for teachers through the Fundisa for Change programme. At the university level, there are a variety of climate change Honours and Master's degree programmes being offered at many of the universities. Furthermore, a number of different research institutions and centres have been established in association with universities that focus on different aspects of climate change and sustainability (DEA 2017a).

In the NGO sector, there are a wide range of local and international NGOs that work in different parts of the country in the climate change education and awareness sphere. These organisations are diverse and work on different climate change related sectors and with different stakeholders. A number of these NGOs work directly with the youth (DEA 2017a).

In the business sector, groups like the National Business Initiative (NBI), play a role in educating business on the possible impacts and opportunities in the sustainability and climate change field and help to promote discussion and knowledge sharing in the private sector (DEA 2017a).

In the government sector, capacity and skills in the climate change field have been identified as key challenges faced by government officials in responding to climate change (DEA 2016b). DEA together with SALGA developed the Let's Respond Toolkit and Local Government Climate Change Support Programme to capacitate local government officials to understand the basics of climate change, how to identify their climate change vulnerabilities, and how to develop response plans. This programme adopted a hands-on approach during the workshops and developed a project website (<http://www.letsrespondtoolkit.org>) where officials could access the programme materials in their own time. All district municipalities were included in the programme and benefited from the capacity building and training exercises.

9.3. Actions

The actions to achieve the outcomes associated with this intervention are outlined below:

Capacity building and awareness for climate change response enhanced

Action	Description
6.1.1 Develop and implement an effective communication and outreach programme	<p>This will involve developing a communication strategy that should consider approaches such as: knowledge sharing events, repositories of information on climate change impacts, climate change forums, resources, translation of climate science into actionable policies and plans.</p> <p>The communication strategy should then be launched and a continuous communications campaign implemented. The content and target audiences should be revised annually based on learnings and feedback. Proposed key messaging for the training programme can be found in Annex A.</p>
6.1.2 Develop and implement a training programme for government officials	<p>This will involve developing and implementing a training programme. Since a number of training initiatives already exist to promote the development of adaptive capacity by government officials, such as the Let's Respond Toolkit for local government, the programme will ensure that there is a unified approach to climate change adaptation training and that the impacts of the programme are monitored.</p> <p>The programme can then be revised annually based on learnings and feedback. The training programme should incorporate training to develop the technical capacity within the various spheres of government and key sector institutions that help build climate resilience and develop risk response strategies.</p> <p>In addition, the training programme should aim to build capacity to mainstream climate change adaptation into planning, programmes and new developments or projects throughout all spheres of government.</p>
6.1.3 Establish formally accredited training courses	<p>This will involve establishing one or more formally accredited climate change adaptation training courses for government officials to ensure consistency in training and to support the professional development of participating officials.</p>

Action	Description
6.1.4 Incorporate climate change adaptation into relevant secondary and tertiary curricula	This will involve incorporating climate change adaptation into relevant secondary and tertiary curricula to mainstream climate change knowledge into education and training. It should form part of the broader framework of education on sustainable development, be interdisciplinary and aim to equip South African citizens to orient society and the economic system towards climate resilience and sustainability.

10. Governance and Legislation

Strategic Intervention 7: Establish effective governance & legislative processes to integrate climate change in development planning.

10.1. Introduction

South Africa's international climate change commitments, the global sustainability movement, as well as changes experienced in climate have resulted in many government sectors and departments, as well as private organisations and communities implementing climate change adaptation projects in South Africa. Despite some coordination taking place in different spheres and sectors, clarity around mandates, especially in the government sector, is unclear in current legislation. Communication between different sectors is lacking and there is a risk that organisations are conducting similar work, making use of funds that could be better spent. Adopting a more integrated approach to climate change where roles, responsibilities and mandates are clear and where partnerships are promoted will help to ensure that South Africa's climate change adaptation goals are met timeously and efficiently.

The key outcomes for this strategic intervention are:

- Adaptation governance defined and legislated through the Climate Change Act once approved by parliament (Strategic Outcome 7.1).
- Institutional support structures for climate change adaptation strengthened (Strategic Outcome 7.2).
- Enhanced public-private-civil society collaboration and stewardship (Strategic Outcome 7.3).

10.2. Status Quo

Governance

Climate change adaptation responses are currently being implemented by different spheres of government and other sectors, such as business and research institutions. The current roles and responsibilities for the three spheres of government and for non-government entities regarding climate change adaptation are outlined below:

- **National Government:** The Department of Environmental Affairs (DEA), a UNFCCC focal point, is the lead department responsible for coordinating the implementation of the NCCAS. Other line function national departments are responsible for integrating climate change response into their sectors.
- **Provincial Government:** Each province has an environmental department that is responsible for leading climate change response. Other line function provincial departments are responsible for integrating climate change response into their sectors.
- **Local Government:** Many critical actions required for climate change responses fall within the responsibility of local government. These include the provision of basic services (water, electricity, waste removal, and sanitation and sewage infrastructure maintenance), road management, disaster risk management, and the provision of safe and healthy human settlements.
- **The private sector:** Climate change will affect business in several ways, including through potential changes to supply chains and direct climate risks posed to operations and assets. As business becomes more proactive in dealing with climate risk, their insights, experiences and resources will provide significant opportunities to leverage public sector benefits.

- **Civil society and labour:** Civil society and labour play a pivotal role in advising on and supporting adaptation initiatives. Both groups are directly affected by the risks posed by a changing climate and the opportunities created by adaptation initiatives. Civil society can raise awareness about the need to adapt, facilitate debates, and support and monitor local implementation. Labour has played a significant role in redressing past inequities in South Africa and is an influential agent of change and transformation.
- **Academia and research:** Academia is central to efforts to improve the understanding of climate science, vulnerabilities and the effects of climate change, and to provide information on appropriate sectoral and community-based responses.

Coordinating Structures

At national level, there are several institutional structures that aim to improve coordination across departments and alignment in national efforts. The three key national climate change adaptation structures are:

- the Inter-Ministerial Committee on Climate Change
- the Intergovernmental Committee on Climate Change (IGCCC)
- the National Committee on Climate Change (NCCC)

In the provincial sphere, many of the environmental provincial departments have established provincial climate change forums where provincial stakeholders can learn about climate change and coordinate their climate change responses. In the local sphere DEA's Municipal Climate Change Support Programme has been rolled out through established forums and working groups at municipal level. These are important platforms on which to build capacity and strengthen responses to climate change.

