

Environment Sector Research, Development and Evidence framework

An approach to enhance sector science-policy interface and evidence-based policy making

Approved by MINMEC 08 June 2012



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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PREFACE

The Environment Sector Research, Development and Evidence (R,D&E) framework was approved by MINMEC on 08 June 2012. This document addresses the need for a common framework for the collection of solid evidence that can be used in support of environment sector policy decisions and for the achievement of sector priorities. In response to the pressing environmental issues of our times the framework is seeking to develop a more rigorous approach that gathers, critically appraises and uses high quality research evidence to inform policy-making and professional practice.

The Outcome 10, Environment Sector Plan and South African Environment Outlook priorities are used to identify evidence needs and likely future developments. These environmental issues inform the environmental research questions and the agenda for the sector at thematic level. The context for this framework is to implement the national R&D goals through responding to the Sector Plan and Outcome 10 evidence needs, while ensuring a coordinated common approach for developing sector thematic strategies.

The knowledge transfer between researchers and policy makers in the environmental sector needs to be strengthened. Policy-makers and researchers need to work more closely together by means of established, regular and trusting interaction and dialogue. Through DEA, a central knowledge management system (web-based data system) will be developed to help facilitate interactions among key stakeholders from the science and the policy domains. Various fora will be used to facilitate sector science-policy interface and evidence based policy-making. These fora include through internal coordinating forum, existing intergovernmental forum, theme specific fora and multi-stakeholders forum.

This environment sector R,D&E framework will be implemented in phases. In line with level 3 thematic strategies, a minimum of five areas are identified to initiate immediate implementation i.e. biodiversity, waste management, climate change, air quality and oceans & coast. These areas were selected based on the Memorandum of Understanding between DEA and DST for initial implementation.

This environment sector R,D&E framework advocates an evidence-based approach to policy-making in order to address the pressing environmental issues of our times.

The breadth of what is considered evidence is wide and dynamic. In the context of this framework and sustainability science, evidence is robust information that the sector can use to turn its policy goals into implementable actions.

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List of Acronyms

ACCESS	Africa Centre for Climate and Earth Systems Science
AMCOST	African Ministerial Council on Science and Technology
AKP DIALOGUE ON IPR	Associated Kyoto Program Dialogue on Intellectual Property Rights
ARC	Agricultural Research Council
ASEAN	Association of South East Asian Nations
CEF	Central Energy Fund
CGIAR	Consultative Group on International Agricultural Research
CSIR	Council for Scientific and Industrial Research
DAC	Department of Arts and Culture
DAFF	Department of Agriculture, Forestry And Fisheries
DBE	Department of Basic Education
DBSA	Development Bank of Southern Africa
DCOG	Department of Cooperative Governance
DEA	Department of Environmental Affairs
DEFRA	United Kingdom Department for Environment, Food and Rural Affairs
DHS	Department of Human Settlement
DHET	Department of Higher Education And Training
DMR	Department of Mineral Resources
DOE	Department of Energy
DOT	Department of Transport
DPW	Department of Public Works
DST	Department of Science and Technology
DTI	Department of Trade and Industry
DRDLR	Department of Rural Development & Land Reform
DIRCO	Department of International Relations
ECOSOC	United Nations Economic and Social Council
EDD	Department of Economic Development
ESSP	Environmental Sector Skills Plan
EU FP7	European Union Seventh Framework Progress
ERA	Global Research Alliance
GEF	Global Environment Funds
GFATM	Global Fund to Fight Aids, Tuberculosis and Malaria
GRA	Global Research Alliance

G77 consortium	The Group of 77 Countries Consortium on Science, Technology and Innovation for the South
G8/5	Heads of Government from the G8 Nations (Canada, France, Germany, Italy, Japan, Russia, and The United Kingdom And The United States) plus the Heads of Government of the five leading emerging economies (Brazil, China, India, Mexico and South Africa).
G20	Group of Twenty Finance Ministers and Central Bank Governors
HCD	Human Capital Development
HFSP	Human Frontier Science Program
HSRC	Human Sciences Research Council
IAC	International Astronautical Congress
IBSA	India Brazil South Africa
IDC	Industrial Development Corporation
ICSU	International Council for Science
IUCN	International Union for Conservation of Nature
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LTMS	Long Term Mitigation Scenarios
MDG	Millennium Development Goals
MTEF	Medium Term Expenditure Framework
NRF	National Research Foundation
NEMA	National Environment Management Act
NSSD1	National Strategy for Sustainable Development 2011 -2014
NT	National Treasury
NGO	Non-Government Organization
OECD	Organization for Economic Co-operation and Development
R D &E Framework	Environmental Sector Research, Development and Evidence Framework (an approach to evidence based policy making)
RIMS	Research Information Management System
SAEON	South African Environmental Observatory Network
SANBI	South African National Biodiversity Institute
SANPARKS	South African National Parks
SAMCOST	South African Ministerial Council on Science and Technology
SASSCAL	Southern African Science Service Centre for Climate Change and Adaptive Land Use
STATSSA	Statistics South Africa
S& T	Science and Technology
STI	Science Technology and Innovation

UNCCD	United Nations Convention to Combat Desertification
UNCSD	United Nations Conference on Sustainable Development
UNCTAD	United Nations Conference of Trade and Development
UNDESA	United Nations Department of Economic and Social Affairs
UNEP	United Nations Environment Programme
UNEP IRP	United Nations Environment Programme International Resource Panel
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation
UNU	United Nations University
UNSTD	United Nations Commission Science and Technology for Development
WHO	World Health Organisation
WIPO	World Intellectual Property Organisation

GLOSSARY OF TERMS

Evidence	In the context of this framework and sustainability science, evidence is robust <i>information that the sector can use to turn its policy goals into implementable actions</i> . It can take many forms in particular, research, structured stakeholder consultations, expert and indigenous knowledge, economic and statistical modelling and cost/benefit analyses. Note: Detailed context is contained in Item 1.2 and 1.3.
Sustainability Science	According to Burns et al. (2006), “Sustainability science is research that produces knowledge that is immediately useful for policy and management... has as its goal the integration of science and technology with other sources of knowledge to solve problems and to inform decisions...both the problem to be solved and the knowledge needed to solve it are defined collaboratively in the conduct of sustainability science...focuses on the interface between human society and the environment upon which societal wellbeing depends...aims to improve understanding of how society shapes the environment and how the environment, in turn, shapes society”.

1. INTRODUCTION

1.1 Background to the Environment Sector Research, Development & Evidence (R, D&E) Framework

The environment sector priorities are driven by the Environment Sector Plan and the Outcome 10 of environmental assets and natural resources that are valued protected and continually enhanced. A need is identified for a common framework on collecting evidence to support the environment sector policy decisions and achievement of priorities. Through this framework, the environment sector will develop a system that will make use of evidence to underpin policy decisions building from the existing evidence collection and procuring new evidence.

Section 24 of the Constitution as implemented through the National Environmental Management Act (NEMA), stipulates that all South Africans have a right to an environment that is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations. The Constitution compels everyone to take reasonable steps to prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources. Given the Constitutional imperative, the Outcome 10 vision is: ***A South Africa where environmental assets and natural resources are valued, protected and continually enhanced*** while the Environmental Sector Plan vision is: ***“A prosperous and equitable society living in harmony with our natural resources”***. The sector vision is informed by the human and environmental rights enshrined in the Constitution, NEMA, priorities captured in the Millennium Development Goals (MDG), Johannesburg Plan of Implementation (JPOI), and National Strategy for Sustainable Development (NSSD1) and other key government socio-economic policies.

A collaborative workshop on evidence-based policy-making in South Africa was hosted by DEA, DST, CSIR and UK DEFRA on 19 - 20 November 2008 to initiate the sector approach. The workshop was attended by sector researchers and policy makers from government, business, research institutions and universities in South Africa and presentations were delivered by representatives from SA, UK, Canada and Australia. A handbook outlining the workshop outcomes was published, titled Evidence-based policy for Environmental Sustainability: A path forward for South Africa. This sector evidence-based policy-making approach is implementing the outcomes of the workshop.

