

OUTLINE OF THE GREENBOOK & NCCIS PROVINCIAL TRAINING WORKSHOP













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1 INTRODUCTION

South Africa's population will reach between approximately 58 and 62 million people by 2050 – that is an additional 19 to 24 million people (based on 2011 figures). The largest growth will occur in cities in towns. Global climate change and severe climate hazards already impact South African towns and cities, events which are projected to increase in frequency and intensity in the future. The compounded effect of population growth, severe weather events and climatic changes, and increased exposure to these hazards due to poor planning practices will contribute to the likelihood for natural disasters to occur more frequently and put government under pressure to reduce the risk for disaster, or deal with the aftermath of one (Van Niekerk, Pieterse & Le Roux, 2020: 1).

The GreenBook and the National Climate Change Information System provide all spheres of government with the evidence and planning support to plan for current and future climate-related threats at a local municipal level, as well as to prioritise and mainstream interventions to adapt settlements and all other economic sectors to climatic changes through effective planning.

This document provides a brief overview of the two tools, namely the GreenBook and the National Climate Change Information System (NCCIS) that are covered in the workshop. It also provides an indication of the GreenBook and the NCCIS national stakeholder training workshop objectives, the high-level two-day programme, and a summary and outcomes per training session.

The provincial training workshop aims to achieve two main objectives, namely to:

- a. Enable a transfer of technical and operational skills for government officials so that tools and systems can be sustainably mainstreamed into relevant government and sector departments.
- b. Establish user perspective feedback and recommendations to assist in improving the usability of the Green Book and the NCCIS.



2 **DEFINITIONS**

Adaptation is 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 (IPCC, 2018).

Adaptive capacity is the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences (IPCC, 2018).

Carbon sinks mitigation is an activity or mechanism which removes a greenhouse gas, an aerosol, or a precursor of a greenhouse gas from the atmosphere, through natural or human, in soil, ocean, and plants (IPCC, 2018).

Climate change mitigation is a human intervention to reduce emissions or enhance the sinks of greenhouse gases (IPCC, 2018).

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 (IPCC, 2018).

Climate extreme (extreme weather or climate event) is the occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable (IPCC, 2018).

Disaster risk reduction is the process of reducing the possible damages caused by natural hazards through a series of practices and efforts. These can include elimination, prevention and mitigation mechanisms and processes (UNDRR, 2020).

Exposure is the presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets in places and settings that could be adversely affected (IPCC, 2018).

Hazard is the potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources (IPCC, 2018).

Mainstreaming can be defined as the process of integrating climate change adaptation strategies and measures into existing instruments and processes, as opposed to developing dedicated adaptation policies and plans (Pieterse, 2019).





Representative Concentration Pathways (RCPs) are scenarios that include time series of emissions and concentrations of the full suite of greenhouse gases (GHGs) and aerosols and chemically active gases, as well as land use/land cover (Moss et al., 2008). The word representative signifies that each RCP provides only one of many possible scenarios that would lead to the specific radiative forcing characteristics. The term pathway emphasizes the fact that not only the long-term concentration levels but also the trajectory taken over time to reach that outcome are of interest (Moss et al., 2010). RCPs were used to develop climate projections in CMIP5. RCP8.5: One high pathway which leads to >8.5 W m-2 in 2100 (the corresponding ECP has constant emissions after 2100 until 2150 and constant concentrations after 2250) (IPCC, 2018).

Resilience is the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation (IPCC, 2018).

Risk is the potential for adverse consequences where something of value is at stake and where the occurrence and degree of an outcome is uncertain. In the context of the assessment of climate impacts, the term risk is often used to refer to the potential for adverse consequences of a climate-related hazard, or of adaptation or mitigation responses to such a hazard, on lives, livelihoods, health and well-being, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure. Risk results from the interaction of vulnerability (of the affected system), its exposure over time (to the hazard), as well as the (climate-related) hazard and the likelihood of its occurrence (IPCC, 2018).

Vulnerability is 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 (IPCC, 2018).

See the NCCIS info-glossary for a detailed list of other terminology and their explanations.