Legislation

A draft National Climate Change Bill (2018) has been developed for South Africa that outlines an integrated approach to responding to and preparing for climate change. The bill was published by the Minister of Environmental Affairs, the late Dr Edna Molewa, on the 8th of June 2018 and went through a public comment review period.

10.3. Actions

The actions to achieve the outcomes associated with this intervention are outlined below:

Adaptation governance defined and legislated through the Climate Change Act once approved by parliament

Action	Description
7.1.1 Create formal climate change legislation for adaptation	This will involve developing Climate Change legislation and taking it through the parliamentary process for enactment. This is required as South Africa's rich body of climate resilience and adaptation knowledge, as reflected in policies, strategies and white papers, needs to be translated into a Climate Change Act. This will enable government's commitments to be backed up by legislation.

Institutional support structures for climate change adaptation strengthened

Action	Description
7.2.1 Continue to facilitate the meeting of the Inter-Ministerial Committee on Climate Change	This will involve ensuring that the Inter-Ministerial Committee on Climate Change continues to meet on a regular basis. The Inter-Ministerial Committee on Climate Change aims to coordinate climate change efforts across sector departments and spheres of government.
7.2.2 Continue to facilitate the meeting of the Intergovernmental Committee on Climate Change (IGCCC)	This will involve ensuring that the IGCCC continues to meet on a regular basis. The IGCCC fosters information exchange, consultation, agreement and support among the spheres of government regarding climate change and government's response to climate change. As a high-level platform, it brings together representatives from National Treasury and the national departments of environmental affairs; agriculture, forestry and fisheries; energy; health; human settlements; international relations and cooperation; trade and industry; transport; rural development and land reform; science and technology; social development; water affairs; and provincial environment departments; and from the South African Local Government Association (SALGA).

Action	Description
7.2.3 Establish a functioning Provincial Committee on Climate Change for each province	This will involve each province establishing a Provincial Committee on Climate Change, managed by the provincial environmental departments. The role of these committees is to coordinate climate change response actions in the relevant provinces (some provinces have already established such committees). The composition of these committees will be determined by the provincial lead departments. Potential stakeholders on these committees could include: Representatives from relevant provincial departments, political representation, civil society/business/academia, and representation from local government.
7.2.4 Establish a functioning Municipal Committee on Climate Change for each municipality	This will involve each municipality establishing a Municipal Committee on Climate Change. The role of these committees is to coordinate climate change response actions in the relevant municipalities (some municipalities have already established committees). The composition of these committees will be determined by the Municipal Lead departments. Potential stakeholders on these committees could include: Representatives from relevant municipal departments, political representation, and civil society/business/academia.

Enhanced public-private-civil society collaboration and stewardship

Action	Description
7.3.1 Continue to facilitate the meeting of the National Committee on Climate Change (NCCC), a multistakeholder climate change forum.	This will involve ensuring that the NCCC continues to meet on a regular basis. The NCCC is a multistakeholder climate change forum that consists of stakeholders from government departments, civil society, business, and academia. The forum advises DEA on international climate change commitments and national climate change implementation.
7.3.2 Implement collaborative pilot resilience-building projects	This will involve government implementing resilience-building pilot projects jointly with business and industry to demonstrate the benefits of building climate change resilience to the private sector. These pilot projects can serve as the catalysts for future climate adaptation work in the private sector. Possible business groups to target include the National Business Initiative, Business Unity South Africa and Business Leadership South Africa.

Action	Description
7.3.3 Continue to support knowledge sharing platforms	This will involve providing continued support to community-based organisations and civil society organisations which provide platforms where lessons, ideas, and knowledge can be shared to build climate resilience. This will promote learning from the experiences of stakeholders in different sectors, including NGOs, academia, business and communities to support adaptation to climate change.

11. Finance

Strategic Intervention 8: Enable substantial flows of climate change adaptation finance from various sources.

11.1. Introduction

The projected cost range for South African adaptation response from 2020-2030 under the low mitigation scenario is between US\$0.42 bn and US\$30.8 bn (DEA 2015a 5). For the moderate to high mitigation scenario the project cost range is US\$3.4 bn to US\$29.8 bn (DEA 2015a). The wide-ranging projected costs in these scenarios reflect the lack of certainty and data regarding the effects of climate variability, which make it difficult to calculate the cost of adaptation. However, it is clear that substantial finance will be required to implement the NCCAS in order to achieving meaningful adaptation in South Africa.

The key outcome for this strategic intervention is: Adequate financial resources for national adaptation priorities from the national fiscus and international sources (Strategic Outcome 8.1)

11.2. Status Quo

Adaptation initiatives are spread across government departments, and very often they are not labelled as adaptation projects. The primary funding for adaptation activities in South Africa is through direct allocations from the national budget via the Medium Term Expenditure Framework (MTEF) including expenditure on research programmes and activities that directly contribute to building and supporting resilience. The other principal source of public sector finances are public intermediaries. Relevant public intermediaries for South Africa include the Global Environment Facility (which functions as an operating entity of the financial mechanism of the UNFCCC); Development Finance Institutions (DFIs) such as the Development Bank of Southern Africa (DBSA), the World Bank and the African Development Bank; Official Development Assistance Institutions such as Germany's International Climate Initiative (IKI), KfW Group and other donor country initiatives; and Climate Funds, for example the Green Fund, the Green Climate Fund and the Adaptation Fund.

South Africa's private sector has also invested in adaptation activities, including sustainable farming practices, building ecological infrastructure and improving water infrastructure. Examples worth mentioning include activities undertaken by South African Breweries' Better Barley, Better Beer; Woolworths' Farming for the Future and the World Wildlife Fund-Mondi Wetlands Programme.

A range of economic and financial instruments exist that are being employed by both private and public investors to support adaptation projects. These include grants, equity, concessional and non-concessional loans and debt, and the operational funding of private and state-owned companies. More recently, leading private sector companies are using combinations of these instruments to mainstream adaptation into their operational activities (for example, an energy company investing in improving the resilience of its transmission lines to extreme weather events) or a company that develops products and services that support adaptation (such as a seed company developing drought-resistant seeds).