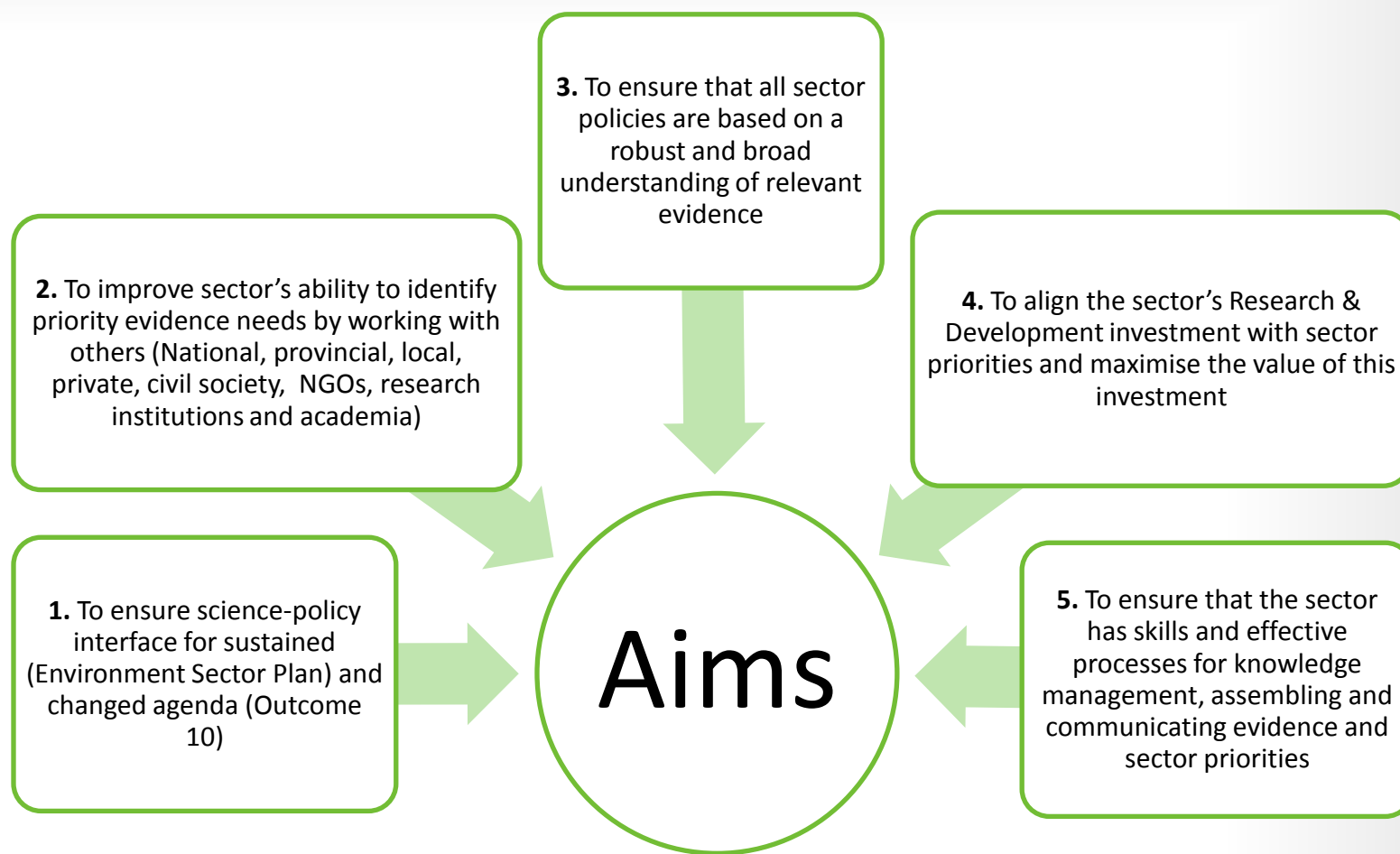


Figure 1: Aims of the Environment Sector R, D & E Framework

This R, D & E Framework (Figure 1) will bridge the gap that currently exists between policy makers and researchers by promoting a clear dialogue and also to ensure that our policies are informed by the evidence produced by researchers. According to the 2006 state of environment report, the following key environmental challenges were reported:

- (a) **Land:** Cultivation, degradation and human settlements are the main agents of transformation of land, having converted 18% of the land surface by 2001.
- (b) **Biodiversity and ecosystem:** Too little of our terrestrial (6%) and aquatic ecosystem (7% of total river length; 18% of wetlands) are formally protected. Aquatic ecosystems, including wetlands, are in the worst condition of all the ecosystems. Only 26% of rivers are intact, 54% are critically endangered, and more than 50% of wetlands have been destroyed.
- (c) **Inland water:** The demand on South Africa's already scarce water resources are increasing and projections are that by 2025, there will be a national deficit in available water.
- (d) **Marine and coastal resources:** Over-exploitation and misuse of resources remains major factor affecting the integrity of marine and coastal ecosystems.
- (e) **Atmosphere:** Pollutant concentrations, particularly for sulphur dioxide and particulates, exceed health thresholds in major urban areas across the country. Indoor pollutants concentrations in wood- and coal-burning households that have no electricity also frequently exceed health limits.
- (f) **Human settlements:** There is a severe housing backlog in cities and pressures on transport and energy infrastructure are increasing, with 50% of the population still not receiving regular waste collection.

The sector research and evidence needs are therefore informed by sector challenges [priorities] that require structured collection of existing evidence and procurement of new evidence. The framework will promote innovative ideas for environment sector research from the scientific community that is focusing on the supply side of providing robust evidence for decision making. The framework will assist to formulate approaches to practical research solutions to policy problems, bearing in mind varying time-frames and the partial need for on-going fundamental research. The Department of Environmental Affairs will establish various fora to engage key researchers and policy makers at internal, intergovernmental and multi-sectoral structures. The forum meetings will be held at least quarterly. A biannual symposium or seminar will also be held where groups of policy makers, researchers, scientists, engineers, economists, sociologists, business and management experts from diverse disciplines will get together to share evidence generated, explore innovative solutions, techniques, and methodologies to address environment sector priorities identified through the Outcome 10 and Sector Plan.

1.2 What is evidence and evidence-based policy-making in the context of this framework?

The evidence for policy-making has three components. Firstly it is hard data (facts, trends and survey information) and the second component is the analytical reasoning that sets the hard data into context. Thirdly, an evidence base comprises structured stakeholder opinion on an issue or set of issues. The breadth of what is considered evidence is wide and dynamic. In the context of this framework and sustainability science, evidence is robust *information that the sector can use to turn its policy goals into implementable actions*. It can take many forms in particular, research, structured stakeholder opinion/consultations, expert and indigenous knowledge, economic and statistical modelling and cost/benefit analysis. The evidence-based policy-making is a set of methods which informs the policy process and advocates a more rational, precise and organized approach. The pursuit of evidence-based policy is based on the premise that policy decisions should be better informed by available evidence and should include rational analysis.

1.3 Why an evidence-based approach to policy-making?

In preparing this framework, a brief assessment of environment sector policy-making processes demonstrate that sector policies, strategies and guidelines are based on research. They have scientific base and consider multi-stakeholder views, i.e. a significant amount of evidence is gathered before decisions are made. However, the environment sector needs to ensure that the evidence itself and the processes through which this evidence is put into policy options are effective and of sufficiently high quality. Furthermore, the evidence generation should be informed by and channelled to address holistic rather than isolated challenges and priorities identified by the environment sector. It should also ensure effective use of sector R&D investment. A structured sector R, D &E framework will ensure that sector policies are better informed, more effective and less expensive than policies formulated through ad hoc, ordinary time-constrained and politically constrained processes with limited evidence input. Policies based on joint scoping and interpretation evidence are also likely to give policy-makers confidence in the decisions that they take. Scientific evidence exposes policy-making to a wider range of validated concepts and experiences, enables

policies to be formulated based on solid technical bases and can open up a range of policy options for policy-makers to consider.

In line with the Sector Plan and Outcome 10 priorities, the evidence is needed both in response to short-term needs for information and also to support longer-term strategy and policy development. Most environmental sustainability challenges, such as climate change, biodiversity loss, impact management and hazardous waste have long-range effects, are inter-related and require integrated long-term solutions. The environment sector knowledge repository system requires enhancement, as the system should ideally serve as a knowledge base. This would make it possible to track the evidence record of a policy output, as well as all key documents of the policy process (i.e. from the terms of reference to the expression of interest, scoping & baseline documents to the final product). At the moment this evidence base resides in isolated locations and is not accessible to the sector for collective use. Moreover, there is the ever present threat of loss of information when key knowledge holders exit from their positions. Therefore, a knowledge management system needs to be developed which is responsive to these constraints and which caters for the growing number and scale of challenges to which the sector must apply knowledge. Increasingly, governments are developing policy (or understanding its impacts) in a global context with time horizons of some 50 years and more (e.g. Long Term Management Strategy, National Strategy for Sustainable Development etc.). The solutions identified by the sector and translated into policy need to be well recorded and stored, recognizing that pathways for future uptake are unpredictable.

2. STRATEGIC CONTEXT

The overall environment sector research efforts respond to the 2002 Cabinet approved National Research and Development Strategy. The context for this framework is to implement the national R&D goals through responding to the Environment Sector Plan and Outcome 10 evidence needs while ensuring a coordinated approach for developing sector thematic strategies (Figure 2). The South African environment trends, challenges and outlook that are updated every five years are indicators of the decline or improvement, and thus further evidence needs. The 10-year Innovation Plan for South Africa identifies five key grand challenges for the National System of Innovation over the period 2008 – 2018 that builds towards the global change grand challenge research plan. Through the MOA between the DST and DEA (signed in 2008 and reviewed in 2011), that focuses on areas including science-policy practice, level 3 thematic strategies and collaborative efforts have been implemented to ensure the support for the sector's evidence needs.

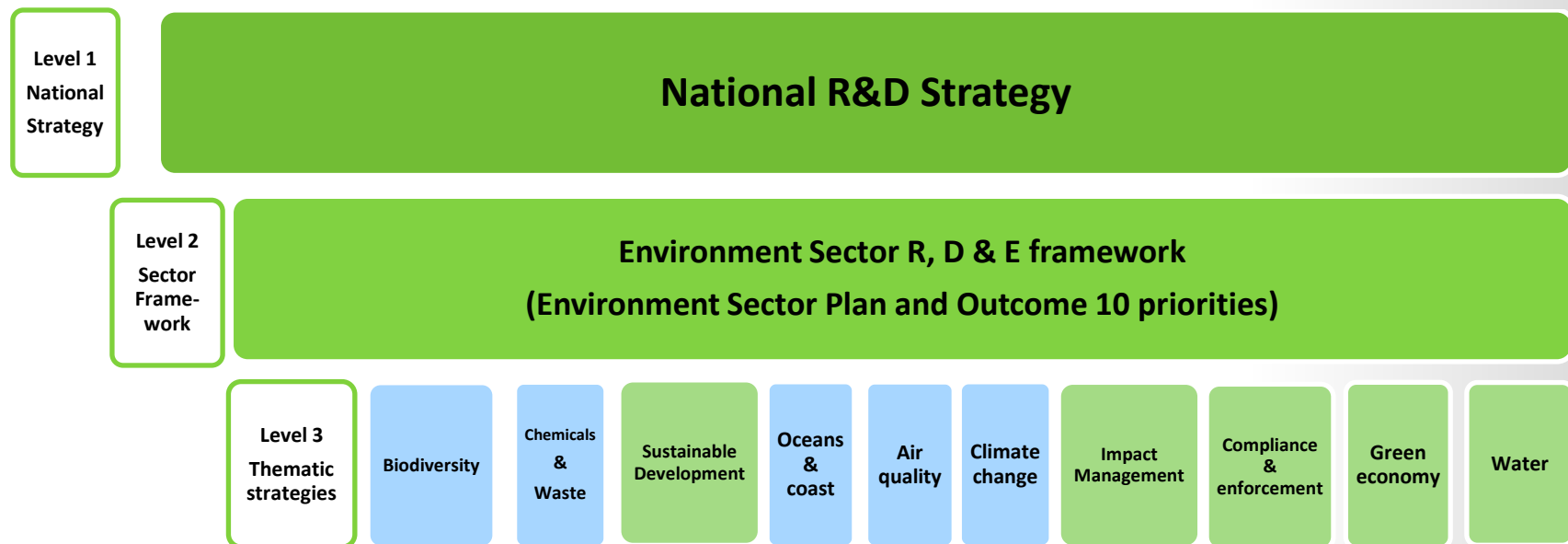


Figure 2: Environment Sector R, D & E strategic context and themes

3. GENERIC POLICY AND RESEARCH CYCLES

This framework aims to among others improve the science-policy interface as one of the important elements for evidence gathering. It is understood that two life cycles exist that require interface i.e. policy life cycle and research cycle. Scientific findings are one example of a range of sources of evidence and influencing factors that shape policy-makers' decisions and actions. It is important that scientists and researchers understand the decision-making process as it links to policy-making, how evidence can feed into the process and what barriers exist to the uptake of evidence. Conversely, it is also crucial that policy-makers make an effort to understand the complexities of the scientific process and how it differs from the policy process, to be able to engage with scientists and researchers more effectively. Evidence is necessary throughout the policy life cycle i.e. recognition, formulation, implementation and control (Figure 3). It is therefore crucial that in line with the research cycle (Figure 4) from diagnosing to reporting, evidence is accessible for policy cycle.

