



## South Africa's 1<sup>st</sup> Annual Climate Change Report

# South Africa's Climate Change Monitoring and Evaluation System

**Theme B**



**environmental affairs**

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

## IMPRINT

### Prepared by

Thapelo Letete  
Tsépang Makholela  
Oscar Mokotedi  
Jongikhaya Witi  
Lungile Manzini  
Hlengiwe Mbatha (All from Department of Environmental Affairs)

### Contributions by

Luanne Stevens, Peter Moore and Mick George

### Layout by

Twaai Design

### Photos

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### Contact information

Department of Environmental Affairs  
Environment House  
473 Steve Biko Street  
Arcadia  
Pretoria 0001  
South Africa

Tel: +27 12 399 9148  
Email: [bmantlana@environment.gov.za](mailto:bmantlana@environment.gov.za)

### The seven Themes of this Report are:

- ▷ **Theme A:** A Synopsis of South Africa's 2015 Annual Report on Monitoring Climate Change Responses
- ▷ **Theme B:** South Africa's Climate Change Monitoring and Evaluation System
- ▷ **Theme C:** Climate Change Trends, Risks, Impacts and Vulnerabilities
- ▷ **Theme D:** Tracking South Africa's Transition to a Lower Carbon Economy
- ▷ **Theme E:** Monitoring the Adaptation Landscape in South Africa:  
*Desired Adaptation Outcomes, Adaptation Projects and the Intended Nationally Determined Contribution*
- ▷ **Theme F:** Climate Finance
- ▷ **Theme G:** Climate Change Adaptation Governance and Management
- ▷ **Theme H:** Near-Term Priority Climate Change Flagship Programmes
- ▷ **Theme I:** Key Outcomes of COP 21

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## FOREWORD BY MS. EDNA MOLEWA

### MINISTER OF THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS

Climate change is one of the greatest challenges of our time. As part of the global community, we know we shoulder an immense responsibility to deal with climate change and its impacts. The more we disrupt our climate, the more we risk severe, pervasive and irreversible impacts. That said - we do indeed have the means to limit climate change and build a more prosperous, sustainable future for our country and world, and all who live in it.


South Africa has endorsed the National Climate Change Response Policy as a vision and a framework for an effective climate change response, and the long-term, just transition to a climate-resilient economy and society. The policy is the product of an extensive consultation process. It sets two high-level objectives:

- **Firstly**, to effectively manage the inevitable climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity; and
- **Secondly**, to make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

South Africa's approach towards an effective climate change response is both developmental and transformational. It is developmental in that we are prioritising climate change responses that have significant mitigation or adaptation benefits, AND have significant economic growth, job creation, public health, risk management and poverty alleviation benefits. It is transformational in that we are seeking to address climate change at a scale of economy that supports the required innovation and finance flows needed for a transition to a lower carbon, efficient, job creating, equitable and competitive economy. In essence, it is about sustainable development.

Work is well advanced in implementing this National Climate Change Response Policy. One of the key elements of the climate change response is a country-wide monitoring and evaluation system that tracks South Africa's transition to a lower carbon and climate resilient economy and society.

The main output of the climate change monitoring and evaluation system is South Africa's annual climate change report. This year, the Department will publish its first annual climate change report. This report focusses on (i) quantifying and profiling the impact of ongoing or recently completed mitigation actions (ii) updating the information on climate finance that was reported in South Africa's



first Biennial Update Report (iii) providing latest available information on climate change risks together with describing ongoing adaptation projects (iv) presenting progress in establishing a credible tracking system for key climate change actions in the country (v) updating the roadmap on climate change flagship programmes (vi) recognising and profiling climate change actions that have been taken by the local government sphere of government and (vii) setting out key outcomes of the 21st Conference of Parties (COP 21) which took place in Paris in December 2015.

Internationally, South Africa submitted its own Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat in September 2015. Our INDC encompasses three distinct components namely mitigation, adaptation and the means of implementation. The main aim of the next annual report (2016/17) is to initiate an in-depth annual process of reporting progress against South Africa's INDC.

Lastly, there is vast potential for co-operation in producing these annual reports. We recognise and thank all those that have assisted us to produce the first report. For this report, we received contributions from all three spheres of government, the private sector, civil society, foreign

embassies, and academia. In addition, I would like to thank the German government for the extensive support that we have received through GIZ. We invite many others to continue the collaboration with us as we contribute towards the identification of opportunities for further climate change actions and management of current and future climate risks with the view to consolidating the gains that this country has attained so far by improving peoples' livelihoods, conserving biodiversity, and improving human well-being. We believe that by working together; we can save our tomorrow today.

Thank you



MS. EDNA MOLEWA

Minister of the Department of Environmental Affairs

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## LIST OF ABBREVIATIONS

AfDB	African Development Bank	IPPU	industrial processes and product use
AFOLU	agriculture, forestry and other land use	M&E	monitoring and evaluation
BUR	biennial update report	MCEP	Manufacturing Competitiveness Enhancement Programme
CC	climate change	MRV	measuring, reporting and verification
cCR	carbon Climate Registry	MWh	megawatt-hours
CNG	compressed natural gas	NC	national communication
CO <sub>2</sub>	carbon dioxide	NCCC	National Committee on Climate Change
CO <sub>2</sub> e	carbon dioxide equivalent	NCCRD	National Climate Change Response Database
CTL	coal-to-liquids	NCCRP	National Climate Change Response Policy
DEA	Department of Environmental Affairs	NCPC	National Cleaner Production Centre
DEROs	desired emission reduction outcomes	NDC	nationally-determined contributions
DFID – UK	Department for International Development – United Kingdom	NDP	National Development Plan
DoE	Department of Energy	NGO	non-governmental organisation
DoT	Department of Transport	NO <sub>2</sub>	nitrous oxide
DPE	Department of Public Enterprises	PetroSA	Petroleum, Oil and Gas Corporation of South Africa
DWA	Department of Water Affairs (now Department of Water and Sanitation)	QA	quality assurance
EEDSM	Energy Efficiency and Demand Side Management	QC	quality control
EPWP	Expanded Public Works Programme	REIPPP	Renewable Energy Independent Power Procurement Programme
GDP	gross domestic product	SAAQIS	South African Air Quality Information System
GEF	Global Environmental Facility	SAFCOL IP	South African Forestry Company, independent producers
GHG	greenhouse gas	SANEDI	South African National Energy Development Institute
GHGIP	Greenhouse Gas Improvement Programme	SASOL	South African Synthetic Oil Limited
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	SD	sustainable development
GTL	gas-to-liquids	SMS	Senior Management Service
HFC	hydrofluorocarbons	TPES	total primary energy supply
ICLEI	Local Governments for Sustainability	UNEP	United Nations Environmental Programme
IDM	Integrated Demand Management	UNFCCC	United Nations Framework Convention on Climate Change
IGCCC	Intergovernmental Committee on Climate Change		
IPAP	Industrial Policy Action Plan		
IPCC	Intergovernmental Panel on Climate Change		



## OVERVIEW

This thematic report presents the overall design of South Africa's Climate Change Monitoring and Evaluation (M&E) System, as well as its implementation plan, as required by the National Climate Change Response White Paper (DEA 2011). This is the main system to track South Africa's transition to a lower-carbon and climate-resilient economy and society. This system also institutionalises and systematises South Africa's periodic reporting obligations under the United Nations Framework Convention on Climate Change (UNFCCC), including the transparency requirements of the new Paris Agreement on nationally determined contributions (NDCs). This report first presents the big picture of the system in section 1 and then zooms into its different elements in section 2 and outlines inter-linkages with other relevant systems. Where indicators and specific methodologies have already been finalised, these are also presented in this section.

The report then dedicates a section to the specialised agriculture, forestry and other land use (AFOLU) subset of the M&E system. The AFOLU sector is multifunctional, diverse and unique in having both sources of greenhouse gases, as well as the capacity to sequester emissions. The sector also provides environmental services that contribute towards improving food security for marginalised communities. However, the drivers of land use and land use change that enhance emissions in the AFOLU sector, and their subsequent management, are not adequately understood across the sector. Furthermore, there are no tools to effectively track and quantify the impact of interventions to adapt and mitigate the effects of climate change. The ultimate intention is to develop a measuring, reporting and verification (MRV) system of AFOLU as a full approach (that is spatially explicit) Tier 3 (using country-specific disaggregated information) carbon system that can account for emissions and removals. It will specifically be a tool to gather and communicate data, information and knowledge about the impacts of AFOLU sector activities, and the results of policy and strategic interventions in the sector. As such it will provide a

knowledge base and measurement framework that will allow the undertaking and improvement of relevant mitigation activities and the guidance of improved land management for multiple goals.

Finally the thematic report presents a summary of the National Greenhouse Gas Inventory Improvement Programme (GHGIP) which aims at improving the quality and accuracy of the National Greenhouse Gas Inventory. Section 6.7 of the National Climate Change Response Policy (NCCRP) recognises that accurate, complete and up-to-date data on greenhouse gas emissions are the foundation of an effective response to climate change. Hence the GHGIP is central to the government's effort to improve the quality of the national greenhouse gas inventory. This chapter therefore highlights key GHGIP related projects as well as institutions that are involved in supporting and implementing such projects.



Worker at Droogfontein Solar Power, Kimberley

# I. SUMMARY OF SOUTH AFRICA'S CLIMATE CHANGE MONITORING AND EVALUATION SYSTEM

## I.1 Policy Mandate and Objectives

The National Climate Change Response Policy (NCCRP) (DEA 2011) and the National Development Plan (NDP) (NPC 2011) highlight the importance of understanding South Africa's progress in moving towards the envisaged climate resilient and lower carbon economy and society.

To this end, both policies call for setting up a mandatory national monitoring, evaluation and reporting system for climate change information (**Table I.1**).

The overall approach to monitoring and evaluation of climate change in South Africa is informed by these policy directives.

Table I.1: NCCRP and NDP extracts on climate change monitoring and evaluation

Policy	Extracts
National Climate Change Response Policy	<ul style="list-style-type: none"> <li>• <b>General:</b> <ul style="list-style-type: none"> <li>- To formulate effective responses to climate change, South Africa needs a country-wide monitoring system to measure climate variables at scales appropriate to the institutions that must implement climate change responses.</li> <li>- To monitor the success of responses to climate change, and to replicate the ones that have worked well, we need to measure their cost, outcome and impact.</li> </ul> </li> <li>• <b>Mitigation and emissions:</b> <ul style="list-style-type: none"> <li>- A national system of data collection to provide detailed, complete, accurate and up-to-date emissions data in the form of a greenhouse gas (GHG) inventory, and</li> <li>- Analyses of emission trends, including changes in emission intensity of the economy and a comparison of actual GHG emissions against the benchmark national GHG emission trajectory range.</li> <li>- A monitoring and evaluation (M&amp;E) system to support the analysis of the impact of mitigation measures.</li> <li>- Mitigation interventions will be monitored and evaluated against the national emissions trajectory range.</li> <li>- The M&amp;E system will assess indicators defined in desired emission reduction objectives (DEROs) and mitigation plans, including impact on emissions, implementation and wider sustainable development (SD) benefits.</li> <li>- Both the GHG inventory system and the mitigation M&amp;E system to be web-based.</li> </ul> </li> <li>• <b>Adaptation and impact:</b> <ul style="list-style-type: none"> <li>- Establish a system for gathering information and reporting progress on the implementation of adaptation actions.</li> <li>- Measure climate variables at scales appropriate to the institutions that must implement responses.</li> <li>- Monitor climate change impacts, risks and vulnerabilities.</li> </ul> </li> <li>• <b>Climate Finance:</b> <ul style="list-style-type: none"> <li>- Create a transitional tracking facility for climate finance mechanisms and climate responses.</li> <li>- Need to track the use and impact of funds.</li> </ul> </li> </ul>
National Development Plan	<ul style="list-style-type: none"> <li>• <b>Building an evidence base:</b> To inform planning, prioritise data collection mechanisms, including urgently setting up mandatory monitoring, evaluation and reporting processes for all relevant stakeholders.</li> <li>• <b>Monitoring, reporting and verifying progress:</b> We need to monitor, report and verify to understand South Africa's progress against the national goals of the envisaged economy and society.</li> </ul>



## 1.2 Benefits of the National Climate Change Response M&E System

The overall benefits of the M&E system can be separated by stakeholder, or beneficiary, as follows:

### South African stakeholders:

- **All South Africans:** The system will provide an evidence base for the impacts of climate change and the vulnerabilities brought about by the resulting climate change. It will also provide learning for what has worked and what hasn't in adapting to or mitigating climate change.
- **Policy-makers:** The information generated by the M&E system will inform the development and implementation of climate relevant and climate conscious policies, strategies and laws.
- **National, provincial and local government departments and institutions:** These entities will be able to use the information generated by the system to support planning, to monitor the success of their initiatives, to map and identify gaps in implementation and in climate finance, and to learn from the successful responses of others. Government will also use the system to monitor the country's progress in responding to climate change and achieving its national or international climate-relevant goals and targets.
- **Academic and research institutions:** Addressing climate research needs, including researching and developing new technologies and tools for mitigating and adapting to climate change.
- **Civil society:** Gaining an understanding of government's climate change response policies, assessing their impact and identifying areas where

civil society involvement can have the highest impact in climate change response.