3 OVERVIEW OF THE GREEN BOOK AND NCCIS TOOLS

3.1 The GreenBook Overview

The GreenBook was a three-year CSIR research initiative in collaboration with the South African National Disaster Management Centre (NDMC) and involving a number of stakeholders and reviewers in co-producing methods and reviewing the research findings. The work was co-funded by the Canadian International Development Research Centre (IDRC) and the Council for Scientific and Industrial Research (CSIR).



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The GreenBook was developed as an online planning support tool to assist municipalities across South Africa to assess their risk and vulnerabilities and respond by adapting settlements to climate change. The GreenBook looks forwards to the year 2050 by projecting settlement growth combined with quantitative, scientific evidence of the likely impacts that climate change will have on South African towns and cities and its key resources. The tool provides appropriate adaptation measures to be considered for implementation towards the development of climate resilient settlements.



The GreenBook is structured into three main components. The first component is a series of interactive national story maps that communicate the research methodologies and main findings, supported by custom maps, images and statistics.

The second component is the municipal Risk Profile Tool: an interactive tool that combines scientific evidence produced from multiple domain-specific research streams into interactive, composite profiles covering current and future (2050) climate risks, impacts and vulnerabilities for all municipalities in South Africa and their settlements.



The third component is the municipal Adaptation Actions Tool: an interactive platform to support adaptation planning in local municipalities. The tool provides a range of planning and design actions for municipalities to select from (based on their risk profile), to adapt their settlements to the likely impacts of climate change, to climate proof their settlements, and to reduce their exposure and vulnerability to hazards and thus the risk for disaster.

G GREENB	OOK Search for an adaptation action	ADAPTATION ACTIONS	-
EVIZABOD & ELINATE IMPOLTS Constal Flooding Inland Flooding Heat Stress			
Wildfine Increased Wind Speed Drought Croundwater Torought	Determiné urban edge	Identify all open spaces	identify all key ecosystems and protected areas
Crepeton Crepeton Surface Water Depinton Hindivernity Loss PLANNING PUNCTION		•	
STRATECY	Connect open spaces	identify areas where vegetation coverage can be increased	identify areas for vegetated windbreaks

The GreenBook can be accessed online **here**. Watch the video on how to access the information in the GreenBook **here**.





3.2 The National Climate Change Information System (NCCIS) Overview



The National Climate Change Information System (NCCIS) was developed by the South African Environmental Observation Network (SAEON) in partnership with DFFE. The NCCIS is a web-based platform that offers a collection of data from a range of sources, providing access to information necessary for domestic and international reporting, as required by the National Climate Change Response Policy (2011), the National Development Plan (NDP) and South Africa's Nationally Determined Contributions (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC). The NCCIS monitors and evaluates climate change drivers, events, links to national objectives, targets, and strategies in respect of climate change mitigation and adaptation. The NCCIS supports South Africa's progress in responding to climate change and achieving national and international goals and targets related to the transition to a low-carbon and climate-resilient economy, as well as providing transparency in monitoring, evaluation, and reporting.



The NCCIS hosts the following components:

- The National Climate Change Response Database (NCCRD).
- The National Carbon Sinks Atlas.
- The National Desired Adaptation Outcomes (NDAO).
- A Climate Information Centre.
- The Tracking and Evaluation (T&E) Portal.



The GreenBook is one of the services that have been integrated into the NCCIS ecosystem of services that contribute to a better understanding of climate change and its impacts.

The focus for the NCCIS part of the training, will mainly be on the NCCRD and the Carbon Sinks Atlas. The NCCRD is intended as a resource to collect and track interventions on climate change (adaptation and mitigation) on past, current and future climate change response efforts (policies, plans, strategies, projects, and research) across South Africa. The Carbon Sinks Atlas component will enable participants to view and extract data, generate reports for local and district municipalities indicating key carbon stocks, a proxy for changes in land use and land use changes for respective jurisdictions. At a local municipality level, the Carbon Sinks Atlas generates a table of stock changes for a period of 28 years, 1990-2018. Such information can be used to complement municipal plans and strategies, including spatial planning and land use management by-laws.

The NCCIS and its components can be accessed here.

4 HIGH-LEVEL WORKSHOP PROGRAMME

The training will be offered as an online workshop during two days of four hours each.