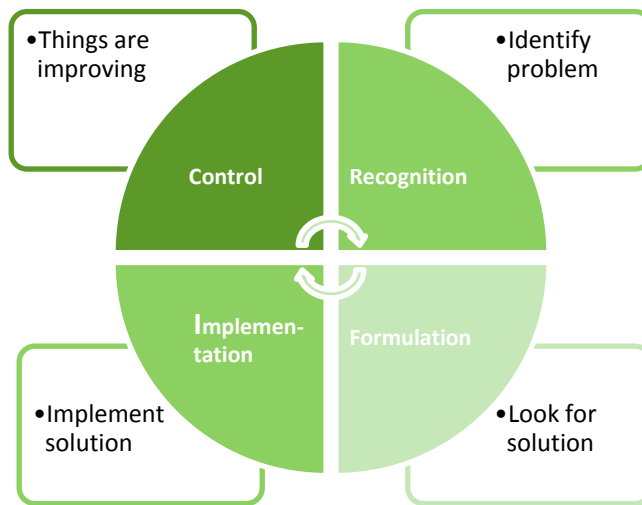


Figure 3: Generic policy cycle



Figure 4: Generic research cycle

According to Godfrey *et al.* (2010), in South Africa a gap exists between the scientific research community and the policy-making community, due to a number of underlying reasons. This gap often results in a 'push of evidence' by researchers to policy-makers, with a hope that policy-makers will take up these findings and use them in policy identification, formulation or implementation processes. The study conducted by Godfrey *et al.* (2010) on research dissemination and uptake in South Africa found that researchers at universities and science councils often feel frustrated when conducting research for government departments because they are not given feedback about what happens to their research outputs once these have been completed and submitted. Policy-makers and researchers need to work more closely together by means of established, regular and trusting interaction and dialogue. The evidence based development of a new policy for elephant management is one of the successful interventions the sector implemented in response to these frustrations (Box 1).

Box 1: Towards a new elephant management policy for South Africa 1995 – 2008 (SANParks 2008)

This SANParks publication is a synthesis of the processes followed and outcomes achieved over the last 12 years in addressing elephant management at Kruger National Park. Key interventions were conducted demonstrating the implementation of science-policy practice. Firstly, the interactions between the elephant management policy, its context, the stakeholders, their issues and concerns, suggested management options, and their potential implications were mapped. Secondly the role players were identified. Among others, scientists were identified as both stakeholders in the debate and providers of knowledge informing value-based decision-making in consultative processes during policy review. The process further recognised that decisions about environmental problems involve both knowledge and values, and it is not only scientists who have knowledge. A participatory management philosophy recognised that “everybody has a piece of the wisdom” we need. Not only do stakeholders have a right to be involved in decisions which affect them, their involvement can lead to policies and decisions that are wiser, fairer, more efficient and more competent.

It was recognised that an effective consultative policy review approach rests on principles including that:

- All views and perspectives count. Solutions are developed through discussions with all stakeholders.
- Science provides information. Science alone cannot provide the answers.
- Management must be adapted to the context of the problem, considering interrelated problems and externalities.
- Decision-making must be discursive and deliberative. Participants engage in open, honest and respectful discussion aimed at mutual learning and understanding others' perspectives. Avoid unproductive, yet common, tactics such as lobbying authorities about a particular point of view, polling opinions across stakeholder sectors without due recognition of proportional representation, and debating to win the argument rather than listening to understand it.
- Understand the past but build the future.

The development of this policy occurred in three phases. Beginning in 1996, it involved extensive consultation with stakeholders from all walks of life and included a range of events, forums, media, round table and opportunities for participation, culminating in the publication of National Norms and Standards for Elephant Management in February 2008.

4. APPROACH TO RESEARCH, DEVELOPMENT AND EVIDENCE

This chapter outlines the practical common implementation of the R, D & E framework that should happen at thematic strategies level 3 (see Figure 2). Improvements in the way the environment sector scopes, procures, assembles and interprets evidence in thematic strategies will lead to improvements in the quality and effectiveness of policy-making. The steps for more effective evidence-based policy-making are identified in Figure 5 below to address short and long term evidence needs. Starting with the point where there are (1) **policy issues** (as covered in Outcome 10, Sector Plan and environment outlook) to be addressed. In this space, evidence providers and policy makers **jointly scope** the questions. For the sector to be able to reach (4) **policy options** (as reviewed in Outcome 10, Sector Plan and environment outlook). In this space, the evidence providers and policy makers **jointly interpret** the results to inform policy options. For short-term evidence needs, the sector will assemble the **existing & emerging** evidence whilst for long-term evidence needs, sector will procure **new** evidence.

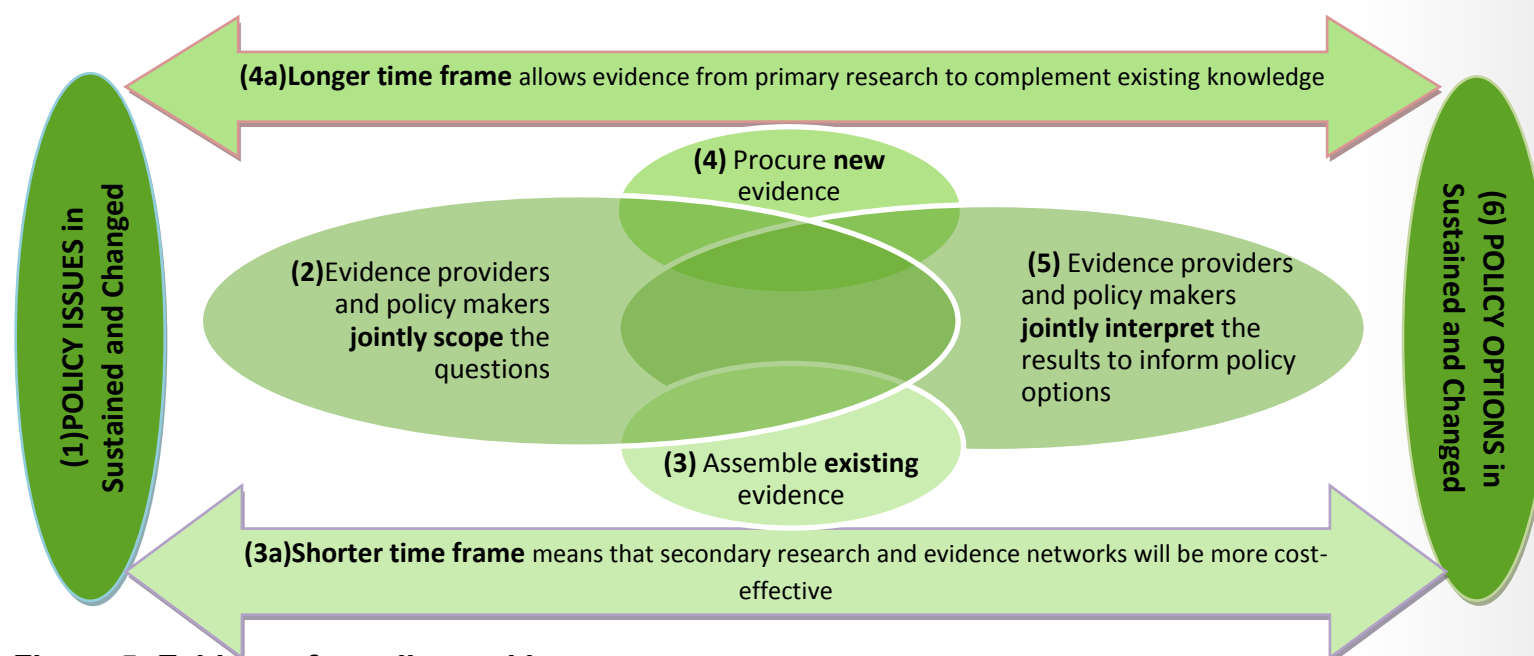


Figure 5: Evidence for policy-making (adapted from Defra, 2007)

4.1 Framing questions

Strengthened knowledge about interactions between people and the environment at all scales, based on the best-available scientific research and data, can be achieved by improving knowledge infrastructure and capacities, promoting interoperability of data systems and tools, and information networking, particularly in developing regions (UNEP, 2007). In order to ensure the approach is focused appropriately on supporting the sector's policy goals, it is necessary to address priority evidence needs and to make maximum use of collaboration with other research providers both within and external to government. To ensure high-level support for thematic strategies, the national sector research, development and evidence stakeholder forum will be established for policy makers and researchers to encourage the early involvement of in-house and outside researchers in the policy-making process. This will also help researchers to better understand the sort of research questions that they need answered and for policy makers to understand the value of evidence in their policy-making processes and to bridge the gap that currently exist between researchers and policy makers. At the forum various policy-makers, stakeholders and researcher will identify and determine the policy relevant evidence that will be needed. The questions are therefore framed directly from the Environment Sector Plan, Outcome 10 and environment outlook priorities. These policy priorities guide what research is to be assembled (short term) and procured (long term).