- **The private sector:** Identifying investment areas and opportunities within the lower-carbon and climate-resilient economy, understanding current and anticipated climate trends to inform private sector planning, benchmarking good practice responses, as well as assessing the impact and effectiveness of private sector responses.
- **South African negotiators under the United Nations Framework Convention on Climate Change (UNFCCC):** The M&E system will provide the necessary factual information to inform South Africa's positions in various negotiating areas under the UNFCCC.

### International stakeholders:

- **The UNFCCC:** This is the primary international stakeholder of the M&E system since the system will support, inform and institutionalise the compilation of the national communications (NCs) and the biennial update reports (BURs) under the UNFCCC.
- **Other international stakeholders:** These include international climate change research and think-tank organisations as well as international funders and cooperation partners in climate change response.

## 1.3 Monitoring and Evaluating Climate Change: An Overview

Based on the requirements of the NCCRP and the NDP set out in **Table 1.1** on the opposite page, South Africa's overall climate change monitoring and evaluation system is composed of two primary complementary systems as shown in **Figure 1.1**.

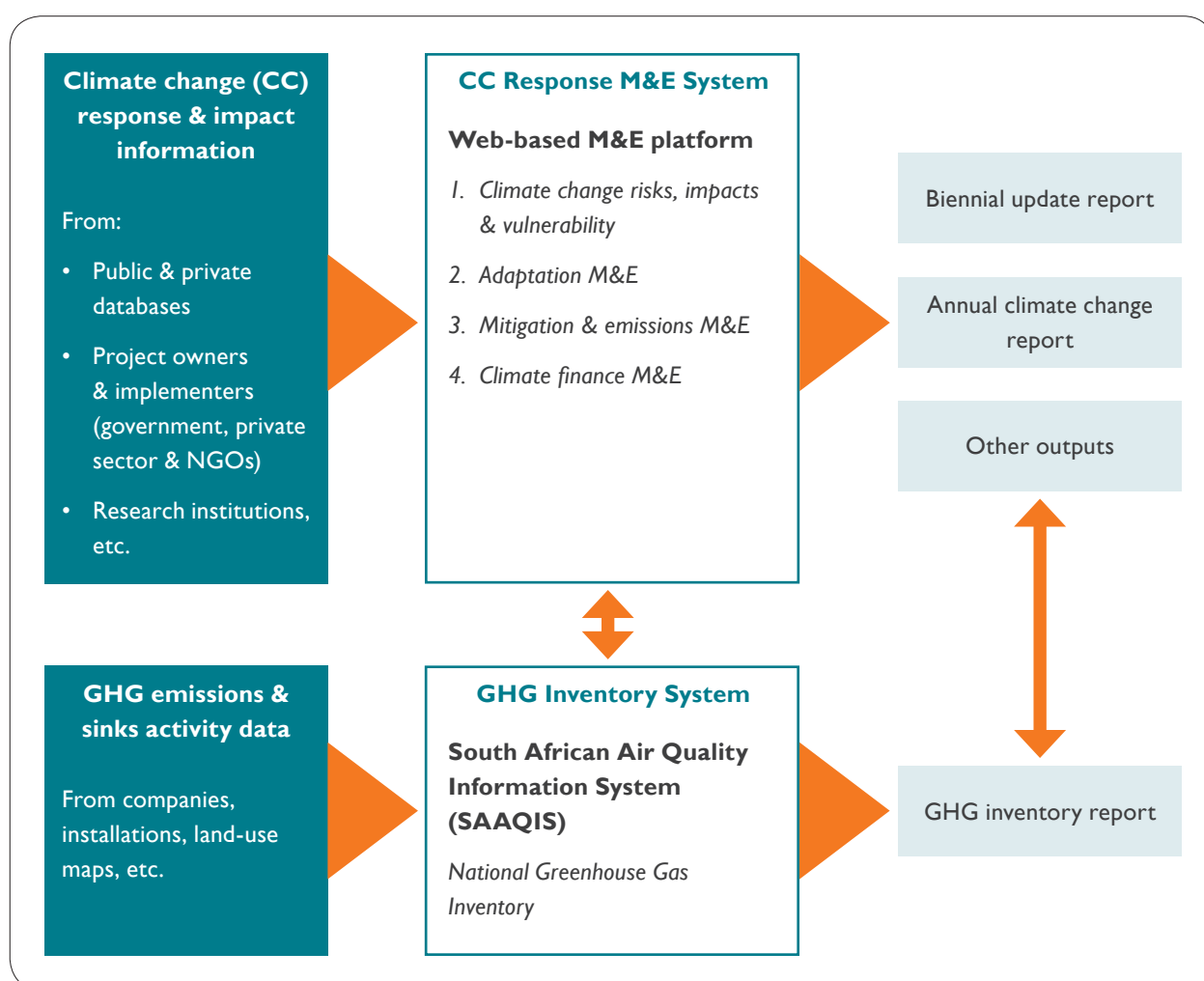


Figure I.1: Summary of the overall M&E system for climate change in South Africa

- **The Climate Change Response Monitoring and Evaluation System:** This system covers all other aspects of climate change M&E and makes use of the GHG inventory as one of its primary information sources.
- **The Greenhouse Gas Inventory System:** With the GHG inventory report as the primary output, this

system has the South African Air Quality Information System (SAAQIS) as its web-based database.

**Chapters 2 and 4** of this document present these systems in detail.



## 2. THE NATIONAL CLIMATE CHANGE RESPONSE M&E SYSTEM

Based on the policy guidance and requirements, the overarching objective of South Africa's climate change response M&E system is to *track South Africa's transition to a climate-resilient society and a lower-carbon economy*. This objective can be disaggregated into the following sub-objectives:

- tracking the country's transition to a lower-carbon economy
- tracking the country's transition to a climate-resilient society and economy
- tracking climate finance to support the transition
- communication and learning.

Each of these is outlined and described in the following sections of this theme.

The overall design of the National Climate Change Response M&E system is shown in **Figure 2.1**. It is broadly composed of the following sections:

**I. MONITORING SECTION:** This can be disaggregated as follows:

- **Data and information network:** This is an information flow system divided into three sub-networks for measurement, reporting and verification (MRV) of information relevant to tracking South Africa's transition to climate resilience, a lower carbon economy and tracking climate finance. Details of these sub-networks are outlined in the respective sections below.
- **The web-based platform:** In 2009, ahead of the national climate change summit, the Department of Environmental Affairs developed a National Climate Change Response Database (NCCRD), hosting a collection of adaptation and mitigation projects. The information technology architecture of this NCCRD will be updated and improved to serve as

the web-based platform and database of the M&E system. The data and information network will feed all information and data into this web-based platform.

**II. EVALUATION SECTION:** This section includes defining and assessing the output and impact indicators that respond to the objectives of the M&E system, informed by the NCCRP requirements and other stakeholder-defined needs. While data and information will flow continuously through the network to the web-based platform, evaluation of impact or progress will only be carried out annually by the M&E system management team.

**III. GUIDANCE:** To support the M&E system, M&E guidelines for different types of response measures and other system indicators will outline, inter alia, the specific types of data to be measured and methodologies for data-collection, for information management and for undertaking impact evaluation. Guidelines for the use of the web-based platform will also form part of the guidance.

**IV. OUTPUTS:** As required by the NCCRP, all the results of the evaluation process will be published annually to inform decision-making on climate change response. In addition, the information from the M&E system will support the various international reporting obligations of the country, including the biennial update reports (BURs) and the national communications (NCs) under the UNFCCC.

**V. FEEDBACK, LEARNING AND REVIEW:** Refinement of procedures that support the effective and efficient functioning of the climate change M&E system will take place on a continuous basis. These refinements will be informed by the periodic system review process, feedback from the stakeholders of the M&E system and by the DEA climate change M&E team.

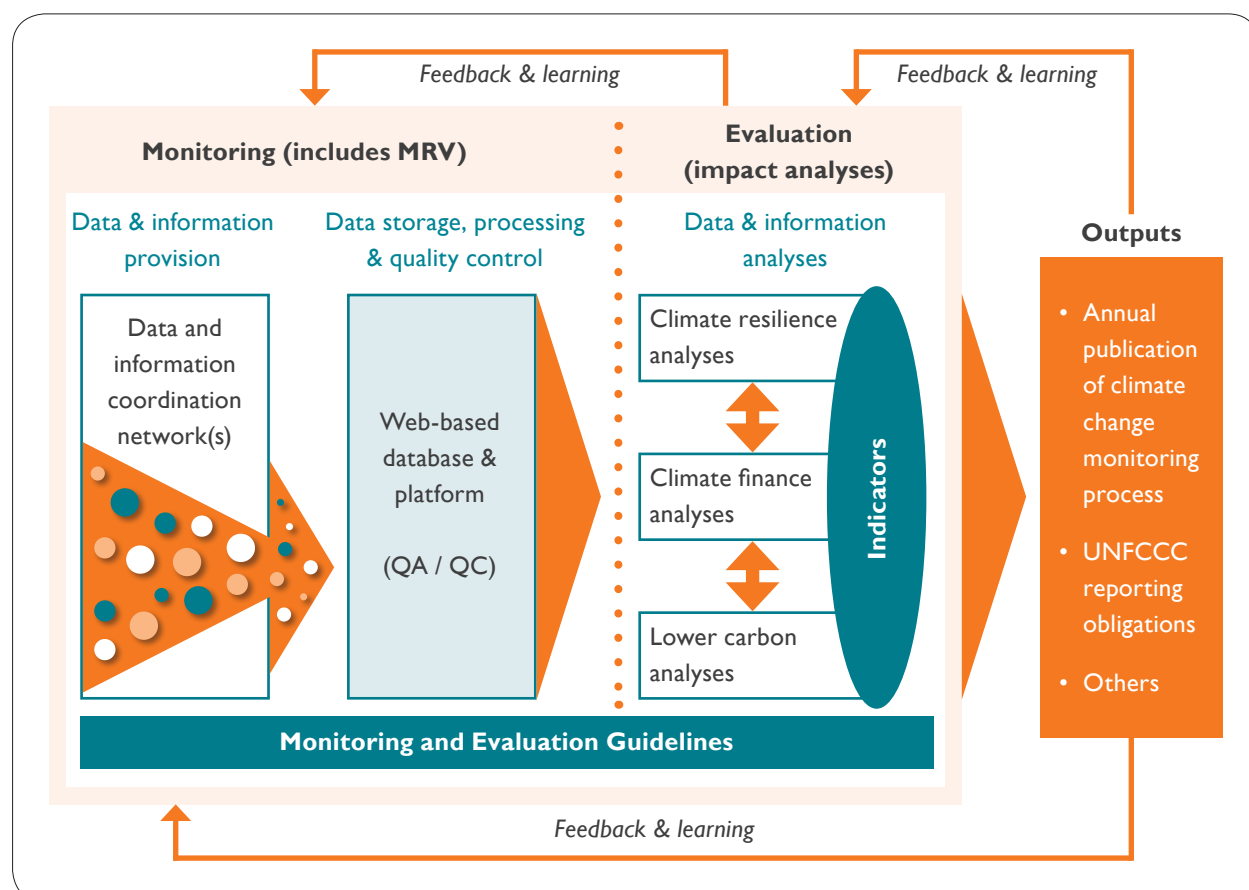


Figure 2.1: Summary of South Africa's Climate Change Response M&E system

The sections below outline how monitoring and evaluation of each of the sub-objectives of the M&E system will be undertaken.

