



**OneWorld**  
Sustainable Investments

# A Western Cape Climate Change Response Strategy and Action Plan

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## ***Inception Report***

*October 2006*



*Appreciating your financial, social and ecological assets*

## Introduction and overview



This inception report provides the Project Steering Committee (PSC) an overview of the outcomes of the Consultant's activities to date in developing a climate change response strategy and action plan for the Western Cape province. Focus for this initial 6 week period has been on establishing key parameters for the response strategy coupled with desktop research, literature review and an initial assessment of international best practice. In addition, some of the Phase 1 outcome activities have commenced - in particular the analysis of the key issues in each system reviewed (detailed in strategy parameters), using the PESTLE (Political, Economic, Social, Technological and Environmental) analysis tool. This report provides a summary of the PESTLE analysis as well as an overview of next steps.

The structure of this report is:

Acronyms and abbreviations

Executive Summary

### **Section one: Review of Response Strategy Inputs**

- Outline of proposed strategy parameters - timelines, priority systems, vulnerability criteria
- Overview of research and literature review
- Overview of the legal framework
- Review of stakeholder engagement outcomes
- Overview of the climate modeling inputs to the strategy as ascertained so far

### **Section two: Project Communications**

- Communications review and proposed project flyer

**Section three: Review of the impacts of climate change on natural systems**

**Section four: Review of the impacts of climate change on key economic sectors**

**Section five: Review of the impacts of climate change on economic resources and infrastructure**

**Section six: Socio-economic review**

**Section seven: Moving forwards**



## Acronyms and Abbreviations (1/2)



| <b>Abbreviation</b> | <b>Definition</b>  |
|---------------------|--|
| ARC                 | Agricultural Research Council                                  |
| BEE                 | Black Economic Empowerment                                     |
| BEEH                | School of Bioresources Engineering and Environmental Hydrology |
| CBD                 | Central Business district                                      |
| CC                  | Climate Change   |
| CDM                 | Clean Development Mechanism                                    |
| CER                 | Certified Emission Reductions                                  |
| CITES               | Convention on International Trade in Endangered Species        |
| CO2                 | Carbon Dioxide   |
| DAPPS               | Dynamic Air Pollution Prediction System                        |
| DEA&DP              | Department of Environmental Affairs and Development Planning   |
| DFPT                | Deciduous Fruit Producers Trust                                |
| DPSIR               | Drivers, Pressures, State, Impacts, Response                   |
| DST                 | Department of Science and Technology                           |
| EB                  | Executive Board  |
| EE                  | Energy Efficiency  |
| EU                  | European Union   |
| EUA                 | European Union Allowances                                      |
| F gases             | Fluorines  |
| FAR                 | Foundation for Arable Research                                 |
| G8                  | Group of 8 Developed Industrial Nations                        |
| GCM                 | General Circulation Models (of the atmosphere)                 |
| GDP                 | Gross Domestic Product   |
| GHG                 | Green House Gas  |
| GIS                 | Geographic Information System                                  |
| GISP                | Global Invasive Species Program                                |
| GW                  | Global Warming   |
| IAM                 | Integrated Assessment Model                                    |
| IAS                 | Integrated Assessment System                                   |
| IPCC                | Inter-Governmental Panel on Climate Change                     |
| IPP                 | Independent Power Producer                                     |
| IVA                 | Impacts, Vulnerability and Adaptation                          |
| LUPO                | Land Use and Planning Ordinance                                |
| M&A                 | Mitigation and Adaptation                                      |



## Acronyms and Abbreviations (2/2)



| Abbreviation | Definition   |
|--------------|--|
| MW           | Megawatt   |
| N2O          | Nitrogen Dioxide   |
| NBT          | National Board of Transport                                      |
| NEMA         | National Environmental Management Act                            |
| NEPAD        | New Partnership for African Development                          |
| NERSA        | National Energy Regulator for South Africa                       |
| NGO          | Non Governmental Organisation                                    |
| NLTTA        | National Land Transport Transition Act                           |
| NPP          | Net Primary Productivity   |
| NWA          | National Water Act   |
| OECD         | Organisation for Economic Cooperation and Development            |
| PDI          | Previously Disadvantaged Individuals                             |
| PESTLE       | Political, Economic, Social, Technological, Legal, Environmental |
| PGC          | Pacific Geoscience Centre  |
| PV           | Photovoltaic   |
| RE           | Renewable Energy   |
| RED          | Regional Electricity Distributor                                 |
| SA           | South Africa   |
| SACSCC       | South African Country Study on Climate Change                    |
| SAPP         | Southern African Power Pool                                      |
| SAR          | Second Assessment Report of the IPCC                             |
| SWH          | Solar water heater   |
| TAR          | Third Assessment Report of the IPCC                              |
| TCA          | Total Catch Allowance  |
| TNA          | Technology Needs Assessment                                      |
| UNEP         | United Nations Environmental Programme                           |
| UNFCCC       | United Nations Framework Convention for Climate Change           |
| US           | United States  |
| VER          | Voluntary Emission Reductions                                    |
| WC           | Western Cape   |
| WCDA         | Western Cape Department of Agriculture                           |
| WMA          | Water Management Area  |
| WSSA         | Water and Sanitation Services South Africa                       |
| WWF          | World Wide Fund for Nature                                       |





### ***Toward an adaptation and mitigation action plan and response strategy***

To be effective, the strategy and action plan should result in climate risk being considered as a normal part of decision making, allowing government, business and individuals to reflect their risk preferences as they would for any other risk assessment. If this is achieved, then climate change has effectively been “mainstreamed”. This means that the WC climate change response strategy and action plan will ideally be integrated into other dimensions of strategic planning and risk management and will not be run as a “silo”.