4.2 Interpretation and policy-making

Knowledge brokering is necessary at this stage to assemble research findings; analysing and synthesising sources of evidence; identifying gaps in the knowledge base; and working directly with appropriate policy makers to translate, interpret and evaluate evidence in the context of Environment Sector Plan, Outcome 10 and environment outlook. A number of knowledge products and knowledge exchange events will be commissioned to facilitate the production of useful, policy-relevant knowledge in a timely, in the right format and effective fashion. These range from facilitation of theme-based interventions to primers on the current state of evidence on a particular or interdisciplinary policy issue. Within the context of research, development and evidence framework, provisions will be made to allow dedicated ongoing analysis of

trends. A variety of activities including seminars, research, networking, engagement and surveillance will be put in place to allow effective horizon scanning.

4.3 Environment sector priorities that inform evidence needs

Through the five-year environment outlook, the state of environment is reported to inform on improvement or degradation of the South African environment relative to its desired state as defined in Section 24 of the Constitution. Environmental issues arising from the State of Environment Report stimulate new research as well as setting the agenda for the sector through Outcome 10 and Sector Plan priorities. Hence, it is through the interactions between the Outcome 10, the Sector Plan and the priorities identified in the environment outlook that new targets are set and sector evidence-based policy-making is enhanced (Figure 6).

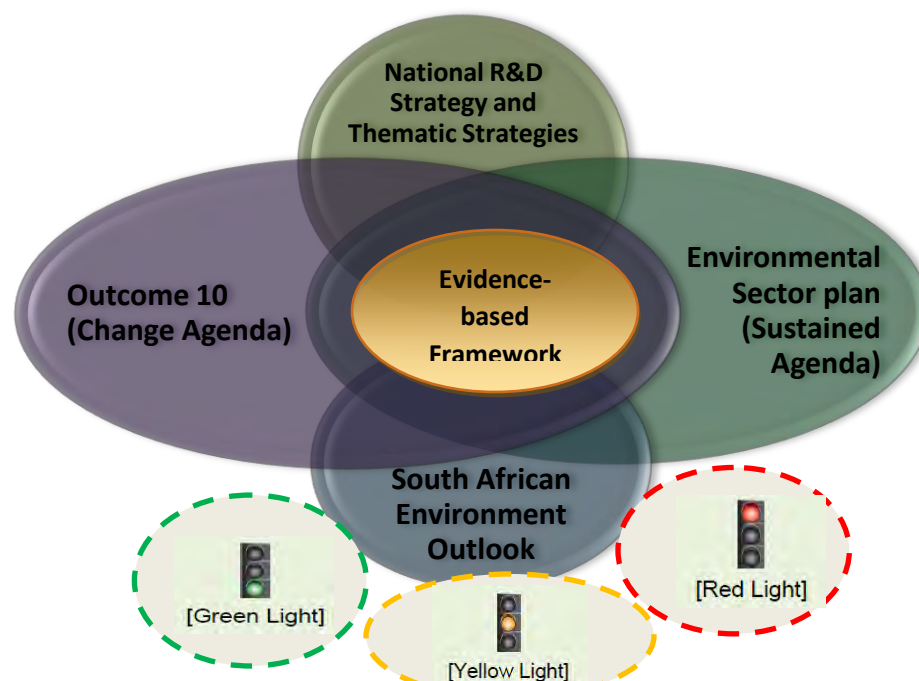


Figure 6: Linking the South African Environment Outlook with environment sector R, D&E priorities

Table 1 unpacks the dependencies and interactions between the Outcome 10, the Sector Plan and the priorities identified in the environment outlook by tabulating evidence needs and research priorities according to the chief compartments of the Environment Sector Plan, viz. air quality management, biodiversity conservation, climate change, marine and coastal management and waste management. Environment sector cross-cutting issues are also detailed. These evidence needs and research priorities have been set with a view of ensuring evidence generation over short and longer terms.

Table 1 uses the robot system for rating the environmental outlook:



Green light = environmental issues which are being well managed, or for which there have been significant improvements in management but for which the sector should remain vigilant.



Yellow light = environmental issues which remain a challenge but for which management is improving, or for which current state is uncertain, or which have been well managed in the past but are less so now.



Red light = environmental issues which are not well managed, are in a bad or worsening state, and which require urgent attention.

Table 1:. Outcome 10, Sector Plan and environment outlook priorities informing evidence needs

ENVIRONMENT SECTOR EVIDENCE NEEDS (RESEARCH PRIORITIES)					
ENVIRONMENT SECTOR PLAN	OUTCOME 10	ENVIRONMENT OUTLOOK			
		Focus area	 [Green Light]	 [Yellow Light]	 [Red Light]
Air Quality Management To continue to provide leadership and coordination of government's approach to large, complex and cross-sectoral environmental issues – specifically: responding to climate change and championing sustainable development	Output 2: Reduced greenhouse gas emissions, climate change & improved air / atmospheric quality Reduction of emission of CO₂; reduction of atmospheric pollutants; renewable energy deployment; adapting to the impacts of climate change; energy efficiency Output 4: Protected biodiversity Expansion of the conservation estate; reduced climate change impacts on biodiversity; protected ecosystem & species ; valuing the ecosystem services; protection of agricultural land	Climate change (Link to Outcome 10 output 2 & 4)		• Slow increase of the use of renewable energy	• Increased concentration of greenhouse gases • Very high energy intensity • Low energy efficiency • Reliance on burning coal • Changes in the distribution and availability of water will cause changes in the patterns of agriculture. • Increased health threats including the spread of malaria • Shifts in habitats of plants and animals • Land degradation- lead to reduced agricultural productivity, subsistence livelihoods, and biodiversity • Sea level rise
Conservation and Sustainable Use of Biodiversity	Output 1: Enhanced quality and quantity of water resources: water demand; water resource protection; regulation of water quality	Loss of biodiversity and ecosystem functioning (Link to Outcome 10 output 1, 3 & 4)		• Slowing of habitat loss and habitat degradation • Increased programmes to rehabilitate ecosystems	• River and marine ecosystems • Increased numbers of species listed as endangered or vulnerable • Land degradation and desertification • Increasing rate of spread of alien invasive plants • Declining biodiversity and

ENVIRONMENT SECTOR EVIDENCE NEEDS (RESEARCH PRIORITIES)					
ENVIRONMENT SECTOR PLAN	OUTCOME 10	ENVIRONMENT OUTLOOK			
		Focus area	 [Green Light]	 [Yellow Light]	 [Red Light]
	Output 3: Sustainable environmental management Restoration & rehabilitation of degraded ecosystems; deforestation & forest management; less and better managed waste; management of environmental impacts from mining and related activities; sustainable land use management Output 4: Protected biodiversity Expansion of the conservation estate; reduced climate change impacts on biodiversity; protected ecosystem & species ; valuing the ecosystem services; protection of agricultural land				ecosystem health • Destroyed or converted wetlands • Poor state of health and declining estuaries • Over-harvesting of indigenous plants • Less than 6.5% of land in South Africa is formally protected
To increase the effectiveness of the implementation of its own sectoral mandates within the context of new and evolving regulatory frameworks and capacity constraints	Cross-cutting Environmental crimes; Environmental Management Inspectorate; Implementation of National Strategy for Sustainable Development and Action Plan; scaling up environmental education, awareness and voluntary activism; scaling up expansion and implementation of environmental sector EPWP	Environmental governance (Link to Outcome 10 cross cutting output)	• National Strategy for Sustainable Development approved by Cabinet • Increasing role of South Africa in international environmental Governance	• Legal and policy framework continuously strengthened since 1994 • Improving access to environmental information	• Small environmental management budgets (less than one half a percent of the total provincial budget) • High staff turnover and vacancy rates

ENVIRONMENT SECTOR EVIDENCE NEEDS (RESEARCH PRIORITIES)

ENVIRONMENT SECTOR PLAN	OUTCOME 10	ENVIRONMENT OUTLOOK			
		Focus area	 [Green Light]	 [Yellow Light]	 [Red Light]
To continue to provide leadership and coordination of government's approach to large, complex and cross-sectoral environmental issues – specifically: responding to climate change and championing sustainable development	Output 3 : Sustainable environmental management Restoration & rehabilitation of degraded ecosystems; deforestation & forest management; less and better managed waste; management of environmental impacts from mining and related activities; sustainable land use management Output 4: Protected biodiversity Expansion of the conservation estate; reduced climate change impacts on biodiversity; protected ecosystem & species ; valuing the ecosystem services; protection of agricultural land	Land (Link to Output 3 & 4)		Impacts of climate change on food productivity	- Severe land degradation is seen to be especially in communal areas - Densities of livestock in all provinces exceed the veld's long-term grazing capacity - Soil erosion
Marine and Coastal Management	Output 3: Sustainable environmental management Restoration & rehabilitation of degraded ecosystems; deforestation & forest management; Less and better managed waste; management of environmental impacts from mining and related activities; sustainable land use management	Marine and coastal resources (Link to outcome 10 Output 3 & 4)	- Sardine fishery recovering after a near collapse in the late 1960s - Increasing Blue Flag beaches		- West coast marine systems in very poor condition - Sustainability of the fishery threatened e.g. abalone and line fish - Increased uncontrolled coastal development - Increased wastewater discharge into marine and coastal waters