## 2.1 Tracking the Transition to a Lower Carbon Economy

### 2.1.1 What is a "lower carbon economy"?

The NDP (2011) presents South Africa's vision of a lower carbon economy where:

- there is reduced dependency on carbon, natural resources and energy

- carbon emissions are reduced to sustainable levels
- economic activity is expanding, but decoupled from carbon-intensive, fossil-based energy

These identifying characteristics of a lower carbon economy form the basis for the output indicators in the sections below.

### 2.1.2 The tiered approach

Based on the NCCRP's requirement that the collective outcome of all the country's climate change mitigation interventions be monitored and measured against the National GHG emissions trajectory range, the system



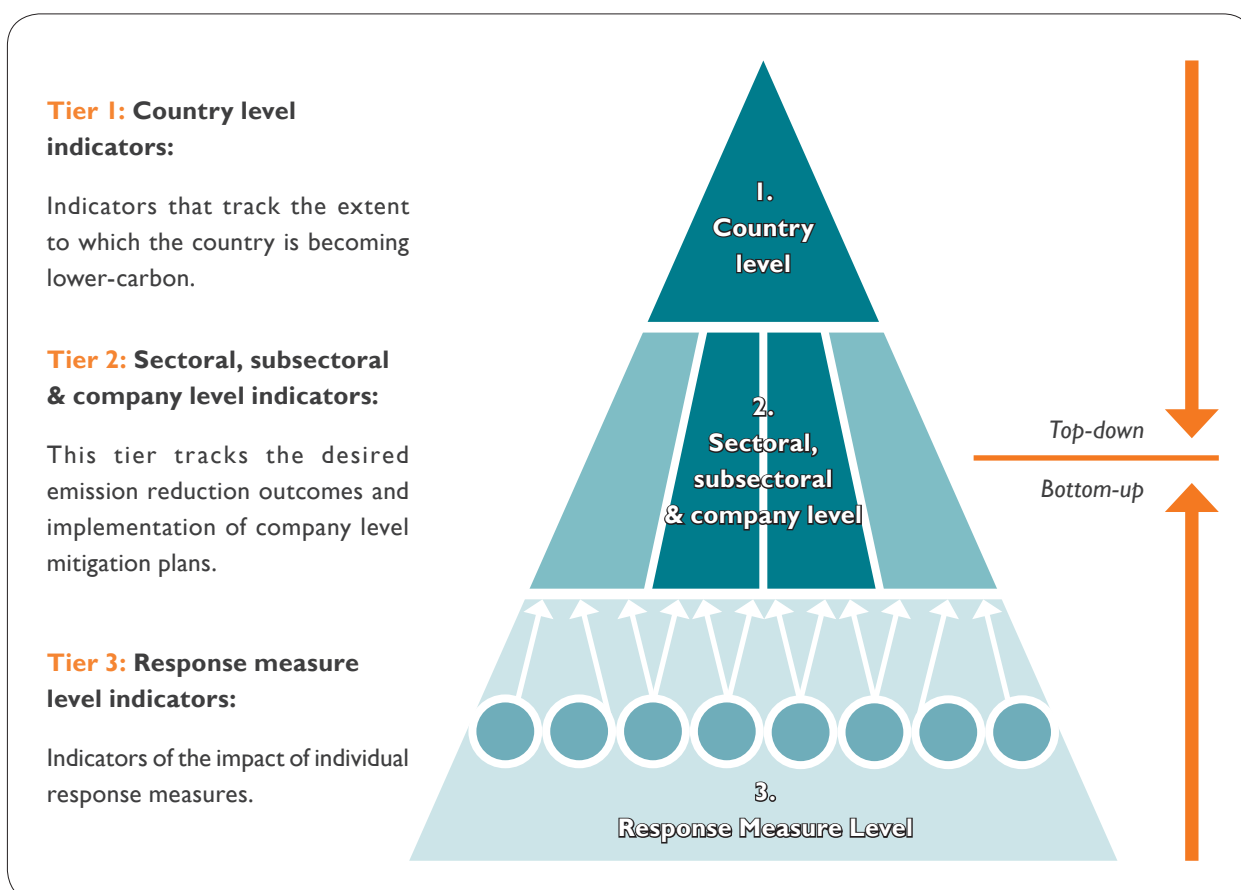


Figure 2.2: The tiered approach to tracking transition to a lower carbon economy

uses a tiered approach as presented in **Figure 2.2** to track transition to a lower carbon economy. Indicators and data-requirements for each tier are described in the subsections which follow.

### 2.1.3 Tier 1 (country level) and Tier 2 (sectoral, subsectoral and company level) information

Tier 1 information is the country level information required to monitor and evaluate the extent to which the country, as a whole, is making the transition to a lower-carbon economy from a top-down perspective, informed by the NDP's vision of this transition.

For Tier 2 the NCCRP requires that the desired emission reduction outcomes (DEROs) be defined for significantly emitting companies, economic sectors or subsectors, which will then be required to formulate mitigation plans of how they intend to achieve their DEROs, including specifying a suite of mitigation programmes and measures appropriate to that sector or subsector. This tier describes the indicators and data requirements relating to tracking progress in the implementation of those mitigation plans and the progress towards achieving the DEROs.

**Table 2.1** presents the core indicators that will be tracked in both of these tiers, informed by the definition of a lower carbon economy as outlined above.



## 2. The National Climate Change Response M&E System

Table 2.1: Core Tier 1 and Tier 2 indicators to be tracked annually

INDICATOR GROUP	Tier 1: country level	Tier 2: sectors, subsectors and companies
	Indicator title	Indicator title
Sustainable carbon levels	National GHG emissions profile	Sector, subsector or company annual GHG profile
	Net change in the national GHG profile	Net change in the GHG profile of the sector, subsector or company
	Collective mitigation impact of all response measures	Collective mitigation impact of response measures
Lower carbon productivity	Carbon intensity of the economy	Carbon intensity of the sector or subsector
	Energy intensity of the economy	Carbon intensity of service or product delivered by the sector, subsector or company
Lower carbon consumption	Per-capita GHG emissions	—
Lower carbon resourcing	Proportion of renewables and carbon-free energy to total primary energy	Proportion of renewables or zero-carbon energy to total energy use
	Carbon intensity of energy supply	Energy use
		Energy intensity of production or service-delivered
Lower carbon sector growth	Growth in green jobs nationally	Growth in green sector or subsector jobs

In addition to these core indicators, other indicators may be identified, analysed and reported from time to time as deemed necessary.

### 2.1.4 Tier 3: Information at the level of response measures

A response measure may be a policy, a law, a strategy, a programme or an individual project that contributes directly to climate change mitigation.

On an annual basis the core Tier 3 indicators shown in

**Table 2.2** will be analysed and monitored by the M&E system.

## 2.2 Tracking the Transition to a Climate Resilient South Africa

Consistent with the requirements of the NCCRP, one of the objectives of the M&E system is to track South Africa's transition to a climate resilient society. This includes:

- Compilation and communication of existing relevant quantitative and qualitative data / information that could usefully indicate whether the country's social,

Table 2.2: Core Tier 3 indicators (level of response measures)

INDICATOR GROUP	Indicator
Implementation Indicators	Achieved progress in implementation
Impact indicators	Net GHGs reduced
	Jobs created
	Other social, environmental and economic co-benefits
Effectiveness indicators	Cost effectiveness
	Job creation effectiveness

economic and environmental systems are becoming more resilient to climate change over time.

- Generation of lessons that will enhance stakeholders' understanding of the country's climate change impacts, risks and vulnerabilities that in turn can help to identify approaches that are effective in reducing those impacts, risks and vulnerabilities.

There are a number of definitions of climate resilience available in the literature, which can be summarised as follows:

Climate resilience is the capacity of social or ecological systems to recover or bounce back from disturbances, shocks and extreme loads or to absorb these disturbances while retaining the same basic structure and ways of functioning (UNDP 2005; UN/ISDR 2004; IPCC 2007; Rockefeller Foundation 2009; Arctic Council 2013 referred to in IPCC 2014).

South Africa's approach to building the climate resilience of the country is "through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity" (DEA

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2011, 11). This approach makes up a major component of adaptation to climate change. While there are many comprehensive definitions of adaptation to climate change, the definition by the UNFCCC embraces, inter alia, the following pragmatic ideas:

Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change. (UNFCCC 2014).

### 2.2.1 General challenges of M&E of climate resilience

Compared to tracking the transition to a lower carbon economy, tracking the transition to a climate resilient society is much more challenging. The following are some of the major challenges:

- the long time-scales associated with climate change and adaptation
- adaptation lacks an agreed metric to determine effectiveness
- the difficulty of attributing cause and effect
- the diversity of key definitions and terms by different stakeholders

Therefore the above-mentioned challenges should be taken into consideration to enable effective M&E while at the same time recognising the role of M&E of climate resilience in:

- supporting the long term learning process for a relatively new field of action
- helping to manage adaptation interventions in the context of uncertainty
- providing an evidence base to inform decision makers on what has been done right and what is working

- demonstrating the effectiveness of policies and programmes

### 2.2.2 South Africa's approach to climate resilience M&E

Tracking the transition to a climate resilient South Africa is composed of three building blocks which are further unpacked into key elements that give more detail on the type of M&E that will be carried out under each building block. **Figure 2.3** presents this approach, showing the building blocks and their respective key elements.

The information necessary to monitor and evaluate climate resilience is therefore disaggregated into these key elements, and will cover the following:

- Development of indicators for monitoring and evaluating the transition to a climate resilient society.
- Mapping the state of knowledge under each indicator.
- Tracking the progress in implementation under each indicator.
- Evaluating the effectiveness of the activities undertaken.