Achieving this will require significant focus on awareness raising and communications, further scientific research and modeling and in particular, development of the techniques for applying the science in practical situations. An important first step is to identify priorities.

### ***Identifying strategy parameters and priorities***

Many of our human and natural systems are strongly influenced by climate. All our natural ecosystems are evolving in changing climate patterns. Economic sectors and communities are also affected by climate factors - climate can influence productivity and reliability of supply. Social systems and communities also expect our infrastructure and cities to cope with severe weather events safely and efficiently. Economic resources such as energy and transport are also, albeit indirectly, impacted on by climate change and in turn can help accelerate the pace of climate change.

Prioritising adaptation and mitigation action requires the identification of vulnerable systems - natural and human - the costs if these fail, the scope to reduce the risks and the ability to capture potential benefits. Vulnerability can be defined as the function of exposure to climate change, the sensitivity to change and the capacity of natural and human systems to adapt to that change. Those systems that are highly exposed, sensitive to change and less able to adapt are vulnerable. Vulnerable systems identified as priorities for this strategy are:

- **Natural systems** - water, biodiversity and coastal and marine
- **Economic sectors** - agriculture, tourism and fisheries
- **Economic resources and infrastructure** - energy, transport, health and air quality
- **Livelihoods and disasters** - social systems, extreme events (floods, fires)



## Executive Summary



The objective of this response strategy will be to closely examine the scope to increase the coping capacity of the prioritised systems and sectors. This will mean an analysis of their resilience which in turn will decrease that vulnerability. This will also mean Identifying vulnerable systems or regions (within the Western Cape province) whose failure or climate change induced / accelerated reduction is likely to carry the most significant consequences.

### ***Approach and Methodology***

**International best practice and a comprehensive literature review** is informing much of the work in developing the strategy and provides a good starting point. A critical success factor for the roll-out of the response strategy is its integration with other, relevant strategic planning processes and initiatives, planned and future, in the Western Cape and nationally. A close review of these therefore further underpins the strategy development.

**Climate science** underpins the adaptation and mitigation strategy development, requiring the use of climate models, global emission scenario models and then applying multi-disciplinary approaches in linking these models to spatial models such as biodiversity and crop productivity and testing sensitivity thresholds of the prioritised, vulnerable natural and human systems. Climate science modeling information will be represented through a set of robust statements about expected climate change in the Western Cape and some climate scenarios (i.e. outlines of future climate development for the WC). These will be assessed as integrated with **socio-economic models** for the province which comprise environmental changes associated with socio-economic changes so as to provide the context in which climate change will have its impact.

**Stakeholder engagement** and discussions are ongoing and provide a rapid assessment of the key issues and priorities as perceived by experts in the related fields, politicians, local authorities and strategy administrators, industry players and communities. Stakeholder engagement also provides a platform for developing the communication strategy and awareness campaigns.

A coordinated **cross-sectoral review of vulnerable areas** in the province using a set of identified vulnerability and risk assessment criteria is a key next step in this process.





1. Review of strategy inputs

2. Project communications

3. Review: Impacts of CC on natural systems

4. Review: Impacts of CC on economic sectors

5. Review: Impacts of CC on economic resources & Infrastructure

6. Review: impacts of CC on livelihoods & disasters

7. Moving forwards



## Strategy Inputs: Literature Review & Desk Research



### Literature Review

- Climate change vulnerability and adaptation strategy documents
- Climate Change Action Plans
- National Communication to the UNFCCC
- (national response to climate change)
- Climate mitigation case studies
- Vulnerability assessment framework can be borrowed and adapted from

Reports from 12 countries and regions/provinces such as, Devon, Kentucky and California

- UNEP Handbook on Methods for Climate Change Impact and Adaptation Strategies (a key reference material that various experts can draw on)
  - Part I – Generic issues
    - Getting started (pertinent research questions to ask)
    - Socioeconomic scenarios
    - Climate change scenarios
    - Integration
    - Adaptation to CC: Theory and Practice
  - Part II – Sectoral chapters
    - Water resources
    - Coastal Zones
    - Agriculture
    - Rangeland and Livestock
    - Human Health
    - Energy
    - Forest
    - Biodiversity
    - Fisheries



## Strategy Inputs: Action Plan & Response Strategy Parameters



### 1. **Timeframe & Climate Change Scenarios:**

Action immediately - taking the WC into the 2030/2050 Climate Change Scenario window I.e. with 2030 and 2050 as “anchor” years

#### ***What are Climate Change Scenarios?***

They are plausible indications of what the climatic future could be like, given a specific set of assumptions.

### 2. **Spatial parameters:**

Water catchments areas with district municipalities overlaid - as per the map on page 13 hereto

### 3. **Systems and sector focus areas:**

#### 3.1 **Priority economic sectors in the WC in the context of climate change:**

- Agriculture
- Tourism
- Fisheries

#### 3.2 **Natural systems:**

- Water
- Biodiversity
- Coastal and marine

#### 3.3 **Infrastructure**

- Air quality
- Health
- Energy
- Water - reticulation and sanitation



## Strategy inputs: Action Plan & Response Strategy Parameters



### 3.4 Economic Resources & Support Services

- Energy
- Transport

### 3.5 Social systems

- Rural livelihoods
- In-migration of populations
- Urban & peri-urban

### 3.6 Disaster Management

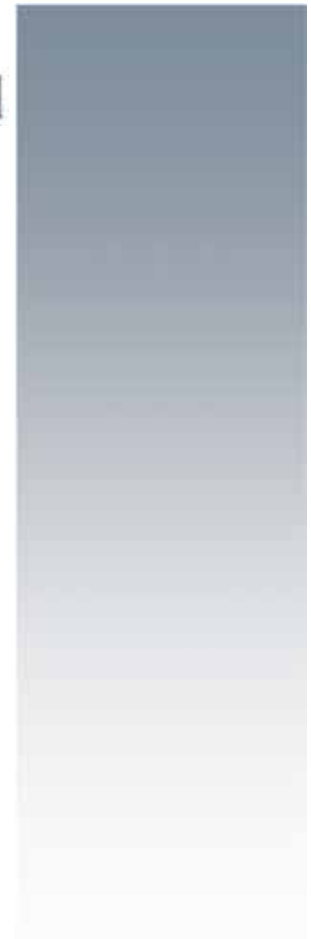
- Fires
- Floods

### 4. Vulnerability & risk assessment criteria:

- Exposure
- Sensitivity
- Adaptive capacity
- Adverse implications
- Potential to benefit