The workshop programme will be divided into seven sessions, each with their own set of outcomes, stated below. The seven sessions are the following:

DAY 1

Session I: Background to the GreenBook & NCCIS

Session II: High level national and provincial findings

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Session III: The local municipal climate change context and priorities

DAY 2

Session IV: Adaptation planning

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Session V: Mainstreaming risk information and adaptation

Session VI: Embedding data into current systems

.....

Session VII: Monitoring and evaluation

Participants will be expected to participate in training activities throughout the duration of the workshop, including breakaway groups, reflection, surveys and polls.

5 SUMMARY OF SESSIONS AND THEIR OUTCOMES

DAY 1

SESSION I: BACKGROUND TO THE GREENBOOK & NCCIS

Summary of training session 1

To set the scene for the rest of the training, this session will provide the overall background to the GreenBook and the NCCIS, their rationale, and an overview of the various components of the GreenBook and NCCIS.

Outcomes of training session 1

At the end of this session, participants will:

- a. Understand the coming into existence of the GreenBook and the NCCIS.
- b. Be aware of the various components of the GreenBook and the NCCIS.

SESSION II: HIGH LEVEL NATIONAL & PROVINCIAL FINDINGS

Summary of training session 2

This session will provide participants with some high-level national findings from the story map component in the GreenBook, zooming into provincial hotspots related to specific climate hazards such as flooding, drought, and heat. Findings from the National Carbon Sinks Atlas in the NCCIS will also be shown.

Outcomes of training session 2

At the end of this session, participants will:

- a. Understand the national urban context relating to issues of urbanisation, settlement vulnerability, key resources, and other key economic sectors.
- b. Be able to identify provincial hotspots related to specific current and future climatic changes and hazards.
- c. Be aware of the impact of climate change and land cover change on biodiversity and potential future carbon stocks.



SESSION III: THE LOCAL MUNICIPAL CLIMATE CHANGE CONTEXT AND PRIORITIES

Summary of training session 3

Using the GreenBook Risk Profile Tool, participants will be shown how to access, extract, and interpret a local municipal current and future climate risk profile. Participants will be guided through the findings, interactive datasets, and models to be able to use this information to identify priority climate risks. This includes information on municipal, settlement and neighbourhood vulnerabilities; projected population projections; exposure to climate related hazards; projected shifts in local climate and the impacts of climate change on some of the key municipal resources.

Outcomes of training session 3

At the end of this session, participants will:

- a. Understand vulnerability indicators.
- b. Be able to identify the most pressing current and future climate related risks threatening municipalities.
- c. Be able to navigate, understand, and contextualise the information in the Risk Profile Tool.
- d. Understand the need to integrate this information into existing and future strategic and sector plans.
- e. Reflect on their existing plans in light of the GreenBook information provided.

DAY 2

SESSION IV: ADAPTATION PLANNING

Summary of training session 4

To address the prioritised risks, appropriate adaptation actions need to be identified. Making use of the GreenBook Adaptation Actions Tool, participants will be guided through the process of selecting and prioritising adaptation actions. Factors that will be considered in this process include:

- The risk being addressed;
- The municipal capacity available; and
- Trade-offs, costs and benefits of adaptation actions.

Through this identification and prioritisation process, baskets of adaptation actions can be created that are relevant to specific plans and frameworks (e.g. IDP, SDF, CAP, DRP, etc.). Mutually beneficial and supporting adaptation actions are grouped together for integration and implementation. This step will also identify any shortcomings in the Adaptation Actions Tool.



Outcomes of training session 4

At the end of this session, participants will:

- a. Understand what municipalities need to adapt to.
- b. Be able to identify the most appropriate adaptation actions to be integrated into municipal planning by using local knowledge and the risk and vulnerability profile in the GreenBook.

- c. Be able to identify supporting actions, and to prioritise these.
- d. Be able to identify the plans, instruments and strategies in the Municipality that need to include climate response planning.
- e. Identify any shortcomings in the range and content of the adaptation actions in the Adaptation Actions Tool.