## 2.3 Tracking Climate Finance

### 2.3.1 What can be termed “climate finance”?

The NCCRP identifies climate finance as all resources needed to finance the cost of the country's transition to a lower carbon and climate resilient society. Based on this, climate finance in South Africa can be defined as follows:

Climate finance refers to all resources that finance the cost of South Africa's transition to a lower carbon and climate resilient economy and society. This covers both climate-specific and climate-relevant financial resources, public and private, domestic and international. This includes financial resources that go towards reducing emissions and

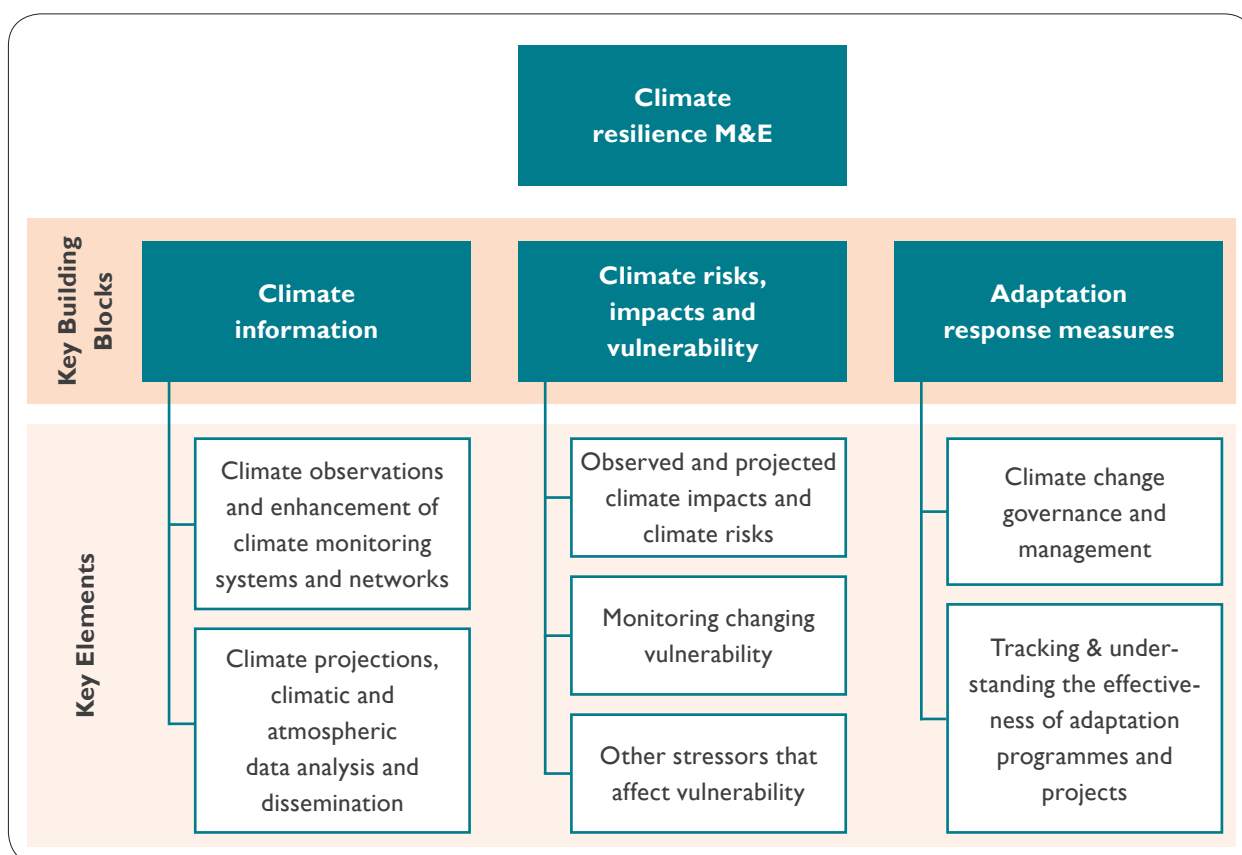


Figure 2.3: Building blocks and key elements of M&E of climate resilience

enhancing sinks of greenhouse gases; reducing vulnerability, maintaining and increasing the resilience of human and ecological systems to negative climate change impacts; climate-resilient and low-emission strategies, plans and policies; climate research and climate monitoring systems, as well as climate change capacity-building and technology.

### 2.3.2 Overall approach to tracking climate finance

The overall approach to tracking finance will incorporate both top-down monitoring of climate finance at source-level and bottom-up monitoring of finance at the final point of impact as follows:

- **Top-down:** This refers to the collection and tracking of climate finance information through the funder or the implementing agency.
- **Bottom-up:** This approach focuses on collecting information at the level of response measures. This includes collecting finance or cost information together with information collected for tracking adaptation and mitigation response measures as described in the sections above.

Correlating the bottom-up and top-down finance / cost information will assist in assessing the extent to which climate finance is meeting the objectives of transparency, effectiveness and proper financial planning.

**Figure 2.4** illustrates this overall approach to climate finance M&E.

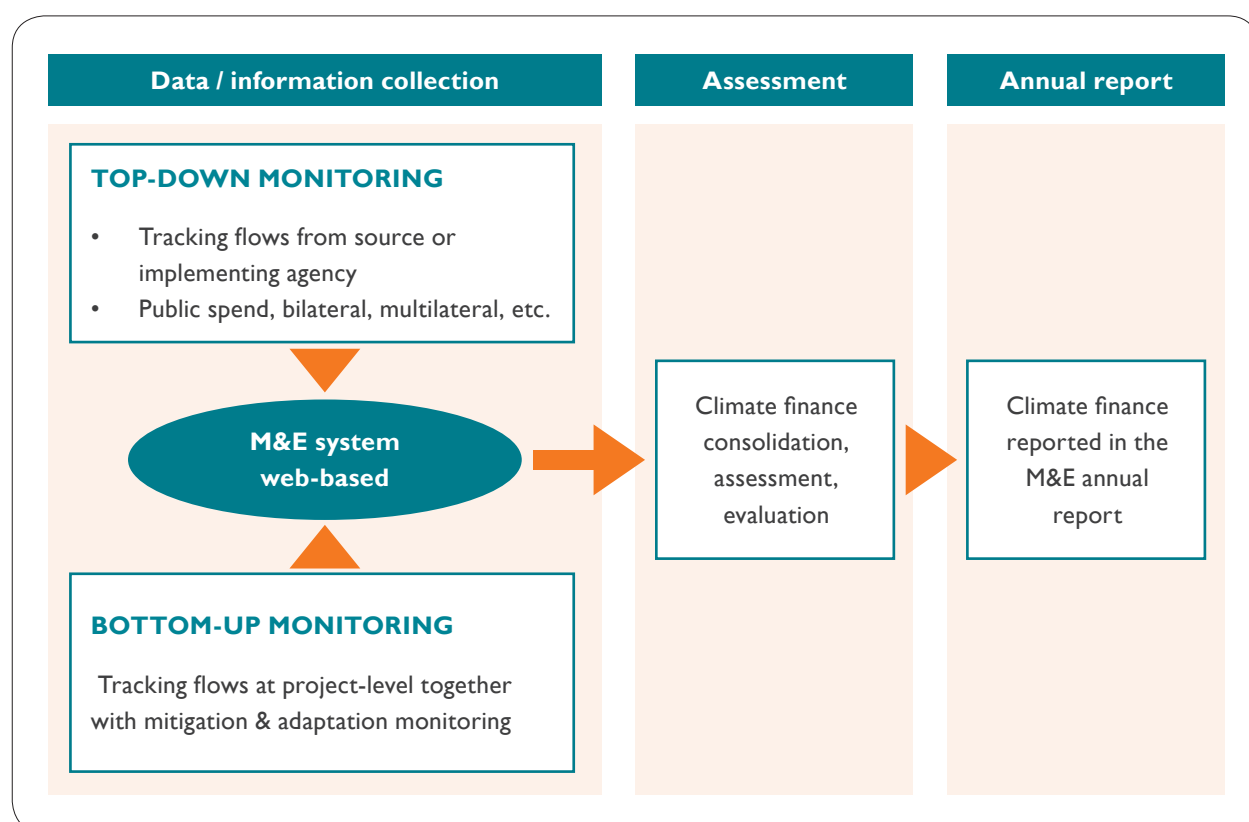


Figure 2.4: The overall approach to M&E of climate finance

### 2.4 Institutional Arrangements

The following institutions will form part of the institutional arrangements for the functioning of the M&E system:

i. **The Climate Change M&E Team:** This is the DEA's climate change monitoring and evaluation team and its key roles will be coordination and daily administration of the M&E system. This team will be the primary body responsible for the following:

- Setting up the system, system improvements, data-requests for monitoring, analysis of indicators for tracking transition to a lower-carbon economy and for tracking climate finance.
- Administration of the web-based platform as well as compilation and publication of the annual

M&E reports.

- Facilitating the establishment and functioning of an Adaptation Monitoring and Evaluation Steering Committee (see below) with access to key stakeholders and representatives, and coordinating any consultations where required.
- Providing support in streamlining data from different sources so that it is available for review by the Adaptation Monitoring and Evaluation Steering Committee in an accessible and easy to use format.

ii. **Climate Change Adaptation Monitoring and Evaluation Steering Committee:** Monitoring and evaluation of adaptation response measures is far more complex than that of mitigation response measures, hence the need for a special committee



for this work. The role of the Adaptation Monitoring and Evaluation Steering Committee will be to:

- Provide strategic guidance and leadership to ensure operationalisation of the climate change response adaptation M&E system.
- Support compilation and finalisation of the annual report on monitoring climate resilience in South Africa.

The Committee will consist of an inter-disciplinary group of technical experts on adaptation spanning key national sectors, local and provincial governments, state-owned entities, private sector, civil society and academia.

- **M&E Advisory Committee:** This is an advisory committee that will be set up annually to consider issues identified in the annual M&E reports (both technical and strategic issues), and will give recommendations to the governance and oversight structures of the M&E system.
- **DEA Climate Change Senior Management (SMS):** This is the senior management team of the DEA

climate change branch, headed by the Deputy-Director General. This team will consider and act on recommendations from the Advisory Committee. This team will also give a report of recommendations to the Intergovernmental Committee on Climate Change (IGCCC), which in turn will give guidance on the improvements needed in the M&E system.

**Figure 2.5** illustrates the institutional arrangements for the M&E system.

## 2.5 Legal and Regulatory Framework

The National Development Plan clearly points to the need for climate change monitoring and evaluation to be mandatory. For this to be implemented a thorough assessment of the legal and regulatory tools will be undertaken to determine the most appropriate tools for supporting the implementation of a mandatory climate change response M&E system. It is envisaged that a set of tools will need to be used, including laws, regulations, memoranda of understanding (MoUs) and even incentives.