### 5. Research Approaches:

- Quantitative
- Qualitative
- Biophysical
- Economic models
- Integrated Assessment Models (IAMs)
- Stakeholder engagement and consultation
- GIS / remote sensing



## Strategy Inputs: WC Climate Change Analysis Parameters



Climate Science will underpin the Western Cape Climate Change Response Strategy and Action Plan. The progressive development of climate models and associated infrastructure provides regional-scale information based on progressively enhanced global monitoring systems. Climate change can manifest in changes in average climate conditions and/or in climate variability. A greater level of certainty exists around average climate conditions (so, average annual or monthly variables such as temperature and precipitation changes) than around patterns of daily climate and inter annual variability.

Whilst there is less scientific certainty about how climate change will affect the temporal variability of climate, it is most likely that climate variability will change as a response to greenhouse gas forcing. Hulme et al.(1996) in their scenario for southern Africa, included changes in inter-annual rainfall variability. Changes in climate variability can have a more dramatic effect on agriculture and water resource systems than changes in the mean alone. Both of these have been identified as priority systems in the WC response strategy development process.

The following 5 (12-16) pages attempt to give an overview of the scientific research and modeling that is being undertaken by the Climate Science Analysis Group at the University of Cape Town. These demonstrate that research is happening on many fronts and reflect where there is broad consensus from the many models about what is happening and is likely to happen - for example, the models agree on pattern of change but not on the magnitude of change.

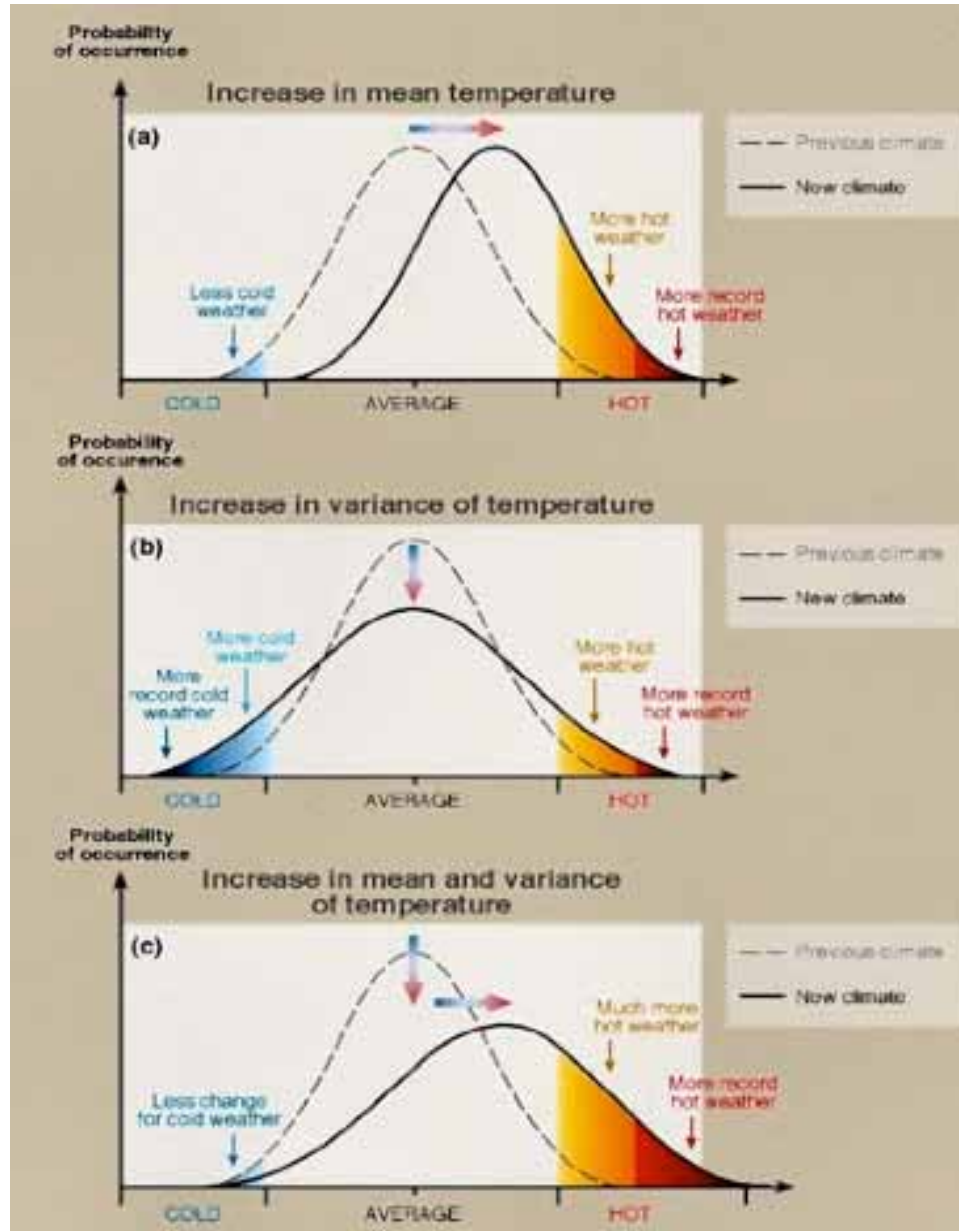
Page 17 provides the “questions” the CSAG team will attempt to answer so as to feed a state of robust scientific statements into the analysis and action plan development process.