11.3. Actions

The actions to achieve the outcomes associated with this intervention are outlined below:

Adequate financial resources for national adaptation priorities from national fiscus and international sources

Action	Description
8.1.1 Carry out a cost-benefit analysis of the NCCAS	This will involve developing a cost-benefit analysis of the NCCAS, initially to determine the full cost of implementing the NCCAS. Thereafter the benefits of the NCCAS will be identified and quantified.
8.1.2 Develop a Resource Mobilisation Strategy	This will involve developing a resource mobilisation strategy that will highlight all activities involved in securing new and additional resources for implementing the Strategy. The Resource mobilisation strategy will also recommend ways to maximise the use of existing resources.
8.1.3 Develop a national climate investment plan	This will involve developing a national climate investment plan which will provide an overview of a set of robust and financeable adaptation projects and programmes for consideration by domestic and international funders.
8.1.4 Expand the list of government entities accredited for climate financing	This will involve identifying additional government entities that would be appropriate to accredit for climate financing and supporting them through the accreditation process. The throughput of adaptation projects to dedicated multilateral climate funds would be maximised by expanding the list of accredited government entities to include well-capacitated municipalities and provinces.
8.1.5 Build capacity of local accredited implementing entities to access adaptation finance	This will involve building the capacity of accredited implementing entities to improve their ability to secure finance. This will assist South Africa to maximise the allocation of adaptation finance from dedicated multilateral climate funds.
8.1.6 Develop a project preparation assistance fund	This will involve establishing a project preparation fund to support entities with the potential to prepare applications but insufficient internal funding for the process.
8.1.7 Mainstream NCCAS priorities into the Medium Term Strategic Framework and assign implementation responsibilities	This will involve mainstreaming NCCAS priorities into the Medium Term Strategic Framework and assigning implementation responsibilities to ensure that the NCCAS is implemented by sectors and spheres of government.

Action	Description
8.1.8 Investigate options to include climate change adaptation parameters in the equitable share allocations of state revenue calculations	This will involve investigating options to include climate change adaptation parameters in the equitable share allocations of state revenue calculations.
8.1.9 Promote knowledge exchange on the economic benefits of private sector adaptation action	This will involve documenting private sector adaptation actions and the economic benefits of these actions, and ensuring that this information is shared widely. This will assist in promoting the uptake of adaptation action by other private sector entities.

12. Monitoring and Evaluation

Strategic Intervention 9: Develop and implement an M&E system that tracks implementation of adaptation actions and their effectiveness.

12.1. Introduction

Since the effects of climate change differ across geographies and will shift over time, adaptation actions will work in some locations and time periods, and not in others. A ‘learning by doing’ approach is therefore needed. This approach will help South Africa progressively improve the NCCAS, and as a result, its ability to deal with the inherent uncertainty of climate change science. In order to implement a learning by doing approach the strategic outcomes of the NCCAS must be monitored and evaluated to understand whether progress has been made towards achieving these strategic interventions. The results of this monitoring and evaluation can then be used to determine if any shifts are required in terms of the strategic outcomes of the NCCAS.

The key outcome for this strategic intervention is: *A national M&E system developed and implemented* (Strategic Outcome 9.1)

12.2. Status Quo

The Climate Change Adaptation Monitoring and Evaluation approach for South Africa has been organised into Desired Adaptation Outcomes (DAOs). Nine generic DAOs have been developed, each of which is of cross-cutting, cross-sectoral relevance and describes, in a general sense, a desired state that will enhance South Africa’s transition towards climate resilience. These DAOs fall into two distinct groups: six DAOs, goal 1 to goal 6, (G1-G6) describe the inputs (for example, processes, resources and capacities) that need to be in place to enable effective climate change adaptation; and three DAOs (G7-G9) describe the key impacts of adaptation interventions and associated measures (for example, reductions in vulnerability of human and natural systems). These DAOs are shown in the table below.

Desired Adaptation Outcomes (DAOs)	
<i>Inputs to enable effective adaptation</i>	
G1	Robust/integrated plans, policies and actions for effective delivery of climate change adaptation, together with monitoring, evaluation and review over the short, medium and longer-term.
G2	Appropriate resources (including current and past financial investments), capacity and processes (human, legal and regulatory) and support mechanisms (institutional and governance structures) to facilitate climate change adaptation.
G3	Accurate climate information (e.g. historical trend data, seasonal predictions, future projections, and early warning of extreme weather and other climate-related events) provided by existing and new monitoring and forecasting facilities/networks (including their maintenance and enhancement) to inform adaptation planning and disaster risk reduction.
G4	Capacity development, education and awareness programmes (formal and informal) for climate change adaptation (for example informed by adaptation research and with tools to utilise data/outputs).

Desired Adaptation Outcomes (DAOs)	
<i>Inputs to enable effective adaptation</i>	
G5	New and adapted technologies, knowledge, research and other cost-effective measures (for example nature-based solutions) used in climate change adaptation.
G6	Climate change risks, impacts and vulnerabilities identified and addressed.
<i>Impacts of adaptation interventions and associated measures</i>	
G7	Systems, infrastructure, communities and sectors less vulnerable to climate change impacts (for example, through effectiveness of adaptation interventions/response measures).
G8	Non-climate pressures and threats to human and natural systems reduced (particularly where these compound climate change impacts).
G9	Secure food, water and energy supplies for all citizens (within the context of sustainable development).