Visit to a prototype of an energy efficient low cost house with solar panels developed by the University of Fort Hare during a Small Enterprise Foundation tour

## 2. The National Climate Change Response M&E System

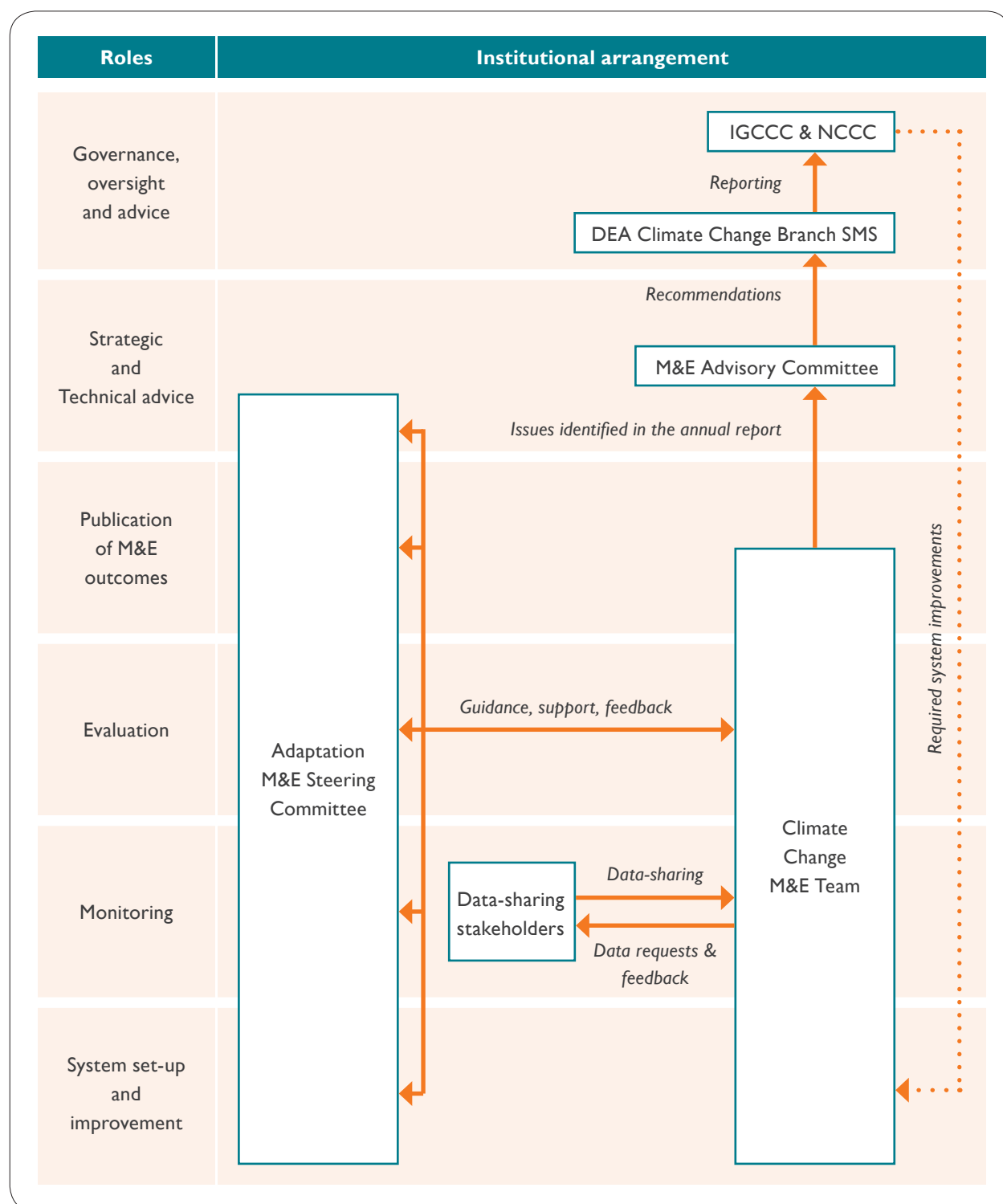


Figure 2.5: Institutional arrangements for the operation of the M&E system



## 2.6 Implementation Plan

The implementation of this M&E system will be phased over time as follows:

- **Phase 1 or SETTING UP Phase (to end of 2016):** This is the setting up phase where the key institutions, frameworks and systems are put in place. A simple, spreadsheet-based data sharing system will be used to test the designed data-sharing network and to supply information for the Third National Communication under the UNFCCC. The collected information will also be used to produce the initial annual report on the monitoring process.
- **Phase 2 or OPERATIONALISATION Phase (2017–19):** This will be the learning phase where data sharing using the web-based platform is implemented and monitored. Adoption of standardised data sharing formats will also take place in this phase. Documentation of lessons learnt will have to be done in this phase to inform the improvements that might need to be made to the system in the next phase.
- **Phase 3 or REFINEMENT Phase (2020–21):** The system will finally be refined in this phase, based on the lessons learnt and the pursuit of accuracy, completeness and consistency in reporting. The influence of the system should be visible at this point, as the system output information is now being integrated into decision-making. The end of this phase should give rise to a fully-fledged version of the M&E system.

**Figure 2.6** summarises the different implementation phases of the M&E system.

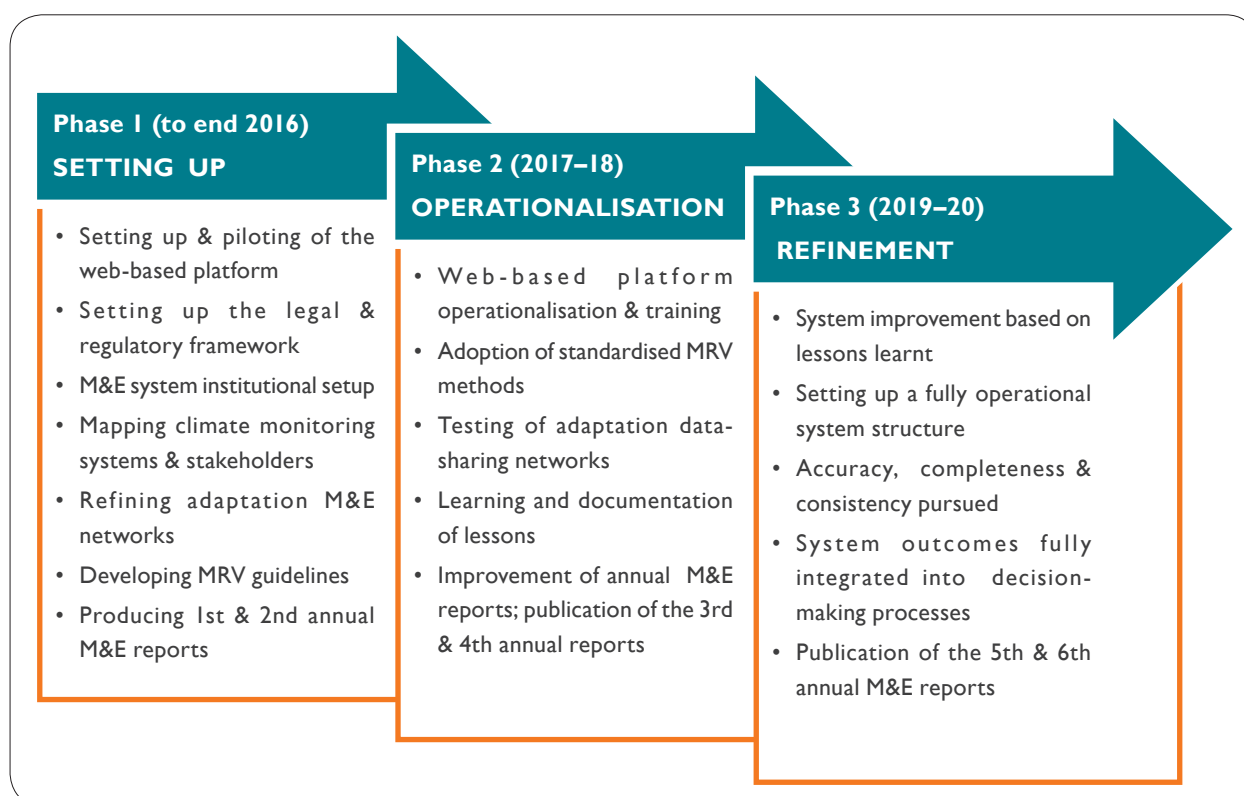


Figure 2.6: Phased implementation of the M&E system

### 3. AGRICULTURE, FORESTRY AND OTHER LAND USES (AFOLU): DEMYSTIFYING THE MEASUREMENT, REPORTING AND VERIFICATION OF THIS SPECIALISED SECTOR

#### 3.1 What is MRV?

The abbreviation MRV stands for measurement, reporting and verification. In the context of ongoing UNFCCC discussions and the IPCC guidelines, there are various levels of MRV which all focus on the estimation and tracking of greenhouse gas emissions. The measurement component refers to the direct or indirect measurement of emissions or removals from the agriculture, forestry and other land use (AFOLU) sector; reporting refers to the presentation of measured information in a transparent and often standardised manner; and verification refers to the assessment through internal and external checks of the completeness, consistency and reliability of the reported information.

The applications of MRV may include, but are not limited to the following:

- greenhouse gas emissions estimations (at national, regional and sectoral levels)
- mitigation actions – this includes GHG and non-GHG parameters / indicators on implementation, impact and effectiveness of policies and measures
- non-GHG impacts (for example co-benefits of mitigation actions)
- climate finance

A more holistic MRV approach for the AFOLU sector is anticipated to be multi-faceted, but at minimum focused on the following immediate objectives, namely to:

- develop capacity within the DEA to undertake MRV in the AFOLU sector
- develop (and publish) a detailed strategic plan for the MRV of the AFOLU sector

#### 3.2 Why Does the AFOLU Sector Require Special Treatment?

Unlike any other sector, the AFOLU sector is multi-functional, diverse and unique in having sources of greenhouse gases (GHGs), as well as the capacity to remove greenhouse gases from the atmosphere. Hence the ability and capacity to manage the dynamic relationship between sources and sinks of GHGs offer a unique opportunity to provide local and regional solutions that contribute to addressing the global challenge of climate change response. Furthermore, the AFOLU sector provides job opportunities through the implementation of programmes such as the Expanded Public Works Programme (EPWP) and the LandCare Programme, aimed at protecting the environment, among other things, from the impacts of climate change. The AFOLU sector also provides environmental services which contribute towards improving food security for marginalised communities. Some of the features unique to the AFOLU sector include:

- **Non-permanence:** Namely the susceptibility of terrestrial carbon to be re-released into the atmosphere due to natural and / or anthropogenic (human) causes, or permanently removed from the atmosphere.
- **Impacts of natural effects can be relatively large:** For example the impact of droughts, floods, wind storms and fires.
- **Non-anthropogenic and indirect effects:** Changes in AFOLU emissions and removals may also relate to indirect effects such as CO<sub>2</sub> fertilisation and nitrogen deposition – therefore it is difficult to separate natural and man-made impacts. The Intergovernmental Panel on Climate Change (IPCC)

states that distinguishing causal factors in the land sector that result in emissions or removals is difficult.

- **Trends can be cyclical:** For example harvesting cycles.
- **Legacy effects:** Past-management decisions, in particular actions that affect the age-class distribution of forests (such as harvesting or reforestation) can have a long term effect on carbon fluxes, including sequestration rates.
- **Emissions and removals are diffuse:** Emissions from other sectors, such as the energy sector, tend to come from point-sources (for example, a power plant or cement factory and so on), while in contrast, land spans large areas and involves multiple stakeholders in its management.
- **Uncertainties can be higher:** Uncertainties in the AFOLU sector can be significantly higher than those in other sectors depending on data availability and methodological approaches.
- **Recalculations can result in significant changes in reported emissions / removals:** Recalculations in the AFOLU sector tend to be more frequent, and often lead to larger changes in revisions of historic emissions.

### 3.3 Sectoral Contribution of AFOLU in South Africa's GHG Emissions Profile

The AFOLU sector has four subsectors, namely:

- **Livestock:** Enteric fermentation, manure management.
- **Land:** Forest land, cropland, grassland, wetlands, settlements and other land.



Crops

- **Aggregate sources and non-CO<sub>2</sub> emissions sources on land:** Emissions from biomass burning, liming, urea application, direct nitrous oxide (N<sub>2</sub>O) emissions from managed soils, indirect N<sub>2</sub>O emissions from managed soils, indirect N<sub>2</sub>O emissions from manure management, rice cultivation and other sources.
- **Other:** Harvested wood products, urea application, and other sources using the 2006 IPCC guidelines.

Most emissions in South Africa originate from livestock.