### ***Understanding the process that constrains climate projections***

- Recognizing the complex interconnection of many global and local processes, and resultant uncertainty
- Climate defines the range of weather events experienced in a region – thus the distribution is important.
- The context of past change ... the large scale climate system is changing, and this is leading to regional weather changes
- Climate change can be through changes in seasonality, intensity, frequency, or the average



# Strategy Inputs: WC Climate Change Analysis



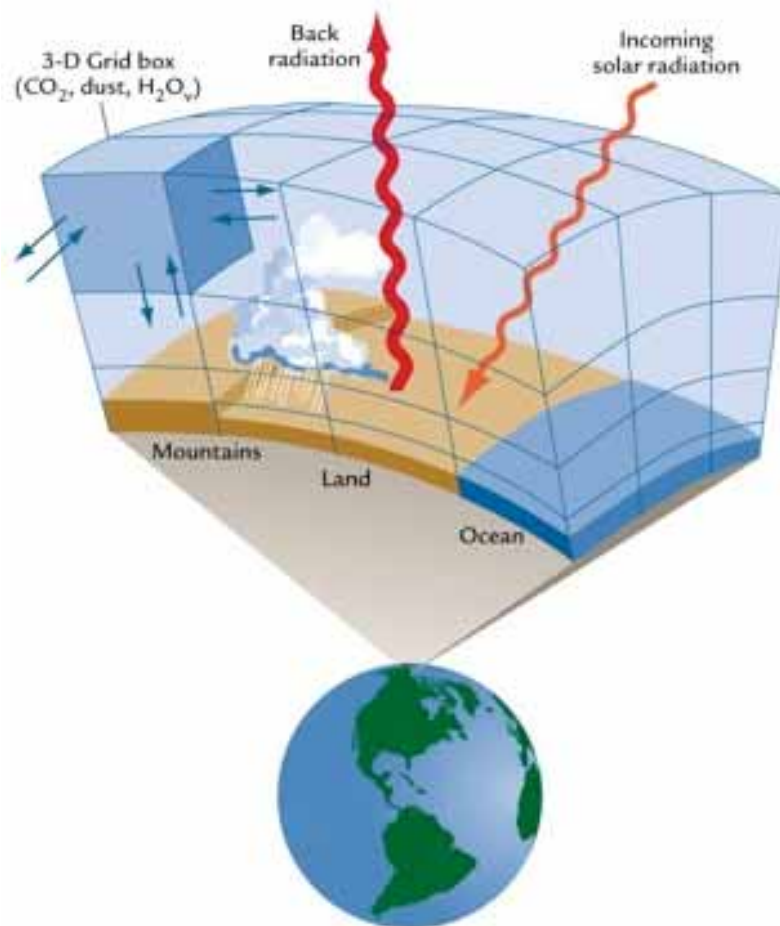
How is change manifest?