ENVIRONMENT SECTOR EVIDENCE NEEDS (RESEARCH PRIORITIES)					
ENVIRONMENT SECTOR PLAN	OUTCOME 10	ENVIRONMENT OUTLOOK			
		Focus area	 [Green Light]	 [Yellow Light]	 [Red Light]
	Output 4: Protected biodiversity Expansion of the conservation estate; reduced climate change impacts on biodiversity; protected ecosystem & species ; valuing the ecosystem services; protection of agricultural land				
Air Quality Management	Output 2: Reduced greenhouse gas emissions, climate change & improved air / atmospheric quality Reduction of emission of CO ₂ ; Reduction of atmospheric pollutants; renewable energy deployment; adapting to the impacts of climate change; energy efficiency	Atmosphere (Link to Outcome 10 output 2)	Decreased use of ozone-depleting substances since 1990	Unknown concentrations of Persistent Organic Pollutants	- Decreasing air quality with high sulphur dioxide and particulate matter (PM₁₀) levels - Increasing health problems due to air pollution - Increasing vehicle exhaust emissions
To pursue and explore the concept of green jobs, promote green economy and create decent work and sustainable livelihoods	Output 3: Sustainable environmental management Restoration & rehabilitation of degraded ecosystems; deforestation & forest management; less and better managed waste; management of environmental impacts from mining and related activities; sustainable land use management	Human settlements (Link to Outcome 10 output 3)			- Almost 60% of the population does not receive regular waste collection - Households lacking access to good basic services increased

ENVIRONMENT SECTOR EVIDENCE NEEDS (RESEARCH PRIORITIES)

ENVIRONMENT SECTOR PLAN	OUTCOME 10	ENVIRONMENT OUTLOOK			
		Focus area	 [Green Light]	 [Yellow Light]	 [Red Light]
Waste and Chemicals Management	Output 3: Sustainable environmental management Restoration & rehabilitation of degraded ecosystems; deforestation & forest management; less and better managed waste; management of environmental impacts from mining and related activities; sustainable land use management	Waste (Link to Outcome 10 output 3)			- Many waste sites do not have the required licenses - Recycling - Sustainable consumption and production
To continue to provide leadership and coordination of government's approach to large, complex and cross-sectoral environmental issues – specifically: responding to climate change and championing sustainable development	Output 2: Reduced greenhouse gas emissions, climate change & improved air / atmospheric quality Reduction of emission of CO ₂ ; reduction of atmospheric pollutants; renewable energy deployment; adapting to the impacts of climate change; energy efficiency Output 4: Protected biodiversity Expansion of the conservation estate; reduced climate change impacts on biodiversity; protected ecosystem & species ; valuing the ecosystem services; protection of agricultural land	Human vulnerability (Link to Outcome 10 output 2 & 4)		- Improved early warning system through vulnerability assessments - Decreased Human Development Index	- Increased human poverty index - Increasing variability in the climate, declining air and water quality, degraded land, and declining natural resources due to over exploitation - Poverty, food insecurity, inadequate access to services, unemployment, HIV and AIDS, and low levels of social capital

ENVIRONMENT SECTOR EVIDENCE NEEDS (RESEARCH PRIORITIES)					
ENVIRONMENT SECTOR PLAN	OUTCOME 10	ENVIRONMENT OUTLOOK			
		Focus area	 [Green Light]	 [Yellow Light]	 [Red Light]
CROSS-CUTTING					
To increase the effectiveness of the implementation of its own sectoral mandates within the context of new and evolving regulatory frameworks and capacity constraints	Cross-cutting Environmental crimes; Environmental Management Inspectorate	Implementation and Enforcement (Link to Outcome 10 cross cutting)		• Training of Environmental Management Inspectors (the 'Green Scorpions') • Improving enforcement of environmental management legislation • Improve the capacity within regulatory authorities to effectively manage, implement and review EIA regulations	• Reestablishment of Environmental courts or dedicated time • Attention to monitoring, evaluating, and reporting
	Cross-cutting Implementation of National Strategy for Sustainable Development and Action Plan;	Accessible and consistent information (Link to Outcome 10 cross cutting)	• Published set of environmental indicators	• Gaps in environmental data	• No adequate data on land cover, fine-scale spatial information on habitat degradation, and some aspects of water quality, air quality, and carbon emissions • No reliable data on genetically modified organisms, human vulnerability, or

ENVIRONMENT SECTOR EVIDENCE NEEDS (RESEARCH PRIORITIES)					
ENVIRONMENT SECTOR PLAN	OUTCOME 10	ENVIRONMENT OUTLOOK			
		Focus area	 [Green Light]	 [Yellow Light]	 [Red Light]
					groundwater use and recharge - Limited knowledge of some aspects of biodiversity - Monitoring carried out at irregular intervals
	Cross-cutting Scaling up environmental education, awareness and voluntary activism;	Increased local government capacity (Link to Outcome 10 cross cutting)		Trained and deployed community development workers	- Skills or resources to integrate environmental considerations into development planning - High turnover of staff in municipalities and high levels of outsourcing
	Cross-cutting Implementation of National Strategy for Sustainable Development and Action Plan	Joint responsibility (Link to Outcome 10 cross cutting)		Socially Responsible Investment Index launched on the Johannesburg Stock Exchange	- Sustainable development as a shared responsibility- government, civil society, industry, and business - Behaviour change to promote a more sustainable South Africa

4.4 Environment sector knowledge management system

The Department of Environmental Affairs through the dedicated Directorate resources, supported by Communications and IT units, will establish various measures to enhance sector knowledge sharing, including development of a database and links, establishment of virtual teams, circulation of regular environmental scans and other measures. Through DEA, a central knowledge management system (web-based data system) will be developed to help facilitate and improve interactions among sector key stakeholders from science and policy domains. The system will ideally serve as a knowledge base that would make it possible to share evidence outputs, track evidence record of a policy output and key documents of the policy process where possible.

The access to the system will be controlled and vary through intranet (internal) and internet (external) options. The web-based data system will have links to other research portals that support the sector research e.g. SANBI, SANPARKS, NRF, CSIR, universities, institutions & RIMS. It should be noted that only links to such websites will be provided to guide researchers and policy-makers towards other sources of evidence and that there will not be an interactive functionality between such websites and the environment sector web-based data system.

According to Godfrey *et al.* (2010), the sector web-based data system will provide and assist with the following functions:

- Assist users to become familiar with the policy-makers and the policy-making process, thus enhancing relevant evidence generation while minimizing duplication.
- Alert researchers as to what policy issues are coming over the policy horizon – new potential research questions, unexpected or even anticipated policy windows.
- Researchers to ask appropriate research questions (strategic, short- and long-term questions) help to facilitate links between scientists and policy-makers.
- Make sure that evidence (completed research) is available if rapidly sought by the policymaker (evidence 'store' or archive)
- Facilitate translation of science for policy/society – thereby packaging new ideas in familiar theory or narratives, often interpreting very technical research for non-specialist policy-makers.

- Drive and oversee research from within government departments, and
- Consider and help facilitate policy alignment around important changes in scientific thought.

4.5 Consideration for copyrights and intellectual property rights

In establishing the environment sector knowledge management system, careful consideration will be taken for compliance with copyrights and intellectual property rights. According to the Publicly Financed Research and Development Act No. 51 of 2008, intellectual property is “any creation of the mind that is capable of being protected by law from use by any other person, whether in terms of South African law or foreign intellectual property law, and includes any rights in such creation, but it excludes copyrighted works such as a thesis, dissertation, article, handbook or publication which, in the ordinary course of business, is associated with conventional academic work”. The objective of the Act is to make provision that intellectual property emanating from publicly financed research and development is identified, protected, utilised and commercialised for the benefit of the people of the Republic, whether it be for a social, economic, environmental or any other benefit. It further seeks to ensure that a recipient of funding from a funding agency assesses record and reports on the benefit for society of publicly financed research and development (Presidency, 2008).

4.6 Enabling collaborations, partnerships and institutional arrangements

In relation to the national system of innovation, the sector has collaborations, partnerships and memberships with various institutions in various forms. As illustrated by the examples shown in Figure 7, the spectrum of these relations spans across all major sectors of society from government over commerce and industry to science and technology institutions, which underpins the importance of supporting evidence-based policy-making.

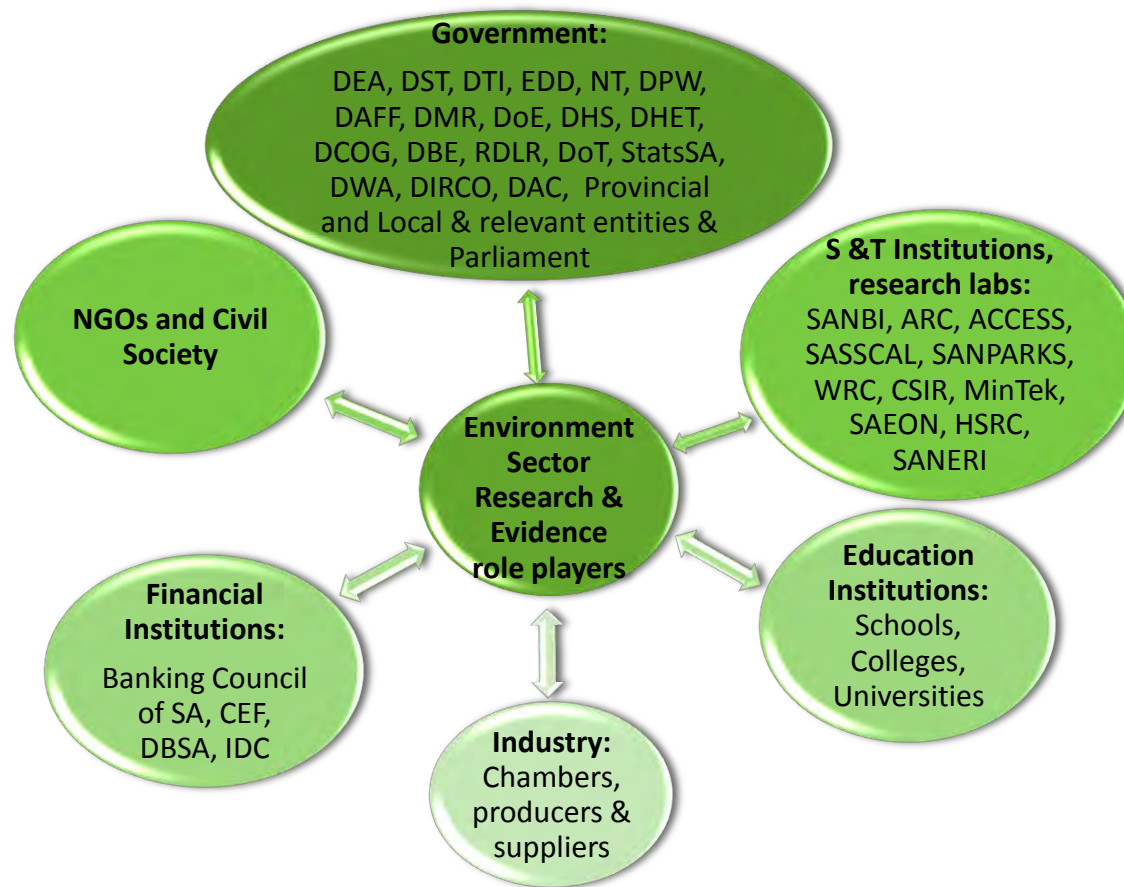


Figure 7: Environment sector evidence and policy-making role players

Some departments have directorates dedicated to R&D management while others have these activities spread across different sections within the same department (HSRC, 2011). The sector will establish an institutional structure to support implementation of this common framework. Structures in a form of fora will be established to support internal, intergovernmental and multi-sectoral stakeholders (Figure 8).