The proportion of emissions from the AFOLU sector relative to total emissions declined marginally between 2005 (7.3%) and 2010 (4.9%) because of the incorporation of the land subsector for the first time in the inventory estimations (**Figure 3.1**). The land subsector is very complex, requires a significant amount of data, and there

is a high degree of uncertainty about activity data and emission factors. Hence, at this stage, mostly Tier 1 or 2 level of detail is being applied for the land subsector. There are other challenges that affect AFOLU in general, concerning:

- Consistency in reporting due to changes in methodologies and technology.
- Compilation of the AFOLU sector GHG inventory and reports by consultants, due to limited institutional capacity at national government level, which leads to different approaches being used, thus creating inconsistencies.
- Inconsistent or inadequate approaches to keeping detailed methodology and data records, which makes it difficult to track original data.

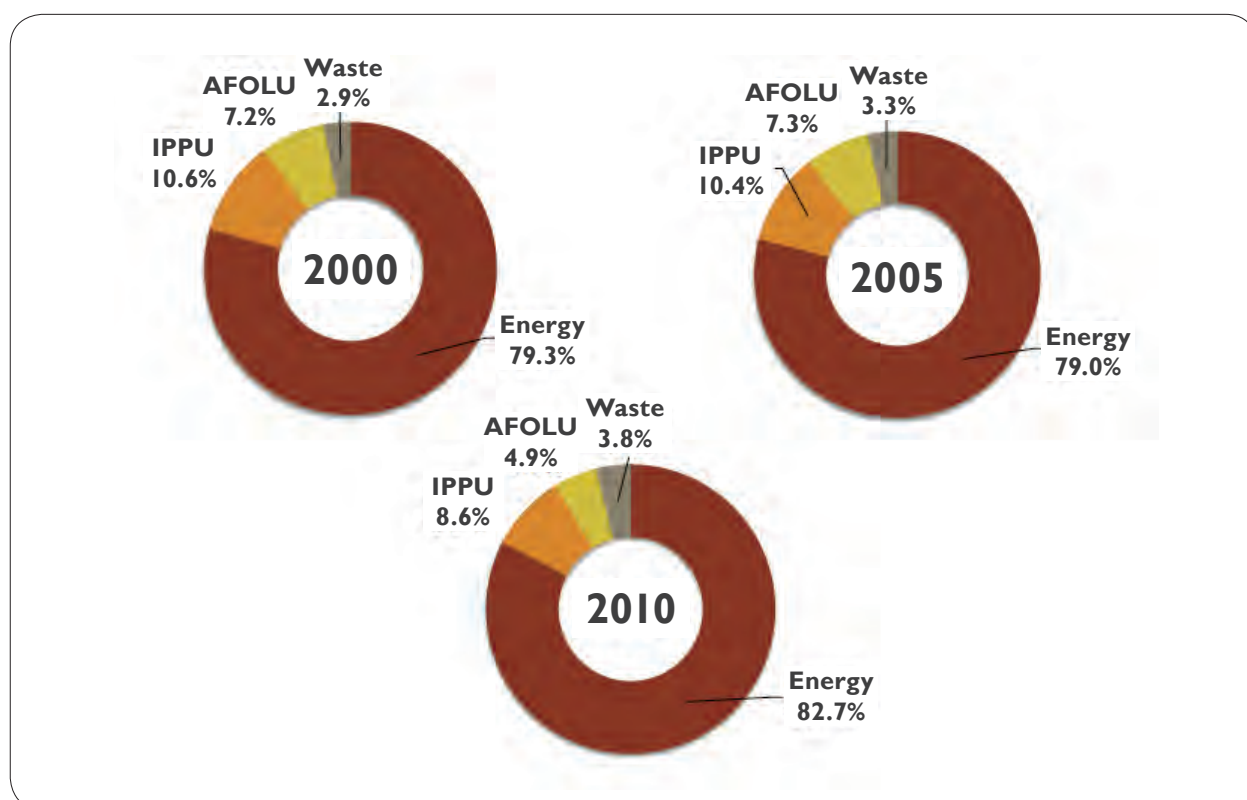


Figure 3.1: Sectoral contribution of the AFOLU sector in South Africa's GHG emissions profile in 2000, 2005 and 2010.



### 3.4 MRV of AFOLU in South Africa

The MRV of AFOLU will serve as a portal for communication and learning, focused on tracking the extent to which the sector is making a contribution to the overall national transition to a lower carbon economy and climate resilient society. The MRV of AFOLU is presently under development as an integral part of the national climate change response M&E system. This will include the development of guidelines and indicators that will inform stakeholders about roles, responsibilities, methodologies and data requirements for the MRV of AFOLU.

A number of aspects and circumstances that are particular to South Africa are relevant here:

- **Making sense of mandates for land management**

There are many policies and legislative acts in South Africa that have an impact on land management, with mandates spreading across numerous national government departments and local government authorities. In light of the enhanced need for evidence-based knowledge of national GHG emission trends, the MRV of AFOLU intends to provide a description of the linkages and synergies in existing mandates for land management which have a material impact on GHG emissions and removals. In addition, the MRV of AFOLU intends to provide an understanding of the material impact on GHG emissions of the legal framework that affects emissions from AFOLU.

- **Contribution of the MRV of AFOLU in supporting policy design and implementation**

An understanding of changes in GHG emissions and removals due to policy implementation can contribute to improving existing policies. For example, South Africa is finalising a number of offset schemes collectively called environmental offsets. These include the biodiversity offset and the carbon offset, among others. It is envisaged that the AFOLU sector will play an important role in these offset mechanisms. The MRV of AFOLU will contribute to

the development and improvement of methodologies that will support the verification of emissions and removals related to these offset schemes.

- **Quantifying the material impact on GHG emissions of national land management programmes**

South Africa has numerous programmes that contribute to land management and which lead to conservation of carbon stocks through avoided emissions and enhanced carbon sequestration. These include the national LandCare Programme, the EPWP, the Grasslands Programme and many other initiatives. The MRV of AFOLU will provide dedicated attention to these programmes with a view to quantifying their contribution towards South Africa's transition to a lower carbon and climate resilient socio-economy.

### 3.5 What is the Value-Add of Tracking, Reporting and Verifying Emissions and Removals from the AFOLU Sector?

The value-add includes the following:

- Periodic reporting on land use, for example status, changes and major GHG emission sources, sinks and trends.
- Monitoring and reporting, with a view to further catalysing the implementation of measures intended to enhance mitigation of GHG emissions from the AFOLU sector.
- Monitoring and reporting impacts of climate change that effect material changes in GHG emissions from the land sector.
- Supporting the ongoing GHG inventory improvement programme.
- Supporting the ongoing improvement of methodological approaches for quantifying GHG emissions from the AFOLU sector.
- Providing a platform for demonstrating the linkages



### 3. Agriculture, Forestry and Other Land Uses (AFOLU)

between climate change adaptation and mitigation.

- Contributing to guiding land use decisions, filling gaps in policy / programme development and implementation, and identifying opportunities and barriers to land use.
- Providing a platform for exchange of views between stakeholders that are involved in improving methodological approaches for quantifying the GHG emissions from the AFOLU sector.
- Contributing to transparency, and to buy-in by stakeholders and government.

The development of the MRV of AFOLU is expected to be a process informed by various land use stakeholders in South Africa, and will require a sustained investment of resources (**Figure 3.2**). A phased approach to the use of data in the framework may also be employed, whereby the system is populated initially with coarse data that will be replaced as new or refined data become available. Close collaboration between policy areas and technical areas is required to ensure the system remains relevant to the government's objectives. It is equally important to recognise and acknowledge the role of research, the private sector (business) and non-governmental organisations in the process.

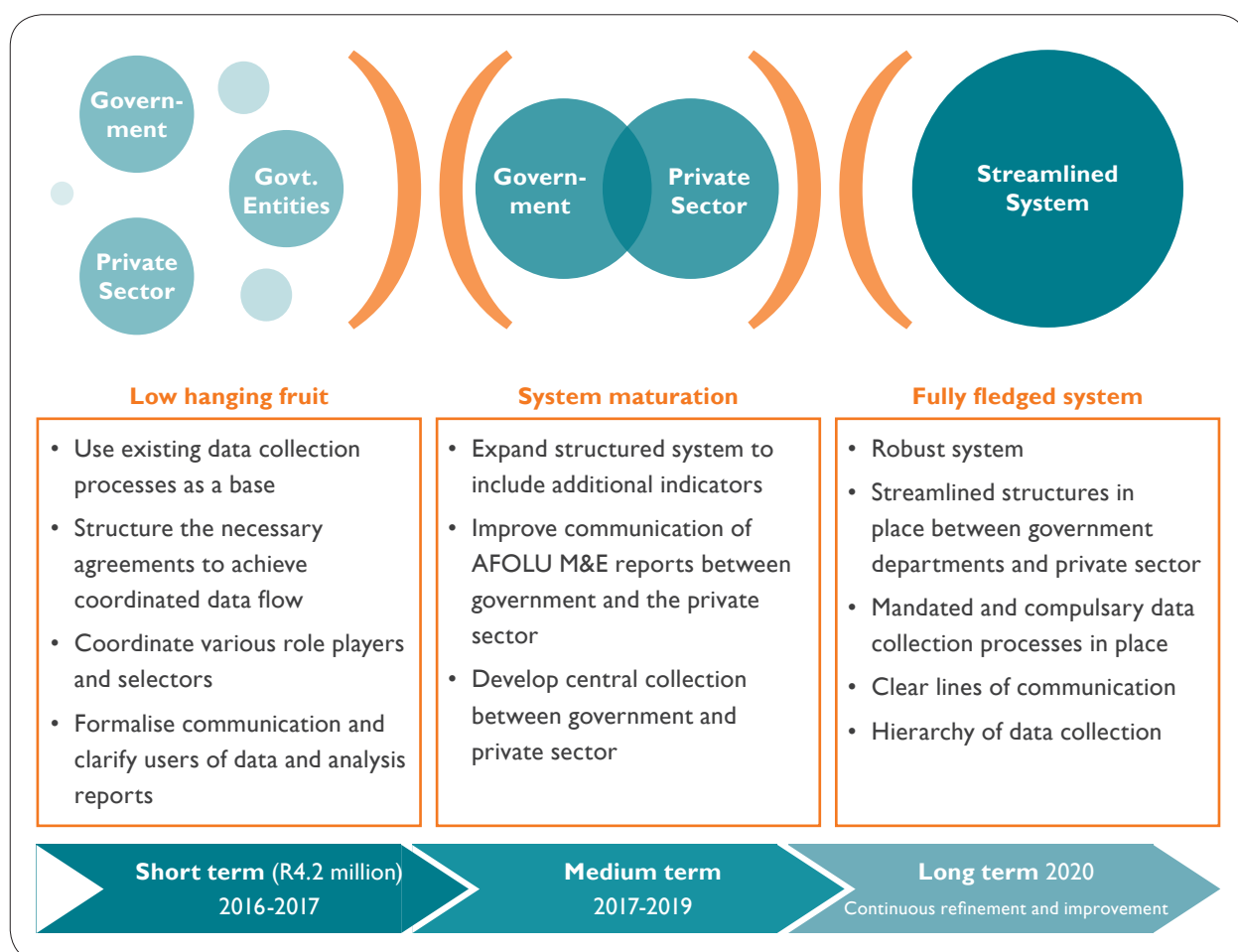


Figure 3.2: The proposed approach for the development of the MRV of AFOLU for South Africa.

Most resources to develop a sustainable long term MRV system for the AFOLU sector exist within government departments as well as the private sector and civil society organisations. It is therefore necessary to find a way to work together, through developing functional institutional arrangements as the development of the system matures. This will ensure that the MRV approach for the AFOLU sector is transparent, complete, consistent, comparable and accurate, as required by the IPCC.

The system will initially plan for Tier 2 emissions factor approaches, but aims to utilise Tier 3 methods as more detailed data are developed. The system will be a highly integrated, yet flexible, system capable of accepting a range of available inputs (and input types) and able to perform both point-based and spatial area-based estimation, and full spatial accounting.