## Strategy Inputs: WC Climate Change Analysis

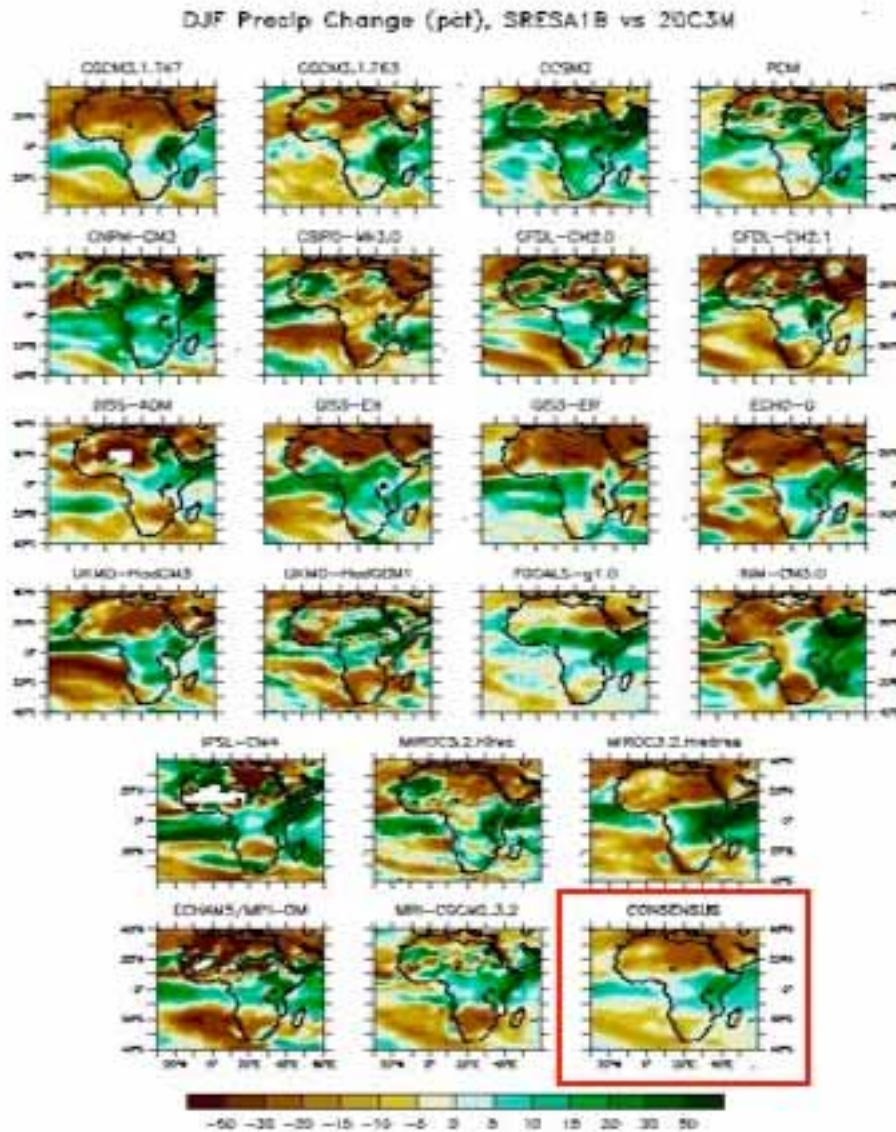


### Attributing change and projecting the future: Global Climate Models Primary tool for research



Constructed on a core of basic physics and dynamics, and then allowed to run.





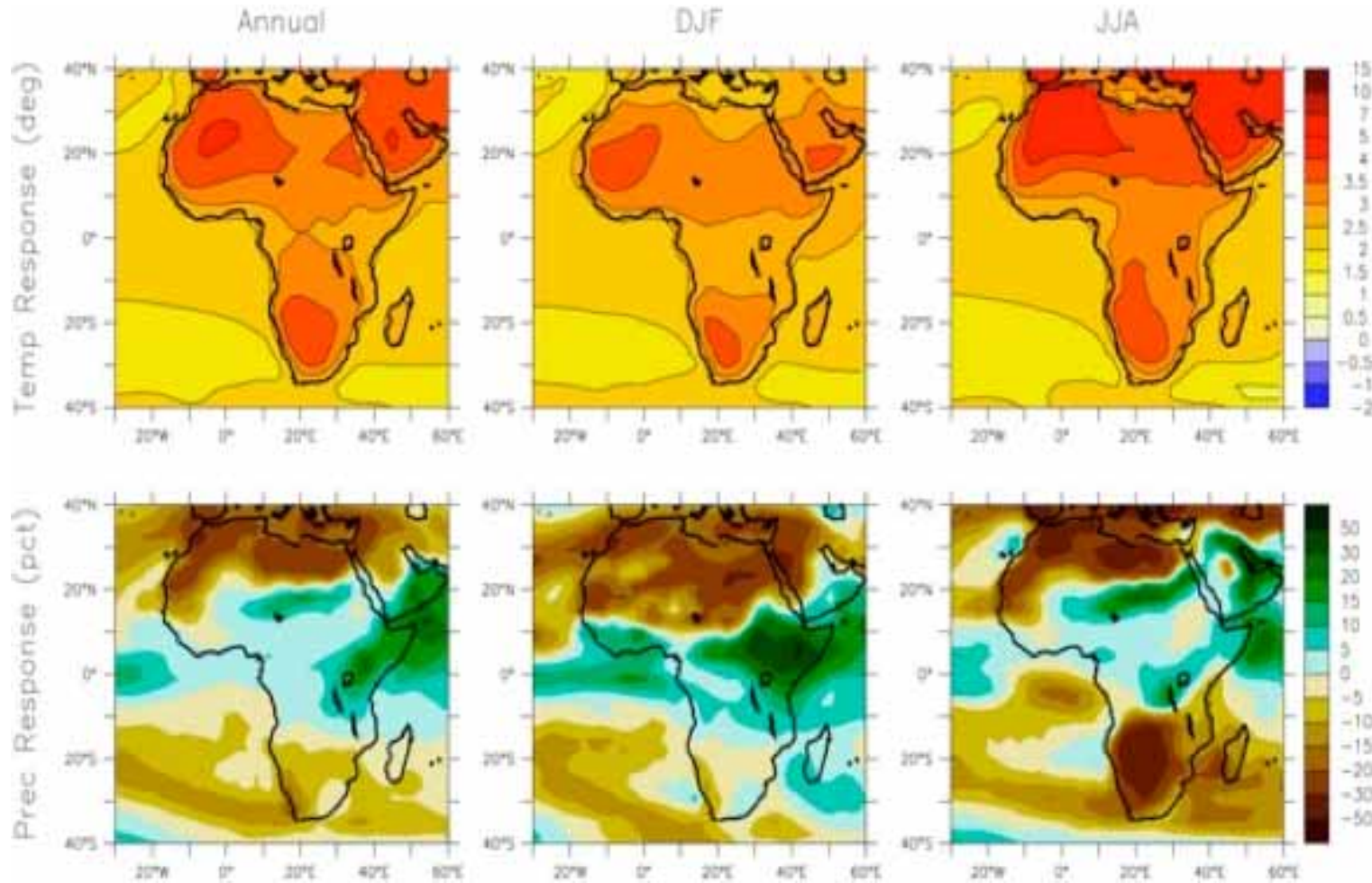
Africa Change  
at the large  
scale

Recognize what  
is uncertain and  
what is  
confident





## Africa temperature and rainfall changes (Average of 20 GCM projections for 2100 – SRES A1B forcing)



Compiled by Isaac Held from PCMDI AR4 model archive

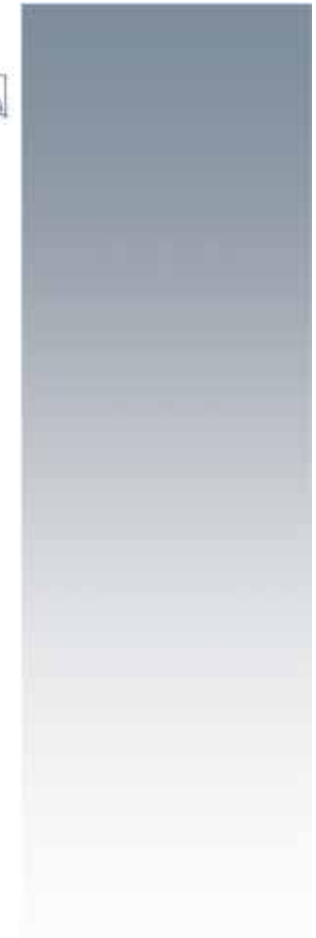


## Strategy Inputs: WC Climate Change Analysis



*The projected climate change that shows consensus from multiple information sources, indicate the following:*