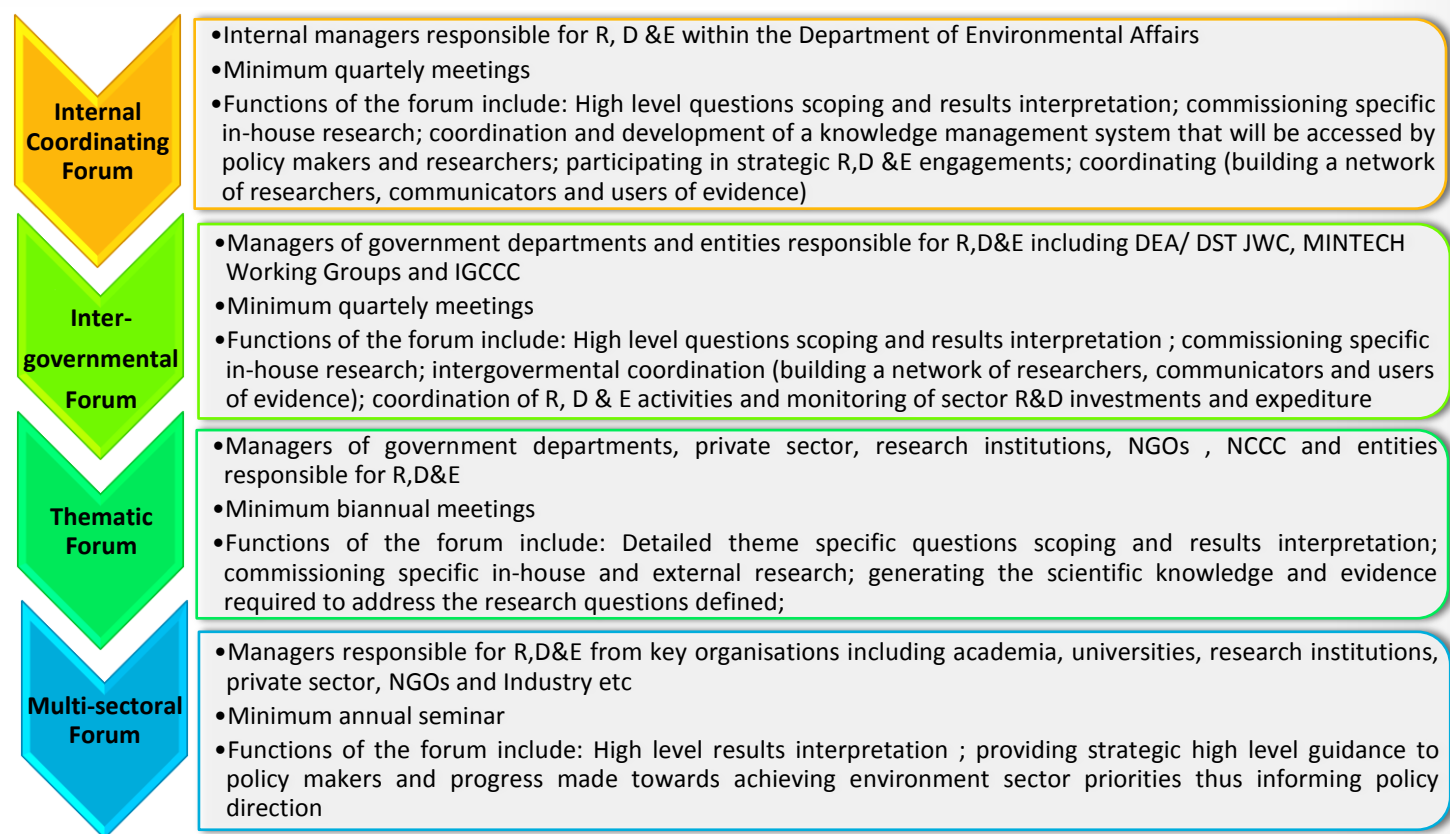


Figure 8: Institutional structures to support framework implementation

South Africa is a party or member to some of the global knowledge structures (Table 2). These structures contribute to the evidence base generation that can be available for policy-making in the environment sector.

Locally, the knowledge can be strengthened through the establishment of networks, research chairs and centres of excellence within the identified areas.

Table 2: Joint governance of knowledge (Adapted from Rennkamp, 2009)

	International Organization	International Regimes	Club Governance	Global Funds	Regional Integration	Research Networks	Interregional Cooperation
Explicit STI Policy	UNESCO	WTO - TRIPS	G8/O5	UNFSCTD	EU	ICSU	IBSA
	UNCTAD		Carnegie		AMCOST	IUCN	Trilateral Commission for S & T
	UNSTD		Group		SAMCOST	UNU	
	WIPO		OECD		ASEAN S & T Network	IAC	G77 Consortium on STI
			Global Science Forum		ERA	GRA UNEP-IRP	
Implicit STI Policy	UNIDO	UN Conventions	G20 planned STI Cooperation	GEF GFATM		CGIAR	AKP Dialogue on IPR
	ECOSOC	UNCSD				HFSP	
	WHO	UNCBD					
	IEA	UNDESA					
	IPCC	UNFCCC	Gleneagles Dialogue				
		UNCCD					

5. HUMAN CAPITAL

Government and private sector initiates a number of policies and interventions to facilitate sector skills. The National Skills Development Strategy (NSDS) III considered the need for development of environmental skills. The Environmental Sector Skills Plan (ESSP) – the first of its kind in South Africa – describes the current status quo with regard to demand and supply of environmental skills, and provides the best available information on scarce and critical skills in the sector from a supply and demand perspective. Initiatives are proposed in the ESSP to address sector skills planning.

The Human Capital Development Strategy (HCD) focuses on the system of skills development and proposes interventions to ensure a more sustainable skills development context for the environment sector. It addresses skills needs at high, intermediate and entry occupation level, and addresses priorities identified in the Environmental Sector Skills Plan within a framework of priorities identified for implementation outlined for the Environment Sector Plan. According to the ESSP the following scarce skills are identified to be included in the Department of Labour's scarce skills list for 2010/11/12: climate change risk assessors/long-range modellers, environmental science technicians, environmental scientists (including natural resource management scientists), hydrologists, policy specialists, scientists, and R&D specialists.

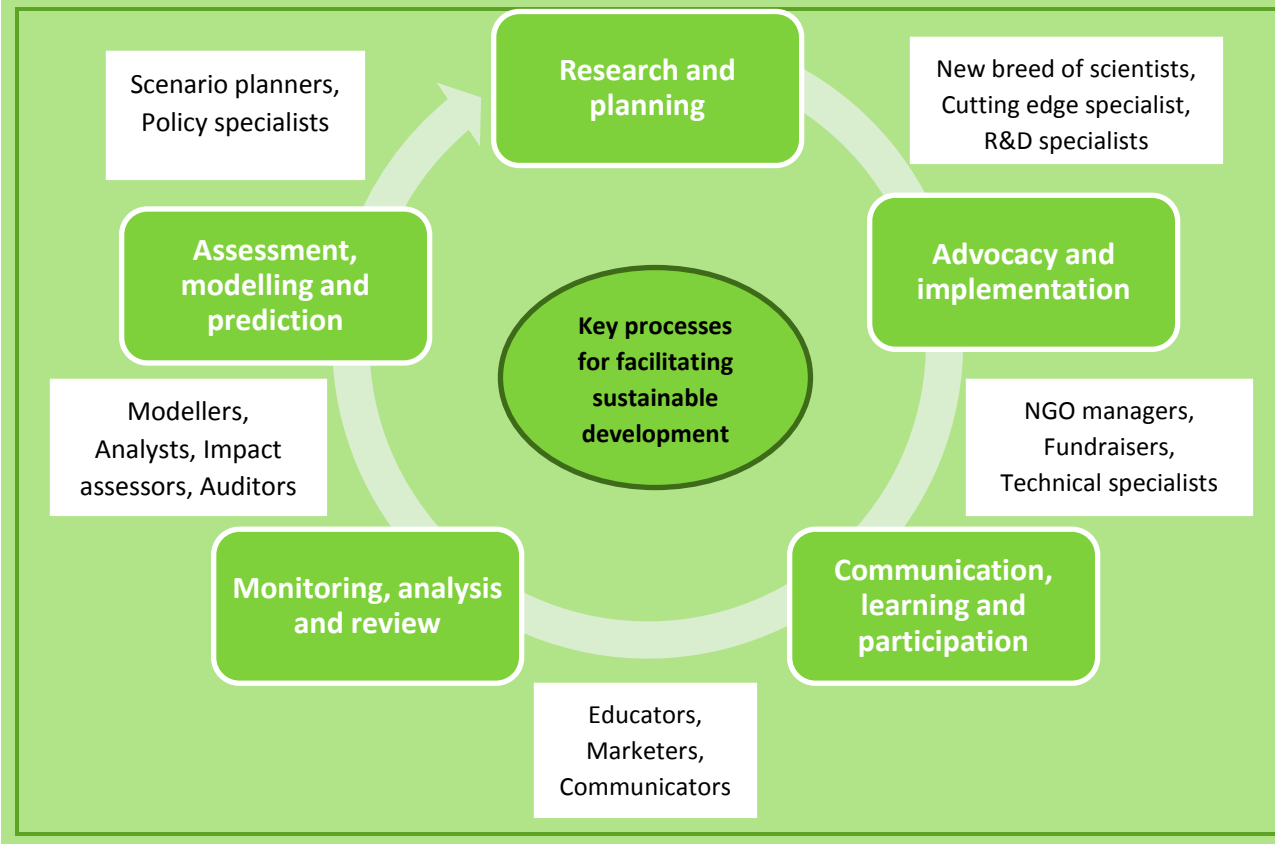
The HCD strategy for the biodiversity sector was finalised in 2011 with the 20-year horizon. The HCD strategy addresses attraction, up-skilling and retention, and reaches across from schooling through higher education institutions into the workplace. This R, D & E framework will therefore be supported by the skills initiatives through the ESSP and the HCD. To foster an effective framework, a variety of instruments will be used including the use of knowledge brokering, research networks, centres of excellence and collaborations.