### 3.6 Milestones

It is anticipated that the MRV of AFOLU will be developed and implemented over several years. The realistic milestones for the development and subsequent implementation of the MRV of AFOLU will depend on

land use stakeholders being part of the process. The milestones will include:

- Developing, formalising and implementing functional institutional arrangements to facilitate data and information flows.
- Developing frameworks for social and environmental safeguards.
- Developing and completing annual work plans.
- Developing and accepting MRV of AFOLU guidelines in line with those of the Southern African Development Community and the IPCC.
- Collating of, and communicating between, South Africa's existing MRV expertise, tools and capacity in the land sector.
- Developing an impact assessment approach for mitigation actions in the land sector.
- Developing a human capacity development plan within national government for MRV work.
- Developing and adopting a communications strategy.





## 4. THE GREENHOUSE GAS INVENTORY IMPROVEMENT PROGRAMME

### 4.1 Background

The Republic of South Africa ratified the United Nations Framework Convention on Climate Change (UNFCCC) and is therefore required to undertake several projects related to climate change responses. This includes the preparation of greenhouse gas (GHG) inventories, a key component of national communications (NCs), as well as biennial update reports (BURs) to the UNFCCC. As a party to the UNFCCC, South Africa has accelerated reporting requirements and is expected to submit its national communication reports every four years as from 2016. In addition, once every two years, starting from 2014, South Africa is expected to submit BURs with a focus on climate change mitigation. The main objective of the UNFCCC is to stabilise GHG concentrations in the atmosphere at a level that will prevent dangerous human-induced interference with the climate system. The ability of South Africa to achieve this objective is highly dependent on the accurate knowledge of emissions trends and on our collective ability to alter these trends.

South Africa compiled its first report in 1998, using 1990 data. This inventory was updated to include 1994 data and the updated version was published in 2004. In 2009 the country published its third GHG inventory which covered the base year 2000. In 2014 the country compiled its fourth inventory, for the first time providing a time series trend of ten years covering the period 2000–2010. The work on national GHG inventories is complex and comprehensive, covering a range of sectors that have to contribute to the data collection and reporting. Updated and correct national GHG inventories are fundamental for sectoral, national and international work on climate change mitigation. Hence the importance of accurately monitoring GHGs through inventories cannot be overstated.

### 4.2 Rationale for Developing a Greenhouse Gas Improvement Programme

The process of compiling an inventory has its own challenges which have the potential of compromising the accuracy, transparency, comparability and completeness of national emissions inventories. The challenges identified include, but are not limited to, lack of activity data, lack of capacity for deriving country-specific emission factors and lack of capacity for assessing and verifying emissions inventories. However, steps are being undertaken to address these challenges such as:

- Efficiently using resources to compile activity data by combining censuses and surveys.
- Using a tiered approach to measuring emissions at appropriately selected sites, coupled with modelling to derive country-specific emission factors.
- Using national emissions inventory systems to guide compilers through the inventory process.

With a determined effort and with assistance through capacity building efforts, South Africa can compile transparent, accurate, complete, consistent and comparable inventories, as recommended by the IPCC.

Part of South Africa's effort to respond to these challenges is the development of a GHG Improvement Programme (GHGIP). The GHGIP refers to a series of sector-specific projects aimed at improving the quality and accuracy of the National Greenhouse Gas Inventory. The GHGIP is a result of a collaborative effort by the Department of Environmental Affairs working with other relevant agencies and industry sectors. A significant number of the projects are donor funded with clear objectives and targets focusing primarily on the improvement of estimation methodologies and activity data, and the development of country-specific emission factors. More than 15 partners are involved in this programme, and

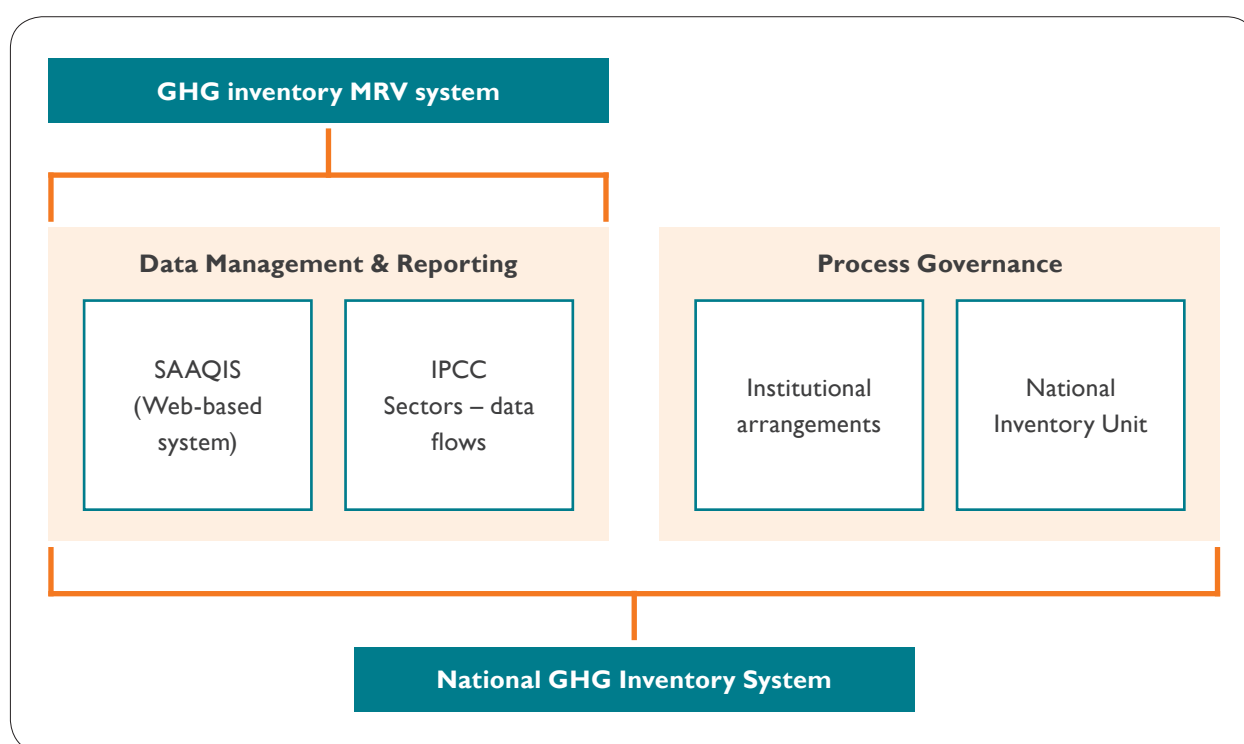


Figure 4.1: Schematic of the two systems making up the National GHG Inventory System

the budget is approximately R32 million for the timelines between 2015 and 2018.

### 4.3 National GHG Inventory System

As part of the GHGIP, South Africa is in the process of implementing a National GHG Inventory System. The main objectives of this national system are as follows:

- Strengthening the institutional arrangements around national inventories, including legal matters.
- Sharing experiences on methodological matters, including technical guidelines, data collection and archiving, documenting methods (including assumptions, emission factors and calculations of

results), and working with quality assurance and quality control, uncertainty analysis, reporting (formats and guidelines) and tools for dissemination (including web-based tools).

The national GHG inventory system is made up of two systems, as shown in **Figure 4.1**.

The measurement, reporting and verification (MRV) part of the system consists of the South African Air Quality Information System (SAAQIS), which is a web-based reporting system, and the mapping of data flows for all the relevant sectors, while the second part of the system outlines the process governance which includes the institutional arrangements and the setting up of the National Inventory Unit.

## 4. The Greenhouse Gas Inventory Improvement Programme (GHGIP)

### 4.4 GHGIP Projects and Their Status

The sectors covered in the GHGIP are energy, industrial processes and product use (IPPU), agriculture, forestry

and land use (AFOLU) and waste. The tables below provide a summary of the projects which form part of the GHGIP for the four IPCC sectors.

Table 4.1: Objectives, partners, outcomes, status and timelines for the development of the National GHG Inventory System

General: Covers all the IPCC sectors					
The projects covering all the IPCC sectors include the National GHG Inventory System, the development of regulations for mandatory reporting of GHGs and technical guidelines.					
Project	Objective	Partner	Outcome	Status	Timelines
Development of the National GHG Inventory System	The implementation of a national system for the sustainable management of the GHG emissions inventory compilation	Norwegian Embassy and Norwegian Environmental Agency	A national system with elements necessary to compile annual GHG emissions inventories, such as institutional, legal and procedural arrangements.	Under Implementation	2015–2017

Table 4.2: Objectives, partners, outcomes, status and timelines related to the energy sector

Energy Sector					
Combustion and fugitive emissions from processing of primary fuels. The projects under the energy sector focus on moving to higher tier methodologies which include development of country-specific emission factors and enhancing bottom-up collection of activity data.					
Project	Objective	Partner	Outcome	Status	Timelines
Plant-specific development of country-specific CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emission factors from power generation and stationary combustion	To develop emission factors for stationary combustion using the main electricity producer and other independent power producers as a pilot	Sasol (power utility), GIZ	Emissions from key sectors based on country-specific information	Completed	2014–2015
Country-specific CO <sub>2</sub> emission factors for road transportation	Development of country-specific CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emission factors	Department of Transport (DoT)	Road transport related GHG emissions factors that reflect national circumstances	Conceptualisation	2016–2017

Table 4.2 continued...

Project	Objective	Partner	Outcome	Status	Timelines
Country-specific CH <sub>4</sub> and CO <sub>2</sub> emission factors for coal mining; emissions from abandoned mines and spontaneous combustion	To develop country-specific emission factors for domestic coal mining	Coaltech	Emissions from coal mining are based on domestically developed methodologies and emission factors	Completed	2011–2014
Bottom-up gas-to-liquids (GTL) and coal-to-liquids (CTL) emission factors	Use of higher-tier methodologies to estimate fugitive emissions from processing of fuels	PetroSA, SASOL	Detailed life-cycle emissions analysis coupled with material balance approach	Completed	2013–2015
Economy-wide fuel consumption survey	Analysis of fuel consumption by energy carrier and demand-side sector	GIZ	Understanding the split of energy carriers across demand-side sectors	Completed	2014–2015

Table 4.3: Objectives, partners, outcomes, status and timelines related to the IPPU sector

Industrial Processes and Product Use (IPPU) Sector					
Greenhouse gas emissions arising from physical and chemical transformation of substances. The projects on the IPPU sector also focus on moving to higher tier methodologies that include development of country-specific emission factors and enhancing bottom-up data collection.					
Project	Objective	Partner	Outcome	Status	Timelines
Sector-specific CO <sub>2</sub> emissions factors for ferroalloy production – (ferrochrome)	GHG emissions from ferrochrome production are based on locally derived CO <sub>2</sub> emission factors	Xstrata (Glencore), United Nations Environmental Programme (UNEP)	Emissions from key sectors based on country-specific information	Under implementation	2014–2016
Bottom-up methodologies for aluminium production	Implementation of a Tier-3 IPCC methodology for estimating process emissions from aluminium production	BHP Billiton	GHG emissions from aluminium production based on plant-specific data	Completed	2011–2014

## 4. The Greenhouse Gas Inventory Improvement Programme (GHGIP)

Table 4.3 continued...