- Changes are detectable and attributable
- Warmer temperatures (max and min) everywhere, but more so in the interior.
- Drier conditions in the shoulder seasons, especially away from mountains, weaker cold fronts, (longer burn season).
- Changes in the mountains are complicated
- Increased humidity and greater persistence of southerly winds (possibly stronger).
- Increased rainfall intensity and extreme events
- Possible increases in inter-annual variability



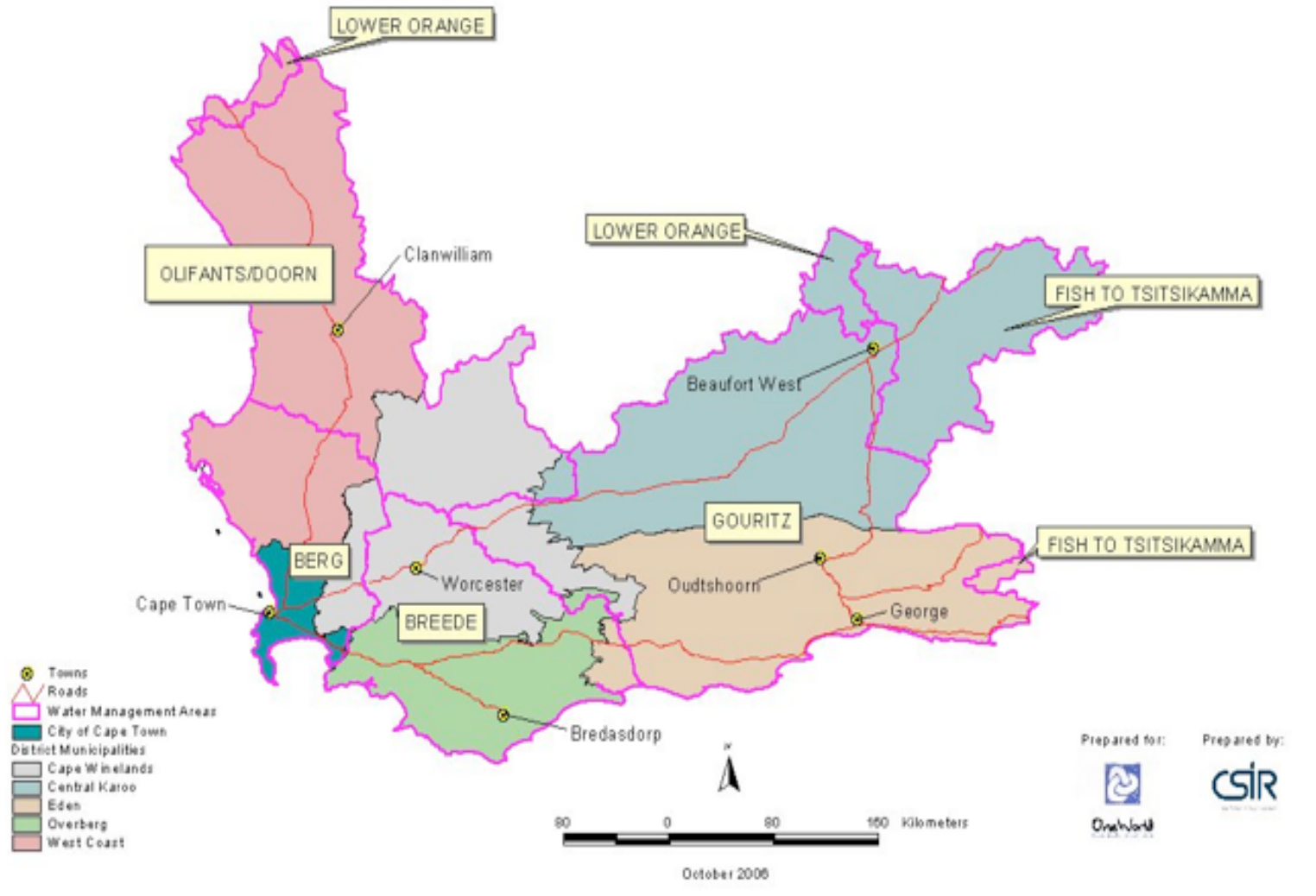
## Strategy Inputs: WC Climate Change Analysis - key research questions

|  |
|--|
| Climate Change scenarios (High and Low) for the identified regions in the Western Cape as an initial assessment of risk for 2030 to 2050: In other words we are looking for 2 scenarios for each time horizon)   |
| Temperature  |
| Rainfall   |
| Sea levels   |
| Wind   |
| Increases in extreme weather events  |
| Disasters - fires - frequency  |
| Potential evaporation  |
| Solar radiation - for example, it would be useful to know where PV systems are best placed?  |
| carbon dioxide concentration   |
| Can these estimate the change (in say temperature) and be tempered with an approximate on the uncertainty within that estimation?  |
| What would these scenarios be relative to? i.e. 2030 relative to 1990 / today's date? - i.e. what is the baseline? Need your guidance here..but most of th lit. reviewed uses 1990 as the baseline   |
| Could the scenarios go so far as to assess impacts - risk and vulnerabilities? So, for example, a decline in annual rainfall with higher evaporative demand would lead to a tendency for less run-off into rivers. Droughts are likely to become more frequent |
| Correlation between trends and scenarios? What methodology do you / would you use to develop these scenarios? If trends inform scenarios in your methodology, could we make the trends explicit in some instances / and/or look at trends as well?             |