Clearly defined synergies exist between the NCCAS strategic outcomes and the climate change adaptation monitoring and evaluation - and, by implication, their corresponding data/information requirements and potential data/information outputs. This should help to ensure a robust approach to reporting on adaptation in South Africa and monitoring the country's journey towards climate resilience. The relationship between the twelve NAS strategic outcomes and the Desired Adaptation Outcomes for climate change adaptation monitoring and evaluation is shown in the table below:

Strategic Outcomes	Desired Adaptation Outcomes for monitoring and evaluation (condensed descriptions)
Strategic Outcome 1.1: Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability	<p>Systems, infrastructure, communities and sectors in businesses, provinces and municipalities less vulnerable to climate change impacts (G7)</p> <p>Non-climate pressures and threats to human and natural systems reduced (particularly where these compound climate change impacts) (G8)</p> <p>Secure food, water and energy supplies for all citizens (within the context of sustainable development) (G9)</p>
Strategic Outcome 2.1: An early warning and monitoring system for key climate vulnerable sectors and geographic areas developed and implemented	Accurate climate information (e.g. historical trend data, seasonal predictions, future projections, and early warning of extreme weather and other climate-related events) provided by existing and new monitoring and forecasting facilities/networks (including their maintenance and enhancement) to inform adaptation planning and disaster risk reduction (G3).

Strategic Outcomes	Desired Adaptation Outcomes for monitoring and evaluation (condensed descriptions)
Strategic Outcome 3.1: An adaptation vulnerability and resilience framework developed and implemented across 100% of key adaptation sectors	Climate change risks, impacts and vulnerabilities (including frameworks) identified and addressed in businesses, sectors, provinces and municipalities (G6).
Strategic Outcome 4.1: Effective adaptation planning that covers at least 80% of the South African sectors identified in the NCCAS	Robust/integrated plans, policies and actions for effective delivery of climate change adaptation, together with monitoring, evaluation and review over the short, medium and longer-term (G1).
Strategic Outcome 4.2: Achieve a 100% coverage of climate change considerations in NCCAS relevant sectoral operational plans	Robust/integrated plans, policies and actions for effective delivery of climate change adaptation, together with monitoring, evaluation and review over the short, medium and longer-term (G1).
Strategic Outcome 5.1: Increased research output and technology uptake to support planning and implementation	New and adapted technologies, knowledge, research and other cost-effective measures (e.g. nature-based solutions) used in climate change adaptation.
Strategic Outcome 6.1: Capacity building and awareness for climate change response enhanced	Capacity development, education and awareness programmes (formal and informal) for climate change adaptation (e.g. informed by adaptation research and with tools to utilise data/outputs) (G2).
Strategic Outcome 7.1: Adaptation governance defined and legislated through the Climate Change Act once approved by parliament	Robust/integrated plans, policies and actions for effective delivery of climate change adaptation, together with monitoring, evaluation and review over the short, medium and longer-term (G1).
Strategic Outcome 7.2: Institutional support structures for climate change adaptation strengthened	Institutional and governance structures to facilitate climate change adaptation (G2).
Strategic Outcome 7.3: Enhanced public-private-civil society collaboration and stewardship	Partnerships, capacity development, education and awareness programmes (formal and informal) for climate change adaptation (e.g. informed by adaptation research and with tools to utilise data/outputs) (G4).

Strategic Outcomes	Desired Adaptation Outcomes for monitoring and evaluation (condensed descriptions)
Strategic Outcome 8.1: Adequate financial resources of national adaptation priorities from national fiscus and international sources	Appropriate resources (including current and past financial investments) to facilitate climate change adaptation (G2).
Strategic Outcome 9.1: A national M&E system developed and implemented	Robust monitoring, evaluation and review over the short, medium and longer-term (G1).

12.3. Actions

The actions to achieve the outcomes associated with this intervention are outlined below:
A national M&E system developed and implemented

Action	Description
9.1.1 Establish a M&E system to track progress in achieving the strategic outcomes of the NCCAS	This will involve setting up an effective M&E system to track and assess success in achieving the strategic outcomes of the NCCAS. Proposed indicators for each strategic outcome are shown in Annex B.
9.1.2 Report on success in achieving the strategic outcomes of the NCCAS	This will involve using the information collected in the M&E system to report annually on progress in achieving the strategic outcomes. The report should also highlight key lessons learnt as well as any shifts that may be required to achieve the strategic outcomes of the NCCAS.
9.1.3 Update the NCCAS based on the M&E learnings	This will involve updating the NCCAS every five years based on the learnings that have been developed as a result of the establishment of an M&E system and development of annual reports.

13. Implementation Framework

Time Frame Definitions: Short Term 1 - 3 Years, Medium Term 4 - 10 Years, Long Term Above 10 Years.

Intervention 1: Reduce human and economic vulnerability, ensure resilience of physical capital and ecological infrastructure and build adaptive capacity: Outcome 1.1: Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability				
Action	Lead	Partners	Time Frame	Indicator
1.1.1 Support the agricultural sector to implement more efficient climate-smart and conservation agriculture practices	Department of Agriculture	DEA, Provincial and Local Governments as well as the private sector.	Short term	Number of climate smart and conservation agriculture programmes
1.1.2 Support the agricultural sector to use and manage water more sustainably	Department of Agriculture	Department of Water and Sanitation (DWS), DEA, Provincial and Local Governments and the private sector.	Short term	Number of agricultural water conservation programmes and number of water conservation technologies implemented
1.1.3 Promote the expansion of food garden programmes outside land classified as agricultural land or farmland to reduce food insecurity and hunger	Department of Agriculture	Department of Rural development and Land Reform (DRDLR), Provincial Departments and local government departments and NGOs	Short term	Number of urban farms and food gardens outside land classified as agricultural
1.1.4 Adopt climate resilient approaches to natural resource management to restore and maintain ecosystem goods and services	Conservation Agencies	Non-governmental organisations (NGOs)	Medium term	Number of climate resilience projects for natural resource management
1.1.5 Protect and conserve South Africa's most vulnerable ecosystems and landscapes	DEA	Conservation agencies, Local Government	Medium term	Number of developed climate resilience management plans for vulnerable ecosystems
1.1.6 Monitor and control the spread of alien invasive species that benefit from climate change.	DEA	Local Government. NGOs and private sector	Short term	Number of effective alien invasive species management projects
1.1.7 Ensure that climate change projections are integrated into long-term biodiversity management plans.	DEA	Provincial Government and Local Government	Short term	Number of biodiversity management plans that include climate change projections

Intervention 1: Reduce human and economic vulnerability, ensure resilience of physical capital and ecological infrastructure and build adaptive capacity: Outcome 1.1: Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability

Action	Lead	Partners	Time Frame	Indicator
1.1.8 Capacitate and operationalise South Africa's National Disaster Management Framework to strengthen proactive climate change adaptive capacity, preparedness, response and recovery	Department of Cooperative Governance and Traditional Affairs (COGTA)	DEA	Short term	Number of Disaster Management Centres that include climate change in their terms of reference
1.1.9 Ensure that national, provincial and local disaster management plans address climate change	COGTA	DEA	Short term	Percentage of disaster management plans which include climate change impacts
1.1.10 Create a more adaptive electricity system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas	Department of Energy	DEA		Extent and duration of electricity disruptions as a result of climate events
1.1.11 Support small-scale fishers to become more climate resilient through use of early warning systems and sea-safety training.	The Department of Agriculture, Forestry and Fisheries (DAFF)	Provincial and local economic development institutions; research institutions; the broader industry and private-sector companies; and NGOs	Short term	Number of sea safety training programmes
1.1.12 Investigate the potential effects of an expanded forestry sector on water availability	DAFF	DEA, DWS, DRDLR, COGTA, Provincial Government departments, Local Government departments and the private sector.	Short term	Report on plantation expansion and water availability developed
1.1.13 Support the integration of climate-smart and ecosystem-based approaches in forestry practices	DAFF	Department of Education, Department of Higher Education	Short term	Inclusion of climate-smart and ecosystem-based approaches in forestry training curricula
1.1.14 Launch an enhanced climate change public health flagship programme to build a healthier, more resilient population	Department of Health (DOH)	DEA	Short term	A National Climate Change and Health Flagship Programme established

Intervention 1: Reduce human and economic vulnerability, ensure resilience of physical capital and ecological infrastructure and build adaptive capacity: Outcome 1.1: Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability

Action	Lead	Partners	Time Frame	Indicator
1.1.15 Develop climate change-related disease monitoring systems.	DOH	DEA	Short term	Number of climate change-related disease monitoring systems implemented
1.1.16 Equip and capacitate healthcare facilities to manage climate change-related health effects.	DOH	DEA	Short term	Number of healthcare worker training programmes on health and climate change.
1.1.17 Develop guidelines on environmentally responsible mining practices that promote climate adaptation.	Department of Mineral Resources	DEA	Short term	Guidelines on environmentally responsible mining practices that promote climate adaptation
1.1.18 Plan for the effects of climate change on infrastructure	Relevant sector department	DEA	Short term	Climate change incorporated asset management plans
1.1.19 Invest in high-quality, climate resilient, public infrastructure	Department of Transport, Department of Public Works	DEA		Percentage of new public infrastructure that incorporates principles of climate resilience
1.1.20 Ensure that water management institutions incorporate adaptive management responses	DWS	DEA, Provincial and local government, as well as private entities	Short term	Number of climate change adaptation responses adopted by water management institutions
1.1.21 Develop a list of resilient-building projects that can easily be replicated.	DEA	Sector departments, Provincial Government, Local Government, civil society organisations	Short term	List of successful resilient building programmes and projects that can be replicated
1.1.22 Identify individuals and communities at most risk from climate change within local municipalities and deliver targeted climate change vulnerability reduction programmes for these individuals and communities	Local Government	DEA, Public Works, Provincial departments, civil society organisations	Short term	Number of vulnerability reduction programmes implemented per local municipality

Intervention 1: Reduce human and economic vulnerability, ensure resilience of physical capital and ecological infrastructure and build adaptive capacity: Outcome 1.1: Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability

Action	Lead	Partners	Time Frame	Indicator
1.1.23 Investigate the potential for expanding sectors and kick-starting new industries that are likely to thrive as a direct or indirect result of climate change effects	Department of Trade and Industry	DEA, Department of Science and Technology, private sector	Medium term	Number of pilot projects implemented

Intervention 2: Develop a risk, early warning, vulnerability and adaptation monitoring system for key climate vulnerable sectors and geographic areas: Outcome 2.1: An early warning and monitoring system for key climate vulnerable sectors and geographic areas developed and implemented

Action	Lead	Partners	Time Frame	Indicator
2.1.1 Improve the climate monitoring and observation network	South African Weather Service (SAWS)	DEA	Medium term	Reliable, comparable, up to date climate data available
2.1.2 Develop a national climate information and early warning system	SAWS	COGTA	Medium term	An efficient national information system
2.1.3 Develop provincial early warning systems for vulnerable geographical areas	Provincial lead departments	DEA, SAWS	Medium term	Number of provincial early warning systems
2.1.4 Develop municipal early warning systems for vulnerable geographical areas	Local Government	DEA, SAWS	Medium term	Number of municipal early warning systems
2.1.5 Improve/develop national early warning systems for key climate vulnerable sectors and risks.	Sector departments	DEA, SAWS	Medium term	Number of national early warning systems for key sectors and risks
2.1.6 Develop and support a climate change early warning and vulnerability network with the involvement of relevant stakeholders	SAWS	DEA	Medium term	A multi-stakeholder network that collaborates and shares information on early warning systems established
2.1.7 Investigate alternative technologies that can be used	DEA	SAWS	Medium term	A number of alternative early warning system application options

Intervention 3: Develop vulnerability and resilience methodology framework that integrates biophysical and socio-economic aspects of vulnerability and resilience: Outcome 3.1: An adaptation vulnerability and resilience framework developed and implemented from 2020 across 100% of key adaptation sectors

Action	Lead	Partners	Time Frame	Indicator
3.1.1 Develop a National Adaptation Vulnerability and Resilience Framework (NAVRF)	DEA	Sector departments, Provincial lead departments, Local Government	Short term	National adaptation vulnerability and resilience framework (NAVRF) drafted
3.1.2 Use the NAVRF to guide sector assessments	Sector departments	DEA	Medium term	Number of sector assessments and response plans guided by the NAVRF
3.1.3 Use the NAVRF to guide provincial assessments	Provincial lead departments	DEA	Medium term	Number of provincial assessments and response plans guided by the NAVRF
3.1.4 Use the NAVRF to guide local assessments	Local Government	DEA, Provincial lead departments	Medium term	Number of local government assessments and response plans guided by the NAVRF