SESSION V: MAINSTREAMING RISK INFORMATION AND ADAPTATION

Summary of training session 5

Building on the previous steps, the information from the risk profiles and the identified adaptation actions would need to be embedded and mainstreamed into plans and frameworks such as the IDP, SDF, CAP, DRP, budget plans and others. Through an interactive session, the status of relevant plans will be discussed together with the opportunities and challenges for mainstreaming evidence around risk and adaptation actions into existing and future plans and frameworks that guide planning and investment in the Municipality. Drawing from the **Let's Respond Toolkit**, a process and framework for mainstreaming climate risk and vulnerability information and appropriate adaptation actions, will be introduced.

Outcomes of training session 5

At the end of this session, participants will:

- a. Understand the concept of mainstreaming.
- b. Understand the advantages, barriers, and facilitators of mainstreaming, and to identify these in their municipality.
- c. Understand the opportunities for mainstreaming GreenBook information into municipal planning.
- d. Be able to qualitatively evaluate the extent of mainstreaming in their own municipal plans.
- e. Be able to devise a framework for mainstreaming climate risk and vulnerability information, and adaptation actions into their municipal plans, instruments, and strategies.
- f. Be able to advise on what information the GreenBook can provide in which format to support municipalities across South Africa in mainstreaming climate change adaptation in municipal planning.



SESSION VI: EMBEDDING DATA INTO CURRENT SYSTEMS

Summary of training session 6

The GreenBook data and information should be embedded into existing decision support tools, Geographical Information Systems or any other spatial decision tool used by municipalities to ensure alignment and optimal use of data. The risk profile data can be extracted and embedded into these tools as required/needed.

Outcomes of training session 6

At the end of this session, participants with a GIS background will:

- a. Be able to extract the Green Book risk profile data and embed this into Geographical Information Systems (GIS) and decision support tools to ensure alignment and optimal use of this spatial data within planning processes.
- b. Be able to unpack and understand the Green Book risk profile datasets.
- c. Be able to access the Green Book risk profile data for input into their planning processes.

SESSION VII: MONITORING AND EVALUATION

Summary of training session 7

Having understood the risk profiles and priorities for all economic sectors, it would be important to understand projects that are planned, adopted and implemented with the view to assist with the tracking of progress towards the transition to a low carbon and climate resilient society. This will be an important component to understand the extent at which climate change issues are mainstreaming into existing plans and strategies with a view to scale up implementation at multilevel of governance. The NCCRD presents a platform where project managers can upload information on their projects' details as well as to provide periodic updates.

Outcomes of training session 7

At the end of this session, participants will:

- a. Understand climate change projects that are planned, adopted and implemented in different municipalities.
- b. Understand how to upload projects on the website and how to populate climate change projects to support reporting under the MTSF and the UNFCCC.





6 RESOURCES

Below is a list and brief description of various climate change-related sources of information, products, tools and services:

MUNICIPAL INFORMATION, PRODUCTS AND SERVICES

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GreenBook

The GreenBook is an open-access tool that supports local municipalities with adapting their settlements to the current and future projected climatic changes and severe weather events. It provides highresolution scientific evidence in the form of data, graphs, and maps for every local municipality in the country. This includes evidence of vulnerability, climate change, hazards, and the impact of climate change on several key resources. It also provides a selection of adaptation actions to be mainstreamed into local strategic and sector plans.



GreenBook Risk Profile Tool

A temporally dynamic composite risk profile for each municipality and its settlements in South Africa, detailing vulnerability profiling, population projections, exposure to climate hazards, and the impacts of climatic changes on some of our key resources. Discover what your municipality might look like in 2050.





Responding to growth pressures and climate change requires action. Select a range of planning and design actions to be integrated with local planning instruments to adapt settlements to the likely impacts of climate change and reduce their exposure to hazards.



National Climate Change Response Database

The National Climate Change Response Database (NCCRD) is intended as a resource to collect and track interventions on climate change (adaptation and mitigation) on past, current and future climate change response efforts (policies, plans, strategies, projects and research) across South Africa. It is designed to capture and store the details of climate change interventions including adaptation, mitigation and crosscutting efforts from across wide range of stakeholders in South Africa. The database presents a platform where project managers can upload information on their projects' details as well as to provide periodic updates. The submitted data supports the undertaking of climate change monitoring and evaluation to track South Africa's transition to a lower carbon economy and climate resilient society.