## Water Management Areas per District Municipality



## Strategy Inputs: Stakeholder Engagement- General



### Stakeholder Approaches:

- Interviews
- Focus meetings
- Public Meetings/Workshops
- Expert discussions and interviews

2 Public Workshops scheduled for the week of 20 – 24 November 2006 and late January 2007

7 Focus meetings covering the PDC social partners ( including local & national government departments) targeting municipal structures (incl. west coast & George), labour and business

Interviews target specialists, agencies and some NGOs currently outside the platform of CC dialogue

### Issues raised thus far (West Coast - local government and industry):

- fresh water challenges for the region, especially the fishing community
- Clean Energy challenges from a municipal and industrial development perspective
- GHG compliance challenges for West Coast industries
  - Climatic change is not an easy subject to engage, specialist input desired in some SE platforms
  - Challenges of an integrated approach to CC responses

### Issues raised thus far (Drakenstein, Stellenbosch and Winelands District municipalities)

- recycle water - as per Namibian example
- Integrate Climate Change with Integrated Development Planning processes - from legislation level
- Communicate climate change issues in 'layman' terms - I.e. language that people can understand

***Stakeholder engagement plan and schedule attached in Annexure B hereto***



## Strategy Inputs: Stakeholder Engagement - Water



### Discussion summary: Western Cape Water Supply System (WCWSS) - Mr W Enright

The WCWSS supply area covers Veldrif in the north, encompassing the Berg river catchment, borders (but does not include) the Brandvlei dam and south-east along the Breeds, ending are Riviersonderend.

The WCWSS is undertaking a “Reconciliation Study” that has as its vision:

*Achieving reconciliation of supply and requirements for a water-scarce area, for the DWAF, Metro, local authorities and urban and agricultural water users, to supply water at adequate levels of assurance within the constraints of affordability and appropriate levels of service to users, whilst ensuring pre-emptive protection of current and possible future resources and optimising the efficiency of the operation and management of the WCWSS in an integrated manner.*

Literally, this means a water balance, between supply and demand, and how to achieve this, recognising water as a scarce resource in the region.

#### Focus points of the study are:

- Water requirements (demand)
- Water use efficiency
- Water availability and system operation
- Comparison of demand and availability (note – not supply, but how much *could* be extracted)
- Selection of interventions and decision-making process
- Risk (this covers drought as well as other risks such as failure of parts of the system (like tunnels) due to geological factors, structural failures and even attack (but this is not highlighted)
- Water resources protection and management
- Monitoring and information management
- Stakeholder management
- Implementation and performance monitoring

#### Two key issues are:

- Future urban requirements
- Future agriculture requirements



## Strategy Inputs: Stakeholder Engagement - Water contd.



Current uncertainties in the urban requirement are:

- Current water requirements of various sectors (what is really saying is that the need of different sectors is unknown – lots of scope for information collection – this needs to part of adaptation strategy)
- Unaccounted-for losses (speaks for itself)
- Population growth
- Economic growth
- Climate change

### **Water Use**

Water demand has been growing at 4% in the main metropolis, but the recent drought and water restrictions have reduced demand to 2% growth. There has been growth of 6% in the small towns.

### **Losses**

- Urban supply to CT about 321 million m<sup>3</sup>
- Wastage and inefficient use about 40%

### **Initiatives in Place to Reduce Losses**

- User education
- Pressure management in areas of high losses
- Repair and maintenance
- More efficient devices (e.g. toilets)
- Metering, effective tariff collection and credit control

### **Agricultural Water Use Efficiency**

Potential to increase efficiency in WCWSS area not considered significant. But, there is a need to understand extent of use, losses and to control abstractions

### **Re-Use**

Re-use currently < 10%. Only for non-potable use.





### Future Scenarios

Under a scenario of un-restricted water use from current situation, additional schemes will be needed by 2012 with High-requirement scenario (growth at 4%) and 2015 with low-requirement growth scenario (Berg River scheme expected to provide for unrestricted supplies for the next 7-8 years)

### Interventions are therefore needed by 2015.

- Includes increase re-use
- Table Mountain aquifer
- Desalination

### Conclusion

Situation ripe for research into increased water-use efficiency in urban areas, as well as systems to increase rate of re-use (safe – to potable water standards).

Intensive monitoring of use and id of wastage required. This must be a significant focus of investment.

But, shortfalls likely to be met at the expense of ecological integrity (rivers, wetlands, estuaries). The ecological and economic impacts of these are still not clear.





There are two major components:

- a description and analysis of the international legal dimension regarding and/or regulating issues around climate change.
- a careful analysis of the South African legal regime (principally in the form of statutes) relevant to climate change.

In addition the linkages between on the one hand, those laws that one would expect to encounter in the regulation of atmospheric emissions and other aspects relevant to climate change (eg NEMA: AQA and APPA) with, on the other hand, other pieces of legislation that may not be directly relevant at first glance will be highlighted.

For example, to incentivise conduct by landowners that may have benefits that lead indirectly to the successful implementation of strategies to reverse climate change. In this regard, we will primarily explore the linkages between laws that regulate or bear upon the sectors identified for particular analysis in the primary consultancy (e.g. agriculture; tourism; and marine resources / the coastal zone).