Project	Objective	Partner	Outcome	Status	Timelines
Survey on HFC consumption	To collect, summarise and present in a written report all relevant technical, commercial and baseline data on the current use of hydrofluorocarbons (HFCs)	The main partner and funder of this project is the United Nations Environment Programme.	HFC application at sectoral level	Under implementation	2015–2016

Table 4.4: Objectives, partners, outcomes, status and timelines related to the AFOLU sector

Agriculture, Forestry and Other Land Use (AFOLU) Sector					
GHG emissions and sinks from agriculture, forestry and other land use. The AFOLU sector improvements are mainly improvements of land cover maps to identify the emissions and sinks taking into consideration South Africa's circumstances and landscapes.					
Project	Objective	Partner	Outcome	Status	Timelines
National land cover maps	To develop national land cover maps for two time steps (1990, 2013)	Department for International Development (DFID) – UK	Emissions and sinks are estimated based on accurate and consistent land cover data	Completed	2014–2015
Croplands management survey	This project involves the collection of crop management data for various agricultural crops to estimate GHG emissions and sinks at national level	United Nations Environmental Programme (UNEP)	<p>The following data are readily available:</p> <ul style="list-style-type: none"> <li>• application of fertiliser per commodity crop</li> <li>• irrigation practice</li> <li>• application of lime</li> <li>• application of organic amendments</li> <li>• management of crop residue</li> <li>• cropping systems</li> <li>• tillage practice</li> <li>• area under cultivation</li> </ul>	Completed	2014–2015

Table 4.5: Objectives, partners, outcomes, status and timelines related to the AFOLU sector

Waste Sector					
GHG emissions from waste management such as waste disposal, waste incineration, open burning of waste and wastewater treatment. Projects for improving the accuracy of data on emissions from the waste sector are focusing on collecting bottom-up level activity data.					
Project	Objective	Partner	Outcome	Status	Timelines
Development of source specific activity data for the waste sector	Improving the estimation of GHG emissions from the waste sector.	African Development Bank	Bottom-up country specific information for estimating GHG emissions from the waste sector	Under implementation	2016–2018

#### 4.5 Conclusions from this Chapter

In conclusion, Section 6.7 of the National Climate Change Response Policy (NCCRP) clearly states that accurate, complete and up-to-date greenhouse gas (GHG) emissions data are the foundation of an effective mitigation response. The NCCRP further identifies the national GHG inventory as one of the tools for comparing the current emissions profile against the benchmark national GHG emission trajectory range described in Section 6.4 of the NCCRP (DEA 2011, 27).

In addition, the GHG inventory and / or its emission estimation methodologies have proved extremely useful in other climate change mitigation policy response areas such as setting up carbon budgets, meeting international reporting obligations, introducing a carbon tax, and in broader climate change monitoring and evaluation. Hence an accurate GHG inventory supports various activities and programmes within the country related to natural resource management, climate change planning, and economic development.



Future crops

## 5. KEY MESSAGES FROM THIS THEME

The key messages from this theme can be summarised as follows:

- As required by the National Climate Change Response Policy (2011) and the National Development Plan, South Africa has designed a National Climate Change M&E system composed of the National Greenhouse Gas Inventory system and the National Climate Change Response M&E system.
- The main objectives of this M&E system are to track South Africa's transition to a climate-resilient society by tracking the country's transition to a lower-carbon economy and tracking climate finance.
- The benefits of the system include providing an evidence-base for the impacts and the vulnerabilities brought about by climate change, providing learning for what has worked and what has not worked in climate change response, informing future responses to climate change, assessing the impact and need for climate finance as well as institutionalising the compilation of the national communications and the biennial update reports under the UNFCCC.
- The climate change response M&E system will have an online portal and database as well as an annual publication on the status and impact of climate change and the country's response to it. The outcomes of this M&E system will further be communicated through other national and international publications and platforms.
- The agriculture, forestry and land-use sector has been identified as a specialised sector that will receive special attention in the climate change response M&E system.
- The measuring, reporting and verification (MRV) of AFOLU is being developed in such a way that it becomes a tool to gather and communicate data / information / knowledge, to ascertain the impacts of land sector activities and the impacts of policy and strategic interventions in the sector primarily on GHG emissions.
- The MRV of AFOLU will provide a knowledge base and measurement framework that will inform both the undertaking and improvement of relevant land sector mitigation activities, as well as helping in understanding the impact of actions that enhance carbon sequestration and improved land management for multiple goals.
- While the national greenhouse gas inventory system has been in operation for a number of years now with three GHG inventory publications to date, the Department of Environmental Affairs has initiated a programme to improve its performance in the form of a GHG Improvement Programme (GHGIP).
- The majority of the GHGIP projects have benefits that stretch beyond climate change objectives and have the potential to support other policy spaces. Good examples of such projects include the development of national land cover maps, which has received nation-wide attention especially from remote sensing practitioners and policy makers. These maps are being used for activities such as tracking land degradation and changes in land cover patterns associated with, inter alia, physical attributes (for example the extent of mining and settlements).
- The GHGIP also supports other climate change response initiatives such as the carbon tax MRV process. Emission factors derived from GHGIP projects can now be used by entities reporting for tax liability as opposed to using default Intergovernmental Panel on Climate Change (IPCC) emission factors which do not necessarily reflect national circumstances.
- The GHGIP has a well-defined objective, is pragmatic and results orientated. The combination of these GHGIP attributes attracts both funding institutions that are interested in similar work as well as industry



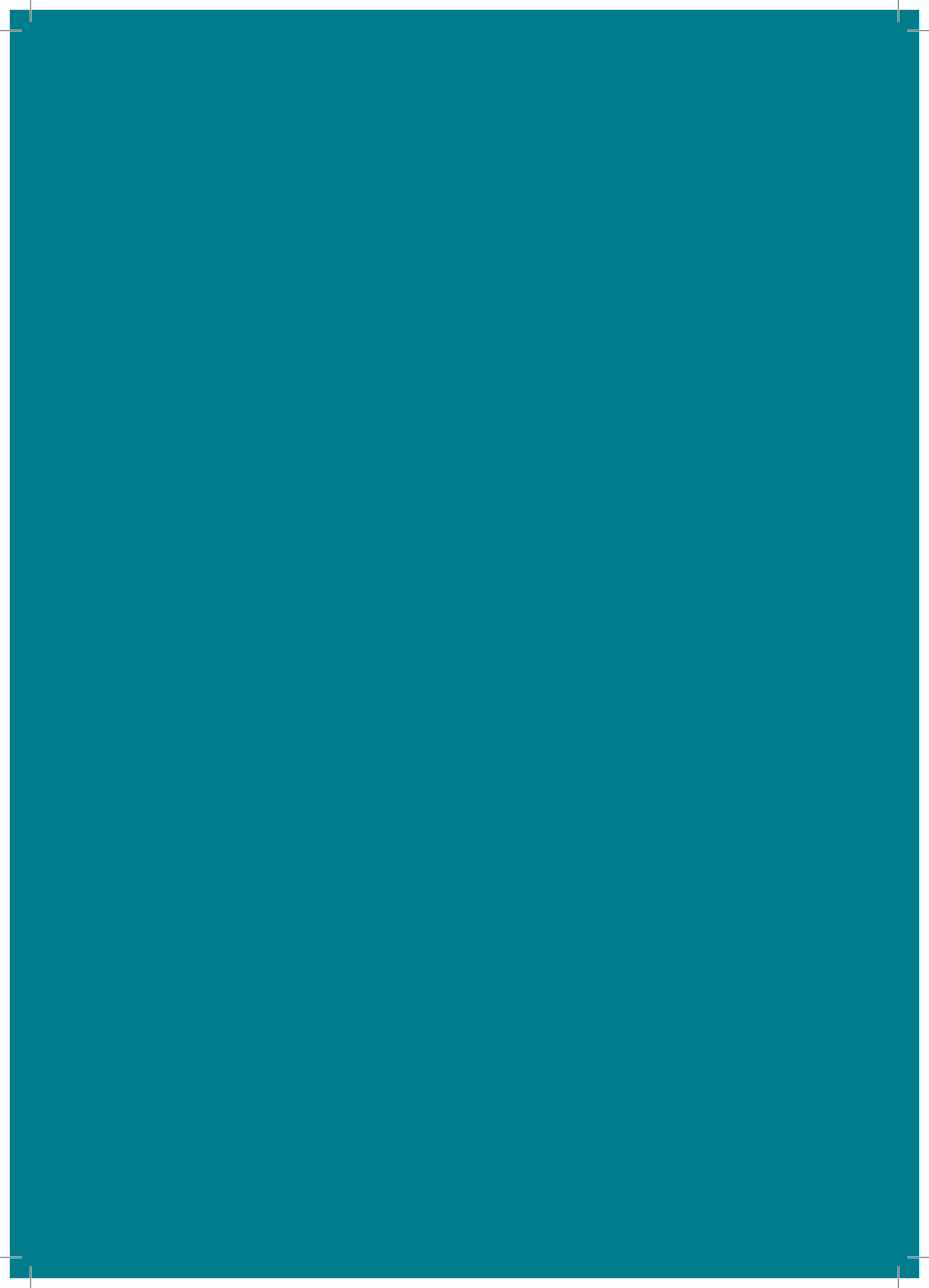



and its associations. This approach ensures that trust is built between government and the private sector. This in turn benefits all parties involved in the process.

- As a way forward, the Department remains committed to the continuation of the GHGIP and invites relevant funding institutions and industry sectors to participate in the programme. This, in turn, will ensure that the GHGIP is sustained and can be scaled up to reach other sectors that are not yet covered.

## REFERENCES

- Arctic Council 2013 in 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.
- Department of Environmental Affairs, 2011. *National Climate Change Response White Paper*. DEA, Pretoria,
- Department of Environmental Affairs, 2015. *The National Climate Change Response Monitoring and Evaluation System Framework*. DEA, Pretoria, RSA.
- Intergovernmental Panel on Climate Change (IPCC), 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Overview. Institute for Global Environmental Strategies (IGES), Hayama, Japan on behalf of the IPCC. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/>
- Intergovernmental Panel on Climate Change (IPCC) 2007: Appendix I: Glossary. In: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Parry, M.L., O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY.
- Intergovernmental Panel on Climate Change (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. Available at: [https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5\\_SYR\\_FINAL\\_Glossary.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_Glossary.pdf)
- National Planning Commission (NPC), 2011. *National Development Plan: Vision for 2030*. National Planning Commission, Pretoria. Available at <http://www.gov.za/documents/national-development-plan-vision-2030>
- Rockefeller Foundation, 2009. *Building Climate Change Resilience*. Rockefeller Foundation White Paper. Available at: [http://accrrn.dev.dotography.net/sites/default/files/publication/attach/10\\_RF\\_WhitePaper\\_Resilience.pdf](http://accrrn.dev.dotography.net/sites/default/files/publication/attach/10_RF_WhitePaper_Resilience.pdf)
- United Nations Development Programme (UNDP) 2005. *Adaptation Policy Frameworks for Climate Change: Developing strategies, policies and measures*. Authors, Lim B, Spanger-Siegfried E, Burton I, Malone E, Huq S. Cambridge: Cambridge University Press.
- United Nations Framework Convention on Climate Change (UNFCCC), 2014. What is adaptation to climate change? Available at: <http://unfccc.int/adaptation/items/7021.php#whatis>
- United Nations Inter-Agency Secretariat of the International Strategy for Disaster Reduction (UN/ISDR) 2004. *Living with Risk: A global review of disaster reduction initiatives, 2004 Version - Volume I*. United Nations, New York and Geneva.
- World Resources Institute, 2014. *Greenhouse Protocol: Policy and Action Standard*. Washington, USA.





Environment House  
473 Steve Biko  
cnr Steve Biko and Soutpansberg Road  
Arcadia  
Pretoria, 0083  
South Africa

Postal Address  
Department of Environmental Affairs  
P O Box 447  
Pretoria  
0001

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