Carbon Sink Atlas

South Africa's National Climate Change Response Policy (NCCRP) highlighted the need to assess the national carbon sinks related to forest restoration, wetlands, agricultural practice, all significant changes in land use and to quantify the potential future carbon stocks under varying climate change scenarios and land use change. In 2014 the CSIR (in partnership with several other organisations) produced the National Terrestrial Carbon Sinks Assessment for South Africa. The CSIR in collaboration with SAEON later converted the NTCSA outputs into atlas format to make the data more widely accessible - the South African Carbon Sinks Atlas.



Let's respond toolkit

The purpose of this website is to provide stakeholders with information and tools to respond to climate change at a local level in South Africa. The Let's Respond Toolkit provides stakeholders with an introduction and overview on how to integrate climate change into municipal planning processes. This website also contains climate change related resources and information on each of the participating municipalities.







Disaster Atlas

This is an ArcGIS Portal for the National Disaster Management Centre. The purpose of the Disaster Atlas is to be able to view historic records of declared or gazetted disasters.



PROVINCIAL INFORMATION, PRODUCTS AND SERVICES

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Climate Trends

View the summary of provincial climate trends from the South African Weather Service and South Africa Third National Communication



Provincial Climate Projections

View future climate projections for South Africa provided by the South African Weather Service, University of Cape Town Climate System Analysis Group, and the Council for Scientific and Industrial Research.





View climate services for South Africa provided by the South African Weather Service, University of Cape Town Climate System Analysis Group, and the Council for Scientific and Industrial Research.



Climate Vulnerability

Summarised review of the most significant climate change risks and vulnerabilities based on the information in Chapter 3 of South Africa's Third National Communication to the UNFCCC. Information is presented for the following sectors: Agriculture and Forestry, Water Resources, Forestry, Terrestrial Ecosystems, Coastal Zone, Health, and Urban and Rural Settlements. A summary of the key impacts of climate change on these sectors in shown in Table below.



NATIONAL INFORMATION, PRODUCTS AND SERVICES

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GreenBook story maps

Find out more about the research and development done as part of the GreenBook and see a national and provincial story unfold about urban growth, the socio-economic vulnerabilities of local municipalities, settlements and neighbourhoods, the likely climatic shifts we can expect, and the impacts of these shifts on some of South Africa's hydrometeorological hazards and resources.





Climate Trends

View the summary of national climate trends from the South African Weather Service and South Africa Third National Communication.



Climate Projections

View future climate projections for South Africa provided by the South African Weather Service, University of Cape Town Climate System Analysis Group, and the Council for Scientific and Industrial Research.



Climate Services

View climate services for South Africa provided by the South African Weather Service, University of Cape Town Climate System Analysis Group, and the Council for Scientific and Industrial Research.



7 **BIBLIOGRAPHY**

CSIR. 2019. *GreenBook: adapting South African settlements to climate change*. Available at: **www.greenbook. co.za**.

- IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press
- Le Roux, A., van Niekerk, W., Arnold, K., Pieterse, A., Ludick, C., Forsyth, G., Le Maitre, D., Lötter, D., du Plessis, P. & Mans, G. 2019. *GreenBook Risk Profile Tool*. Pretoria: CSIR. Available at: https://riskprofiles. greenbook.co.za/.
- Pieterse, A. (2019). *Mainstreaming climate change adaptation into municipal planning: lessons from two unique cases*. Dissertation submitted in fulfilment of the requirements for the degree Master of Town and Regional Planning in the Faculty of Engineering, Built Environment and Information Technology, University of Pretoria.
- United Nations Office for Disaster Risk reduction (UNDRR). (2020). Sendai Framework for Disaster Risk Reduction". UNISDR. 2015-03-18. Retrieved 2020-08-31. Available at: https://www.undrr.org/implementing-sendaiframework/what-sendai-framework.
- Van Niekerk, W., Pieterse, A & Le Roux, A. 2020. 'Introducing the Green Book: A practical planning tool for adapting South African settlements to climate change', in: Town and Regional Planning. DOI: 10.18820/2415-0495/ trp77i1.8.
- Van Niekerk. W., Pieterse, A., Davis-Reddy, C., Le Roux, A. & Lötter, D. 2019. *GreenBook Adaptation Actions Tool.* Pretoria: CSIR. Available at: https://adaptationactions.greenbook.co.za/.