An example of the importance of skills planning for thematic areas is given in Box 2 illustrating the full sustainable development value chain and associated skills needs (DEA, 2010).

Box 2: Full sustainable development value chain

A pro-active approach to sustainable development in South Africa requires that the *full sustainable development value chain* be considered in skills planning, at macro- and at micro-institutional level. If the system lacks modellers, it will be difficult to predict impact, thus affecting planning and policy efficacy. As shown in the diagram, skills for the sustainable development value chain include: policy and planning skills; advocacy and critical implementation skills; communication learning and participation skills to build community and business resilience and participation; monitoring, analysis, impact management and review skills; assessment modelling and prediction skills. These skills involve a range of occupational categories including scenario planners, policy specialists, scientists, R&D specialists, policy specialists, scientists, R&D specialists, NGO managers, fundraisers, technical specialists, educators, marketers, communicators, modellers, analysts, impact assessors, auditors.

Sustainable Development processes & system and future global workers



6. FINANCE

Research & Development in South Africa is funded by government, private sector, donors, not for profit organisations and foreign sources. According to the HSRC (2011), government total in-house R&D expenditure was R1.1 billion, while science councils spent R3.1 billion in the 2008/9 financial year (Annexure 2a). Out of these total expenditures, R 83 429 000 (government) and R 173 945 000 (science councils) was for environmental knowledge generation (Annexure 2b). Overall in 2009, South Africa's total (public and private sector) expenditure on R&D amounted to approximately 0.7% (government 0.29%) of GDP whereas the average OECD country expenditure was 2.15% of GDP. According to the DST (2011) budget vote, a total of R4.4 billion is allocated to boost R&D in South Africa for the 2011/12 financial year. About 58% of the 4.4 billion is shared amongst the seven public entities reporting to DST.

The DST established a national science and technology (S&T) expenditure plan as envisaged in the White Paper on Science and Technology. The national S&T expenditure plan is a means of reporting projected and actual national expenditure on scientific and technological activities (STAs) over the MTEF. The plan provides information on expenditure levels and trends per government, entities, private sector and other relevant institutions. Explicit identification of STAs and their linkage to national development objectives is therefore necessary to enhance the monitoring and evaluation of such expenditures. Assessing the socioeconomic impacts of public R&D is crucial in order to evaluate the efficiency of public spending, assess its contribution to achieving social and economic objectives and enhance public accountability (OECD, 2008).

The DST is responsible for overall strategic research and development in South Africa. Furthermore it is also responsible for promoting R&D for the effective application of science and technology in meeting local challenges. The environment sector framework therefore outlines specific sector activities that contribute to the overall national R&D goals. Most government departments fund research and development in universities, entities and research institutes. The following are some examples of research funding links.

- (a) National Research Foundation:** Research funding is directed mainly at academic research, the development of high-level human resources and supporting the country's National Research Facilities. It offers funding opportunities for students, researchers and staff at higher education institutions; scientists involved in bilateral and multilateral joint research projects; private individuals and science councils. The NRF disburses funds from a variety of sources including Parliamentary grants and various government departments such as Science & Technology; Labour; Trade & Industry; and Environmental Affairs.
- (b) South African National Biodiversity Institute:** SANBI is supported by the Department of Environmental Affairs and the UN Framework Convention on Climate Change (UNFCCC) Adaptation Fund to champion the exploration, conservation, sustainable use, appreciation and enjoyment of South Africa's exceptionally rich biodiversity diversity for all people; improve society's ability to adapt and cope with the risks posed by climate change; monitor and report regularly the status of the country's biodiversity.
- (c) Council for Scientific and Industrial Research:** The CSIR is a para-statal science council focusing on multidisciplinary research, technological innovation, and industrial and scientific research. CSIR receives an annual grant from Parliament, through the DST, which accounts for close to 40% of its total income. The remainder is generated from research contracts with government departments at national, provincial and municipal levels, the private sector and research funding agencies in South Africa and abroad.
- (d) Water Research Council:** The WRC was established to promote the country's water research. It is funded through the Water Research Fund that was established by the Water Research Act to play its roles in promoting co-ordination, co-operation and communication in the area of water research and development; establishing water research needs and priorities; stimulating and funding water research according to priority; promoting effective transfer of information and technology; enhancing knowledge and capacity-building within the water sector.

- (e) South African National Parks:** SANParks is an important facilitator of research in and around the National Parks. It receives grants from the government and donor funders to provide ethical and professional services relating to capture, holding, translocation and research pertaining to wildlife.
- (f) Agricultural Research Council:** It is the premier national research body responsible for the technological needs in support of production, disaster management. It is supported through a core budgetary allocation from the parliamentary grant to: maintain adequate competencies (human and infrastructural) required for the competitiveness of the sector nationally, regionally and to support government development agenda as defined from time to time.
- (g) South African Environmental Observation Network:** Funded by NRF through the DST, its vision is to establish a South African observation and research facility that provides understanding, based on long-term information, needed to address environmental issues. The core of SAEON is to create a framework that permits collection, transmission and interpretation of data on long term ecological changes, new understanding brought about through SAEON will inform suitable policies and appropriate procedures (actions) for dealing with the inevitability of environmental change and its consequences for the livelihoods of South Africa's people.

This framework and strategic thematic strategies will therefore be financed through the existing budget funding structures. It is expected that the framework will encourage a platform to share and use existing evidence prior to procuring new evidence. Thus there is a possible opportunity to use the already allocated costs effectively and efficiently eventually allowing existing R&D funds to be directed to other unique evidence needs.

7. MONITORING AND EVALUATION OF SECTOR R, D & E FRAMEWORK

The R, D & E framework will be monitored through the progress made in the achievement of the five aims (shown in Annexure 1) identified to address the Outcome 10 delivery agreement and Environment Sector Plan priorities. Progress will be monitored through the implementation plan (Annexure 1) that will be reviewed annually. The framework itself will be reviewed in line with Government's Medium Term Strategic Framework and environment sector priorities as informed by the progress in the science-policy interface and the South African environment outlook.

The evidence generated through the thematic strategies will inform the formulation of government planning and prioritisation through among others, the Medium Term Strategic Framework and National Strategy for Sustainable Development. The changes in the state of environment (South African environment outlook) will be used to evaluate the evidence use and policy impact. The sector science-policy networks and web-based data system performance will be assessed for enhancing the interface and knowledge management

8. CONCLUSION

The Environment Sector R, D & E framework highlights key areas that require joint evidence generation and interpretation. This framework guides the path to ensure that the environment sector resources are used efficiently and that they maximise the contribution obtained from R&D investment. The framework is to be implemented at the level 3 thematic strategies, where the use of existing evidence base is encouraged particularly when dealing with short-term policy decision while new evidence is procured for long term evidence needs. Furthermore, joint scoping and interpretation is encouraged to minimize research efforts that are commissioned in isolation. This Environment Sector R, D&E framework will be reviewed in line with Government's Medium Term Strategic Framework and environment sector priorities as informed by the progress in the science-policy interface and the South African environment outlook. While the Implementation Plan (Annexure 1) will be reviewed annually.

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ANNEXURE 1: ENVIRONMENT SECTOR R, D & E FRAMEWORK IMPLEMENTATION PLAN

This sector framework will be implemented in phases. In line with level 3 thematic strategies, a minimum of five areas are identified to initiate immediate implementation i.e. biodiversity, waste management, air quality, oceans & coast and climate change. These areas were selected based on the MOA between DEA and DST that identified these areas for initial implementation. It should be noted that although other thematic strategies are not identified for phase 1, activities will continue alongside phase 1 until the phase 2 and phase 3 are formally rolled out in subsequent years supported by the lessons from phase 1. The first five thematic areas of implementation are selected for the period of 2012 - 2013, as work is already initiated on the development of the research and development strategies by the respective stakeholders.