Intervention 4: Facilitate mainstreaming of adaptation responses into sectoral planning and implementation: Outcome 4.1: Effective adaptation planning that covers at least 80% of the South African sectors identified in the NCCAS by 2025

Action	Lead	Partners	Time Frame	Indicator
4.1.1 Draft updated National Climate Change Sector Plans to include climate change adaptation	Sector departments	DEA	Medium term	Number of updated national climate change sector plans
4.1.2 Draft updated provincial climate change adaptation strategies and associated implementation plans	Provincial lead departments	DEA	Medium term	Number of updated provincial climate change strategies and implementation plans
4.1.3 Draft updated local government climate change adaptation strategies and associated implementation plans	Local Government	DEA, Provincial lead departments	Medium term	Number of updated municipal climate change strategies and implementation plans

Intervention 4: Facilitate mainstreaming of adaptation responses into sectoral planning and implementation: Outcome 4.2: Achieve a 100% coverage of climate change considerations in NCCAS relevant sectoral operational plans by 2025

Action	Lead	Partners	Time Frame	Indicator
4.2.1 Integrate climate change adaptation into provincial growth and development strategies	Provincial lead departments	DEA	Medium term	Percentage of provincial growth and development strategies that include climate change adaptation projects and programmes
4.2.2 Amend development planning guidelines to incorporate climate change adaptation considerations	National Planning Commission, COGTA	South African Local Government Association, DEA	Medium term	Development planning guidelines amended to include climate change adaptation
4.2.3 Integrate climate change adaptation into municipal development planning documents	Local Government	DEA	Medium term	Percentage of IDPs that include climate change projects and programmes. Percentage of SDFs that respond to climate change.
4.2.4 Mandate that all public infrastructure be planned, designed, operated and managed after explicitly taking current and predicted future climate change impacts into account.	Office of the President	Department of Public Works (national), the National Planning Commission, and Provincial and Local government	Medium term	Percentage of large-scale infrastructure projects that include climate change in their planning
4.2.5 Mainstream climate change adaptation in business strategic implementation plans	DEA, NBI	Business	Medium term	Number of business strategic implementation plans that incorporate climate change adaptation

Intervention 5: Promote research application, technology development, transfer and adoption to support planning and implementation: Outcome 5.1: Increased research output and technology uptake to support planning and implementation

Action	Lead	Partners	Time Frame	Indicator
5.1.1 Set up a National Climate Centre in an existing institution	DEA	Research institutions	Medium term	Institutional home for National Climate Centre identified
5.1.2 Establish an Interactive Online Climate Service Platform	DEA	SAWS, research institutions	Medium term	An established online climate services platform

Intervention 5: Promote research application, technology development, transfer and adoption to support planning and implementation: *Outcome 5.1: Increased research output and technology uptake to support planning and implementation*

Action	Lead	Partners	Time Frame	Indicator
5.1.3 Establish a Climate Change Science Advisory Technical Council	DEA	Research Institutions, non-governmental organisations	Short term	Climate Change Science Advisory Technical Council established
5.1.4 Develop a research roadmap for climate change adaptation	DEA	Research institutions	Medium term	A clear roadmap for climate change adaptation research
5.1.5 Continue and enhance climate observation and monitoring	SAWS	Research institutions, DEA	Short term	A dataset of climate observation information updated regularly
5.1.6 Continue to invest in climate change prediction and modelling data	SAWS	Research institutions, DEA	Short term	Climate projections for South Africa revised
5.1.7 Continue to invest in research that aims to understand the different impacts of climate change on the environment and society	DEA	Research institutions	Medium term	LTAS documents updated

Intervention 6: Build the necessary capacity and awareness for climate change response: <i>Outcome 6.1: Capacity building and awareness for climate change response enhanced</i>				
Action	Lead	Partners	Time Frame	Indicator
6.1.1 Develop and implement an effective communication and outreach programme	DEA	Provincial Governments, Local Government	Short term	Climate Change Adaptation Communication and outreach programme drafted. Annual reports on the implementation of communication programme drafted.
6.1.2 Develop and implement a training programme for government officials	DEA	Provincial Governments, Local Government	Short term	Climate Change Adaptation training programme drafted. Annual reports on the implementation of training programme drafted.
6.1.3 Establish formally accredited training courses	DEA	Provincial Governments, Local Government	Medium term	Number of formally accredited climate change adaptation training courses. Number of participants who successfully complete formally accredited adaptation training courses.
6.1.4 Incorporate climate change adaptation into relevant secondary and tertiary curricula	Department of Education, Department of Higher Education	DEA	Medium term	Number of secondary and tertiary curricula amended to incorporate climate change adaptation.

Intervention 7: Establish effective governance & legislative processes to integrate climate change in development planning: <i>Outcome 7.1: Adaptation governance defined and legislated through the Climate Change Act once approved by parliament</i>				
Action	Lead	Partners	Time Frame	Indicator
7.1.1 Create formal climate change legislation for adaptation	DEA		Short term	Climate Change Act enacted by Parliament

Intervention 7: Establish effective governance & legislative processes to integrate climate change in development planning: Outcome 7.2: Institutional support structures for climate change adaptation strengthened

Action	Lead	Partners	Time Frame	Indicator
7.2.1 Continue to facilitate the meeting of the Inter-Ministerial Committee on Climate Change	DEA		Short term	Number of annual meetings of the Inter-Ministerial Committee on Climate Change
7.2.2 Continue to facilitate the meeting of the Intergovernmental Committee on Climate Change (IGCCC)	DEA		Short term	Number of annual meetings of the IGCCC
7.2.3 Establish a functioning Provincial Committee on Climate Change for each province	Provincial lead departments	DEA	Short term	Percentage of provinces that have Provincial Committees on Climate Change that meet at least twice per year
7.2.4 Establish a functioning Municipal Committee on Climate Change for each municipality	Local Government	DEA, Provincial lead departments	Short term	Percentage of Local Governments that have Municipal Committees on Climate Change that meet at least twice per year

Intervention 7: Establish effective governance & legislative processes to integrate climate change in development planning: Outcome 7.3: Enhanced public-private-civil society collaboration and stewardship

