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Department: Science and Technology REPUBLIC OF SOUTH AFRICA

# Global Change Grand Challenge National Research Plan, South Africa

# Extract from full document only





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**DRAFT FOR REVIEW** 

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# **Contents**

1.	EXEC	CUTIVE SUMMARY	3		
2.	BACKGROUND AND CONTEXT				
	2.1	Introduction			
	2.2	Scope and opportunities	5		
	2.3	Facts about global change	5		
	2.4	Economics and ecology	9		
	2.5	South Africa as a priority research destination	10		
	2.6	Possible scenarios	11		
3.	RISING TO THE CHALLENGE: A RESEARCH PLAN FOR GLOBAI CHANGE				
	3.1	Knowledge Challenge 1: Understanding a changing planet	13		
	3.2	Knowledge Challenge 2: Reducing the human footprint	18		
	3.3	Knowledge Challenge 3: Adapting the way we live	21		
	3.4	Knowledge Challenge 4: Innovation for sustainability	24		
4.	IMPL	EMENTING THE PLAN	29		
5.	CON	TRIBUTORS	29		



## Boxes

SOME DEFINITIONS		5
HUMAN IMPACTS		6
GLOBAL CHANGE EFFECTS		7
THE WORLD'S "POLYCRISIS"		8
	SOME DEFINITIONS HUMAN IMPACTS GLOBAL CHANGE EFFECTS THE WORLD'S "POLYCRISIS" _	SOME DEFINITIONS

# Figures

Figure 1: South Africa is located at the tip of the African continent, adjacent to important oceans that influence global weather patterns and atmospheric greenhouse gas concentrations in unique ways.	с 10
Figure 2: Four possible scenarios.	11
Figure 3: Countries characterised in terms of their quality of life and ecological footprint. Only one country (Cuba) meets the minimum criteria for sustainability.	. 18

## 1. EXECUTIVE SUMMARY

The Department of Science and Technology's Ten-year Innovation Plan for South Africa, *Innovation Towards a Knowledge-based Economy 2008-2018*<sup>4</sup>, identifies five key Grand Challenges for the National System of Innovation over the next decade. One of these Grand Challenges is science and technology in response to global change. This Grand Challenge has two main aspects: enhancing scientific understanding of global change, and developing innovations and technologies to respond to global change.

An inclusive process involving a wide cross-section of the science and policy communities in South Africa was followed to develop a detailed implementation plan for the first of these, i.e. enhancing scientific understanding. This process has culminated in the development of this 10-year national research plan for the Global Change Grand Challenge (the Global Change Research Plan).

The Global Change Research Plan identifies four major cross-cutting knowledge challenges and 15 key research themes, summarised in the table below.

Understanding a changing planet		Reducing the human footprint		Adapting the way we live		Innovation for sustainability	
1.	Observation, monitoring and adaptive management	1.	Waste minimisation methods and technologies	1.	Preparing for rapid change and extreme events	1.	Dynamics of transition at different scales - mechanisms of innovation and
2.	Dynamics of the oceans around southern Africa	2.	Conserving biodiversity and ecosystem services, e.g. clean drinking water	2.	Planning for sustainable urban development in a South African context	2.	learning Resilience and capability
3.	Dynamics of the complex internal earth systems	3.	Institutional integration to manage ecosystems	3.	Water security for South Africa	3.	Options for greening the developmental state
4.	Linking the land, air and sea		and ecosystem services	4.	Food and fibre security for South Africa		
5.	Improving model predictions at different scales						

<sup>&</sup>lt;sup>1</sup> Available on the DST website (<u>www.dst.gov.za</u>)

#### National Research Plan DRAFT FOR REVIEW

The Global Change Research Plan is notable for the following reasons:

- It adopts an earth system approach.
- It is strongly interdisciplinary.
- It is based on the unique geographic location and developmental challenges of South Africa.
- It is grounded in a social-ecological paradigm.
- It supports making a contribution to the international knowledge base as well as locally relevant and required research.
- It aims to advance a better understanding of the functioning of the earth system and to support efforts to respond effectively to changes.
- It is intended to be policy-relevant.
- It has a strong focus on climate change, and takes into consideration contemporary debate and discussion in this regard.

## 2. BACKGROUND AND CONTEXT

#### 2.1 Introduction

In 2008, South Africa's Department of Science and Technology launched its Ten-Year Innovation Plan for South Africa, *Innovation towards a Knowledge-based Economy 2008–2018*, which identifies five Grand Challenge areas on which efforts will be focused to bring about social, economic, political, scientific and technological benefits, namely –

- the "Farmer to Pharma" value chain to strengthen the bioeconomy;
- space science and technology;
- energy security;
- science and technology for global change with a focus on climate change;
- human and social dynamics.

Each of these Grand Challenges is designed to stimulate multidisciplinary thinking, and to challenge the country's researchers to answer existing questions, create new disciplines, and develop new technologies.

The Challenges will contribute to transforming South Africa's transformation into a knowledge-based economy by –

- developing human capital;
- generating new and relevant knowledge;
- facilitating the establishment of research infrastructure;
- bridging the divide between research results and socio-economic outcomes.

The Global Change Grand Challenge initiative supports science and technology, as well as key social, economic development, and environmental management objectives<sup>2</sup>

#### 2.2 Scope and opportunities

This Global Change Research Plan embraces the wider sphere of global change (see Box 1), although its main focus is on climate change.

It includes changes in economics, politics, land use, atmospheric composition, and loss of biodiversity, as well as palaeo-analysis and the geosciences in so far as they illuminate global change issues. Topics range widely within the linked human-ecological system in which global change is believed to play a crucial part, so they include the social sciences and humanities where relevant.

This Grand Challenge specifically engages with global change, bearing in mind that two other Grand Challenges focus on the related areas of human and social dynamics, and energy security.

The Global Change Research Plan prioritises addressing local needs and working in areas of global comparative advantage.

- **Local needs** researchers will investigate aspects of global change that affect the well-being of the country and the region, and that are unlikely to be examined by scientists elsewhere (for example, the areas of urbanisation, agriculture, forestry, fisheries, and water).
- Areas of national comparative advantage researchers will build on existing scientific and disciplinary strengths; investigate what is specific to the country's geographical location and of global as well as local interest (such as the Southern Ocean and South Africa's rich biodiversity); consider the human dimensions of vulnerability and impacts of abrupt, extreme events (such as floods and cyclones), as well as longer-term, slower trends; and explore global change from the social and economic perspective of a top-end developing country, emerging from a troubled past, operating as a participatory democracy, with innovative laws.

#### 2.3 Facts about global change

After much debate, contemporary climate change has become accepted as a scientific reality, and the facts relating to global change have become central issues to be addressed by researchers, innovators, decision-makers and governments around the world.



<sup>&</sup>lt;sup>2</sup> The key formal documents that underpin the design of this Grand Challenge are: the *White Paper on Science and Technology* (1996); *South Africa's National Research and Development Strategy* (2002); the *Climate Change Response Strategy* (2004); the *National Industrial Policy Framework* (2007); the *National Sustainable Development Framework* (2008); and the relevant Sectoral Policies (water, agriculture, and others).