LEVEL 3 THEMATIC STRATEGIES

Phase 1 implementation

Biodiversity

Waste
Management

Climate Change

Oceans & Coast

Air Quality

Phase 2 and 3 implementation

Compliance and
Enforcement

Sustainable
Development

Impact
Management

Water

Green Economy

SECTOR R, D & E FRAMEWORK IMPLEMENTATION PLAN FOR, 2012 – 2014

CONTRIBUTION TO AIMS	PHASE 1 (2012 – 2013) ACTIONS & TIMEFRAMES	DEA CONTACT PERSON
Aim 1: To ensure science-policy interface for sustained (Sector Plan) and changed agenda (Outcome 10)	1. Environment Sector R, D & E Framework consultation, finalized, approved and begin implementation for Phase 1 by June 2012 Notes: Phase 2 (2012 – 2013) activities will continue alongside phase 1 until the themes are ready for development of theme specific evidence strategy implementation Phase 3 (2013 – 2014) activities will continue alongside phase 1 and phase 2 until the themes are ready for development of theme specific evidence strategy implementation	Ms Mapula Tshangela 012 310 3508 MTshangela@environment.gov.za
Aim 2: To improve sector's ability to identify priority evidence needs by working with others (National, provincial, local, private, civil society, NGOs, research institutions and academia)	2. Internal coordinating Forum meeting by June 2012 Notes: Internal members of themes in phase 1, phase 2 and phase 3 to be permanent part of the internal forum	Ms Thembelihle Ndukwana 012 310 3883 TNdukwana@environment.gov.za
	3. Intergovernmental coordinating Forum meeting Quarterly- Note R, D & E will form agenda item for JWC and relevant Working Groups. Notes: Intergovernmental members of themes in phase 1, phase 2 and phase 3 to be part of the internal forum	Ms Faith Phooko 012 310 3738 FPhooko@environment.gov.za
	4. Sector web-based data system a. Process initiated for the development by March 2012 with intranet phase implemented by March 2013. b. Process initiated for the development of internet-based system phase 2 by April 2013. c. Intranet and internet sector web-based data system fully functional by March 2014	Ms Mapula Tshangela 012 310 3508 MTshangela@environment.gov.za
Aim 5: To ensure that the sector has skills and effective processes for knowledge management, assembling and communicating evidence and sector priorities	5. Multi-stakeholder R, D & E Forum established and annual seminar held by December 2012	Ms Mapula Tshangela 012 310 3508 MTshangela@environment.gov.za
Aim 1: To ensure science-policy interface for	6. Biodiversity theme strategy: Evidence- based National Biodiversity Research, Development and Evidence Strategy and Action Plan a. Development process initiated by March 2012	Ms Wadzi Mandivenyi

CONTRIBUTION TO AIMS	PHASE 1 (2012 – 2013) ACTIONS & TIMEFRAMES	DEA CONTACT PERSON
sustained (Sector Plan) and changed agenda (Outcome 10) Aim 3: To ensure that all sector policies are based on a robust and broad understanding of relevant evidence	b. Consultations and finalization by March 2013 c. Theme specific science-policy interface initiatives and engagements by March 2013 d. Implementation initiated by March 2014	012 310 3395 WMandivenyi@environment.gov.za Prof John Donaldson 021 799 8771 J.Donaldson@sanbi.org.za
	7. Waste management theme strategy: Evidence- based National Waste Management Research, Development and Evidence Strategy and Action Plan a. Development process initiated by June 2012 b. Consultations and finalization by March 2013 c. Theme specific science-policy interface initiatives and engagements by March 2013 d. Implementation initiated by March 2014	Ms Thandeka Mandigora 012 310 3220 TMandigora@environment.gov.za
	8. Air quality strategy: Evidence- based National Air Quality Research, Development and Evidence Strategy and Action Plan a. Development process initiated by June 2012 b. Consultations and finalization by March 2013 c. Theme specific science-policy interface initiatives and engagements by March 2013 d. Implementation initiated by March 2014	Dr Patience Gwaze 012 395 1846 PGwaze@environment.gov.za Mr Jongikhaya Witi 012 310 3083 JWiti@environment.gov.za
	9. Climate change theme strategy: Evidence-based 3rd National Communication approach a. Development process initiated by June 2012 b. Consultations and finalization by March 2013 c. Theme specific science-policy interface initiatives and engagements by March 2013 d. Implementation initiated by March 2014	Dr Brian Mantlana 012 310 3296 BMantlana@environment.gov.za
	10. Climate change theme strategy: Adaptation, Risk and Vulnerability Atlas into practice a. Theme specific science-policy practice intervention activities identified and initiated by March 2013 b. Theme specific science-policy practice intervention activities initiated and implementation action by March 2014.	Dr. Sylvester Mpandeli 012 310 3587 SMpandeli@environment.gov.za
	11. Oceans and Coast Research, Development and Evidence Strategy and Action Plan a. Development process initiated by June 2012 b. Consultations and finalization by March 2013 c. Theme specific science-policy interface initiatives and engagements by March	Dr Ashley Johnson 021 402 3569 AJohnson@environment.gov.za

CONTRIBUTION TO AIMS	PHASE 1 (2012 – 2013) ACTIONS & TIMEFRAMES	DEA CONTACT PERSON
	2013 d. Implementation initiated by March 2014	
Aim 4: To align the sector's Research & Development investment with sector priorities and maximise the value of this investment	12. Sector implementation of DST S & T plan to ensure continuous reporting of projected and actual national expenditure on scientific and technological activities (STAs) over the MTEF a. Initiate linking of STAs activities to national development objectives, National Treasury and Finance units to enhance the monitoring and evaluation of such expenditures by March 2013 b. Participation on the sector R&D surveys to ensure compliance with DST (HSRC survey) and other requirement. c. On-going evaluation of expenditure trends on sector R & D and use this information to strengthen sector R & D on areas that support the mandate. d. On-going identification and communication of funding opportunities to support sector research and development	Ms Mapula Tshangela 012 310 3508 MTshangela@environment.gov.za
Aim 5: To ensure that the sector has skills and effective processes for knowledge management, assembling and communicating evidence and sector priorities	13. On-going implementation of skills initiatives through the ESSP and the HCD: a. Partnerships with the DST/NRF Global Change Grand Challenge National Research Programme to fund bursaries and to place graduates funded by NRF Global National Grand Challenge Scholarships. b. Establish an initiative to provide for, and strengthen Environmental Leadership Skills which includes giving attention to retention of environmental leadership skills in the sector. c. Support the development of skills programmes for the sector that address critical skills gaps identified across the sector	Mr Thomas Mathiba 012 310 3653 TMathiba@environment.gov.za

ANNEXURE 2A: R&D EXPENDITURE BY RESEARCH FIELD (2008/09)

MAIN RESEARCH FIELD	BUSINESS ENTERPRISE		GOVERNMENT		HIGHER EDUCATION		NOT-FOR PROFIT		SCIENCE COUNCILS		TOTALS	
	R'000	%	R'000	%	R'000	%	R'000	%	R'000	%	R'000	%
Division 1: National sciences, Technology & engineering	11 902 551	96.5	824 394	75.7	270 3975	65.9	72 019	27.6	291 6350	90.9	18 419 290	87.5
Mathematical sciences	183 255	1.5	20 704	1.8	151 880	3.6	1041	0.4	40 632	1.3	397 512	1.9
Physical sciences	655 898	5.3	45 804	4.0	135 002	3.2	0	0.0	115 737	3.7	952 441	4.5
Chemical sciences	859 041	7.0	17 009	1.5	136 528	3.3	0	0.0	44 271	1.4	1 056 848	5.0
Earth sciences	95 034	0.8	163 156	14.3	136 955	3.3	1012	0.4	167 463	5.3	563 619	2.7
Information, computer & communication	2412 430	19.6	22 191	1.9	125 413	3.0	1555	0.6	201 731	6.4	27 633 20	13.1
Applied sciences and technologies	1671 375	13.6	15 852	1.4	78 904	1.9	0	0.0	139 267	4.4	1 905 397	9.1
Engineering sciences	3 908 347	31.7	11 487	1.0	352 114	8.4	0	0.0	863 084	27.5	5 135 032	24.4
Biological sciences	162 776	1.3	125 152	11.0	282 280	6.7	2126	0.9	171 810	5.5	744 144	3.5
Agricultural sciences	293 357	2.4	200 598	17.6	192 265	4.6	19 426	8.1	442 060	14.1	1 147 706	5.5
Medical and health sciences	1 509 109	12.2	180 260	15.8	966 365	23.1	36 032	15.0	447 479	14.3	3 139 245	14.9
Environmental sciences	57 764	0.5	11 675	1.0	68 869	1.6	8396	3.5	101 920	3.2	248 624	1.2
Material sciences	82 192	0.7	640	0.1	68 467	1.6	0	0.0	155 529	5.0	306 828	1.5
Marine sciences	11 975	0.1	9 866	0.9	8933	0.2	2431	1.0	25 368	0.8	58 574	0.3
Division 2: Social Sciences and Humanities	429 461	3.5	315 282	24.3	1 487 391	34.0	168 631	72.4	220 993	9.1	2 621 757	12.5
Social sciences	428 969	3.5	268 058	23.5	967 204	23.1	165 924	68.9	194 646	6.2	2 024 801	9.6
Humanities	491	0.0	47 225	4.1	520 187	12.4	2707	1.1	26 347	0.8	596 956	2.8
Total	12 332 012	100	1139676	100	4 191 366	100	240 650	100	3 137 343	100	21 041 047	100

Source: Adapted from HSRC, 2011. See chapter 6 "Finance" for recent budget allocations in the R&D field.

ANNEXURE 2B: R&D EXPENDITURE BY SOCIO-ECONOMIC OBJECTIVE (2008/09)

SOCIO-ECONOMIC OBJECTIVE	BUSINESS ENTERPRISE		GOVERNMENT		HIGHER EDUCATION		NOT-FOR PROFIT		SCIENCE COUNCILS		TOTALS	
	R'000	%	R'000	%	R'000	%	R'000	%	R'000	%	R'000	%
Defence	908 781	7.4	0	0.0	51 50	0.1	2050	0.9	280 219	8.9	1196 200	5.7
Division 2:Economic Development	9 737 338	79.0	373 251	32.8	1 539 535	36.7	69 809	29.0	1 592 110	50.7	13 312 043	63.3
Economic development unclassified	0	0.0	0	0.0	209 400	5.0	0	0.0	0	0.0	209 400	1.0
Plant production and plant primary products	266 259	2.2	66 503	5.8	153 054	3.7	17 520	7.3	349 907	11.2	853 243	4.1
Animal production and animal primary products	74 302	0.6	78 619	6.9	117 255	2.8	972	0.4	18 760	0.6	289 908	1.4
Mineral resources (excluding energy)	839 558	6.8	0	0.0	88 576	2.1	0	0.0	67 418	2.1	995 552	4.7
Energy resources	732 188	5.9	0	0.0	71 648	1.7	1760	0.7	379 859	12.1	1 185 455	5.6

Source: Adapted from HSRC, 2011

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