Action	Lead	Partners	Time Frame	Indicator
7.3.1 Continue to facilitate the meeting of the National Committee on Climate Change (NCCC), a multistakeholder climate change forum.	DEA		Short term	Number of annual meetings of the NCCC
7.3.2 Implement collaborative pilot resilience-building projects	DEA	Non-governmental organisations, local government	Medium term	Number of joint resilience-building pilot projects implemented
7.3.3 Continue to support knowledge sharing platforms	DEA	Non-governmental organisations, local government	Medium term	Number of active knowledge sharing platforms

Intervention 8: Enable substantial flows of climate change adaptation finance from various sources: Outcome 8.1: Adequate financial resources of national adaptation priorities from national fiscus and international sources

Action	Lead	Partners	Time Frame	Indicator
8.1.1 Carry out a cost-benefit analysis of the NCCAS	DEA		Short term	Cost-benefit analysis drafted
8.1.2 Develop resource mobilisation strategy	DEA		Short term	Resource mobilisation strategy drafted
8.1.3 Develop a national climate investment plan	DEA	National Treasury	Medium term	Investment plan developed
8.1.4 Expand the list of government entities accredited for climate financing	DEA		Short term	Number of entities accredited to secure climate finance
8.1.5 Build capacity of local accredited implementing entities to access adaptation finance	DEA	Accredited implementing entities	Short term	Amount of adaptation finance secured annually from climate funds
8.1.6 Develop a project preparation assistance fund	DEA	National Treasury	Medium term	Project preparation fund established
8.1.7 Mainstream NCCAS priorities into the Medium-Term Strategic Framework and assign implementation responsibilities	National Treasury	DEA	Medium term	Medium Term Strategic Framework reflects the priorities of the NCCAS
8.1.8 Investigate options to include climate change adaptation parameters in the equitable share allocations of state revenue calculations	National Treasury	DEA	Short term	Climate change and equitable share report drafted
8.1.9 Promote knowledge exchange on the economic benefits of private sector adaptation action	NBI	DEA	Short term	Number of private sector adaptation actions documented

Intervention 9: Develop and implement an M&E system that tracks implementation of adaptation actions and their effectiveness: Outcome 9.1: A national M&E system developed and implemented by 2025.

Action	Lead	Partners	Time Frame	Indicator
9.1.1 Establish a M&E system to track progress in achieving the strategic outcomes of the NCCAS	DEA		Short term	M&E System established
9.1.2 Report on success in achieving the strategic outcomes of the NCCAS	DEA		Short term	Annual M&E reports drafted
9.1.3 Update the NCCAS based on the M&E learnings	DEA		Medium term	NCCAS updated

14. Annex A: Proposed Key Messaging for Climate Change Adaptation Communication and outreach programme

- **Adapting to build a strong South Africa** has been conceptualised as the key message of the NCCAS. This message will be central to all NCCAS related communications during both the strategy development phase and implementation phase. In addition, there are a number of subsidiary messages which reinforce the key message.
- **South Africa needs to adapt to climate change:** Sustained warming and increasing rainfall variability over the short to medium term (the next two to three decades) will have increasingly adverse effects on key sectors of South Africa’s economy in the absence of effective adaptation responses.
- **Climate change threatens development:** The projected adverse effects of ongoing climate change in South Africa are likely to threaten the achievement of urgent national development needs, and well-founded aspirations to address historical inequities.
- **The poor are most vulnerable to climate change impacts:** The increasing frequency of extreme weather events is likely to have a disproportionate impact on the poorest in society (both rural and urban), amplifying existing social inequalities. The poor typically have limited opportunities and, consequently, are disproportionately affected by the negative impacts of climate change.
- **The NCCAS will give South Africa an advantage in the future:** Planning for climate change ensures that South Africa is in a position to leverage opportunities that arise due to changing climatic conditions and enhance its global competitiveness.
- **Climate change presents investment opportunities:** New funding flows to support adaptation represent the biggest acceleration of development investment since the achievement of democracy in South Africa. This provides a unique opportunity to both ensure climate resilience and achieve development aspirations.

- **Transformational change:** Transformational, systemic change is required to address the challenges presented by climate change.
- **The need for integration and collaboration:** Sectoral and integrated cross-sectoral approaches are essential to building societal resilience in a holistic way.
- **Linkages between adaptation and mitigation** are increasingly vital. This is because there is an intensified international focus on keeping global warming below 2°C, and therefore adaptation responses need to be cognisant of their mitigation implications. At the same time, the adverse impacts of climate change on resource availability potentially limits energy development options. An adaptation and mitigation strategy requires integrated planning.

15. Annex B: Indicators for monitoring and evaluation of the NAS strategic outcomes

NAS strategic outcomes	Data/information needed to monitor and evaluate progress and understand effectiveness	
	Monitoring	Evaluation
Strategic Outcome 1.1: Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability	<p>Evidence of reduced risk/vulnerability as a result of addressing the identified risk/vulnerability.</p> <p>Land use and land use change, population demographics, pollution, water quality and siltation of dams, protection and enhancement of natural resources and other environmental assets, service delivery protests, non-maintenance of infrastructure, and socio-economic status/factors.</p> <p>Climate smart agricultural practices, conservation agriculture practices, and water conservation and demand practices.</p>	<p>Lack of behavioural/system/ infrastructure change/modification as a result of addressing identified risks (including climate risk) and vulnerabilities to reduce climate change impacts (red).</p> <p>Evidence of reactive behavioural/ system/infrastructure change/ modification as a result of addressing identified risks (including climate risk) and vulnerabilities to reduce climate change impacts (amber).</p> <p>Evidence of proactive behavioural/ system/infrastructure change/ modification as a result of addressing identified risks (including climate risk) and vulnerabilities to reduce climate change impacts (green).</p>
Strategic Outcome 2.1: An early warning and monitoring system for key climate vulnerable sectors and geographic areas developed and implemented	<p>(i) historical climate trends; (ii) fine-scale projections, forecasts (seasonal to inter-annual and intra-seasonal variability) and early warning systems for provincial and municipal use; (iii) dissemination and communication platforms for weather and climate-related events (e.g. SMS and media); (iv) utilisation of data/information products by end-users; and (v) maintenance and enhancements of monitoring and forecasting facilities/ networks.</p>	<p>No dissemination and utilisation of weather and climate-related information (red).</p> <p>Dissemination but no utilisation of weather and climate-related information (amber).</p> <p>Dissemination and utilisation of weather and climate-related information at provincial, municipal and community levels (green).</p>
Strategic Outcome 3.1: An adaptation vulnerability and resilience framework developed and implemented across 100% of key adaptation sectors	<p>Details of sectoral, business, provincial and municipal risk and vulnerability frameworks; risk profiles and vulnerability assessments and measures/actions to address the identified risks, impacts and vulnerabilities in businesses, sectors, provinces and municipalities.</p>	<p>No risk and vulnerability frameworks and profiles (red).</p> <p>Risk and vulnerability frameworks profiles identified/developed (amber).</p> <p>Risks, impacts and vulnerabilities addressed in policies, plans and actions (green).</p>

<p>Strategic Outcome 4.1: Effective adaptation planning that covers at least 80% of the South African sectors identified in the NCCAS</p> <p>Strategic Outcome 4.2: Achieve a 100% coverage of climate change considerations in sectoral operational plans</p> <p>Strategic Outcome 7.1: Adaptation governance defined and legislated through the Climate Change Act once approved by parliament</p> <p>Strategic Outcome 9.1: A national M&E system developed and implemented by 2025</p>	<p>Number of business, sectoral, provincial and municipal legal frameworks, plans/strategies, policies, programmes and projects that incorporate climate change adaptation (e.g. Spatial Development Frameworks/Environmental Management Frameworks, Growth and Development Strategies, Disaster Management Plans, Conservation Plans, Food Security Strategies, Energy Security Strategies, Coastal Management Programmes, Agricultural Plans and Strategies, Integrated Development Plans and associated Sector Plans as prescribed in Municipal Systems and Structures Act, Water Catchment Strategies, Integrated Waste Management Plans, Alien Invasive Strategies, Environmental Impact Assessments, International Agreements on Water Allocation, Business Plans, Land Capability Plans, Air Quality Plans, Greening Strategies/Green Economy Strategies, Transport Strategies, Water Management Strategies, Forest Protection Strategies, Education Plans, Economic Plans, Tourism Plans, Human Settlements/Rural Development Plans, licensing/permitting/authorisation procedures and by-laws, and broader risk management procedures).</p>	<p>Legal frameworks, plans/strategies, policies, programmes and projects not informed by existing risk and vulnerability profiles that include climate risks and impacts (red).</p> <p>Legal frameworks, plans/strategies, policies, programmes and projects informed by risk and vulnerability profiles that include climate risks and impacts (amber).</p> <p>Implementation of legal frameworks, plans/strategies, policies, programmes and projects - informed by risk and vulnerability profiles that include climate risks and impacts - to reduce vulnerability in risk and vulnerability profiles and enhance capacity to respond to climate change impacts (green).</p>
<p>Strategic Outcome 5.1: Increased research output and technology uptake to support planning and implementation</p>	<p>(i) new technologies, research and knowledge adopted; (ii) indigenous knowledge systems; (iii) technology needs assessments; (iv) technology transfer and access (national and global); (v) web-based tools on technologies and technology transfer opportunities; and (vi) other adaptation challenges and opportunities on technologies, research and knowledge.</p>	<p>Lack of awareness/understanding of newly developed technologies, research and knowledge leading to poor or no application (red).</p> <p>Awareness/ understanding of technologies, research and knowledge but no implementation and utilisation (amber).</p> <p>Evidence of implementation and utilisation of technologies and knowledge</p>

<p>Strategic Outcome 6.1: Capacity building and awareness for climate change response enhanced</p> <p>Strategic Outcome 7.3: Enhanced public-private-civil society collaboration and stewardship</p>	<p>i) number of capacity development programmes (including students, staff, researchers and institutions) addressing climate change adaptation; (ii) coverage of adaptation research and training being undertaken and financed; (iii) uptake of research outcomes and human capacity trained in adaptation; (iv) collaboration and partnerships between sectors, businesses, provinces, municipalities and researchers; and (v) incorporation of climate change issues into school curriculum.</p>	<p>No capacity building programmes (including research), collaboration and partnerships to address climate change adaptation and no incorporation into school curriculum (red).</p> <p>Attendance of capacity building programmes but no utilisation, collaboration and partnerships to address climate change adaptation and no incorporation into school curriculum (amber).</p> <p>Capacity building programmes (including research and utilisation), collaboration and partnerships to address climate change adaptation, incorporation into school curriculum, and utilisation to inform policy and decision-making (green).</p>
<p>Strategic Outcome 7.2: Institutional support structures for climate change adaptation strengthened</p> <p>Strategic Outcome 8.1: Adequate financial resources for national adaptation priorities from national fiscus and international sources</p>	<p>i) dedicated climate change champions/nodes/units and funding for businesses, sectors, provinces and municipalities (metropolitan, district and local); (ii) inclusion of climate change agendas in business, sectoral, provincial and municipal forums/committees (e.g. Climate Change Sustainability Councils, Municipal Climate Change Task Teams, Disaster Management Advisory Forums, Ward Councillor meetings, Provincial Cluster meetings, Board-level oversight); and (iii) implementation of forum/committee climate change action plans; iv) dedicated budget/funding (including monetary incentives).</p>	<p>No dedicated political/administrative champions, capacity, structure (i.e. organogram with climate change key performance indicators or Board-level oversight of climate change) or funding (including monetary incentives); no inclusion of climate change items in existing administrative and political forums/committees in businesses, sectors, provinces and municipalities (red).</p> <p>Political/administrative champions designated but with no capacity, structure (i.e. organogram) or funding; inclusion of climate change items only by request in existing administrative and political forums/committees (amber).</p> <p>Political/administrative champions designated, and capacity, structure (i.e. organogram/Board-level oversight) and dedicated funding; climate change standing item in administrative and political provincial, municipal and sector forum/committee agendas (green).</p>

RED indicates that no or only preliminary work has begun towards the strategic outcome
 AMBER indicates that significant progress is being made towards the strategic outcome
 GREEN indicates that work on the strategic outcome is in an ideal state.

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