Legal council will also be available to assist other members of the consultancy in responding to particular questions that might arise in the context of their own work and that have environmental legal implications.





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# Project Communications: Review and Activities



**To develop:**

“an appropriate set of communication resources about climate change that the DEA&DP can use in communicating the Strategy and Action Plan to stakeholders on different levels, ranging from provincial and municipal politicians and officials through to the general public.

**Informed by:**

Stakeholder engagement process; Specialist feed-in; Individual interviews & research

**Approach & Key Information:**

| Target Audience  | Key Message   | Tools                                    | Timing    | Responsibility | Budget | M&E                  |
|------------------|---|--|-----------|----------------|--------|----------------------|
| Fishing Industry | Resource relocation<br>Job Losses<br>Higher Input costs | Seminars with:<br>Associations<br>Unions | Immediate | DEA&DP         | R20k   | Stakeholder feedback |
| Etc, etc         |   |  |           |                |        |                      |

**The Way Ahead:**

- Review stakeholder meetings
- Interview key specialists & sectors
- Engage DEA&DP & other govt. depts.
- Integrate CCRAS developments into comms. Strategy

*The proposed communications flyer is attached in appendix c hereto*



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## Review of the Impacts of Climate on Natural Systems



Vulnerable natural systems (in terms of climate change) selected for focus in the Western Cape are Water, Biodiversity and Coastal and Marine. A preliminary analysis of the external factors influencing these is indicative of what is affecting provincial natural systems now and what is likely to affect them in the future. The six differentiated factors applied are Political, Social, Economic, Technological, legal and Environmental (PESTLE).

A summary of the preliminary results reveals that CC is impacting on our natural systems and scientific evidence strongly points to the likelihood of increasing future impacts. CC for example places additional strain on already scarce water resources (as does economic growth and development). This means that there is pressure to develop further water resources that will be further a field and consequently at greater cost. As things stand, the safety margins on our water resources are narrow and the WC is increasingly vulnerable to drought. Coupled with this is the rising demand for water - about 8% per annum. The latter can be attributed to population growth (the Western Cape averages a population growth of 2.8% per annum against the national average of 2% per annum - 1996-2001), economic growth (for example the tourism sector) and inefficiencies of usage and technologies. There is increasing pressure to provide results in a search for alternative resource systems / supplies. Groundwater for example is a possible water supply base to be exploited but then the impact of this activity on ecosystems is not yet understood. This means we need time to establish this if we are to avoid future negative impacts.

Human behaviour plays a substantial role and only education, awareness and access to robust information can really shift this.

There is evidence that the Province is already experiencing reduced environmental function - we can see this is the decline of the estuary function and loss of wetlands. This in turn comes with significant economic loss. Furthermore, losses to extremes, such as floods in the last 5 years, is also increasing.

Adapting to and / or mitigating against climate change clearly needs to go hand in hand with economic development planning - many of the issues raised are development issues, but there is increasing evidence that climate change is already exacerbating this - a situation that is likely to worsen in the future. Development that increases the vulnerability of poor communities to climate change is a key consideration - as is economic growth planning that places pressure on our natural systems that we cannot manage in the future.



# Review of the Impacts of Climate on Natural Systems

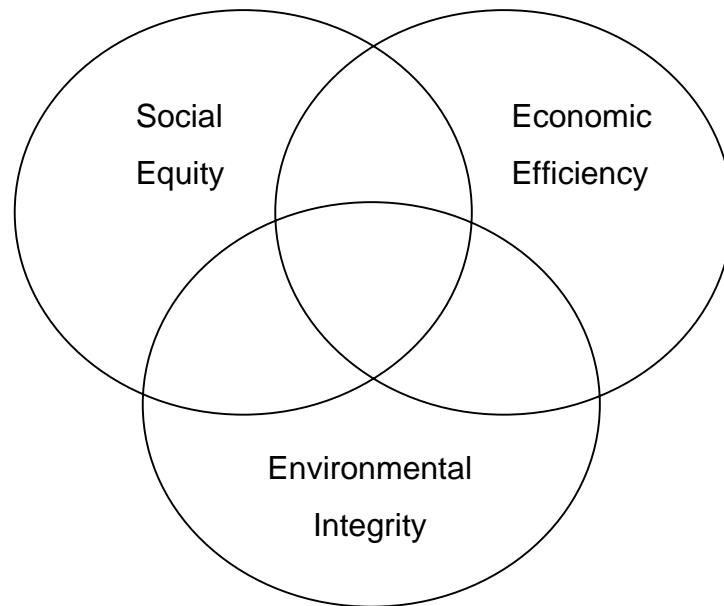


|   |  |  |
|---|--|--|
| <p><b>Political</b></p> <ul style="list-style-type: none"> <li>• Equity - access for all</li> <li>• Balance between allocation of resources and managing scarcity is difficult - particularly in the context of equity and redressing the past</li> </ul>   | <p><b>Economic</b></p> <ul style="list-style-type: none"> <li>• Natural resources can play a key role in poverty reduction programmes and are also integral to economic growth and development (e.g. tourism and agriculture). This must be balanced with the impacts of CC on natural systems - scarcity increase. Tourism for example impacts on water demand but is expected to be the source of new jobs in the Province</li> </ul>  | <p><b>Social</b></p> <ul style="list-style-type: none"> <li>• Population growth is a key challenge in managing natural systems</li> <li>• Development is significant and much of this is happening on coastal strips which in turn are vulnerable to climate change</li> <li>• Culturally and socially, people perceive natural resources as “free” with correspondingly little regard for efficient usage, protection of and costs</li> <li>• Need for education and awareness</li> <li>• Ownership of natural systems and resources is an issue</li> </ul> |
| <p><b>Technological</b></p> <ul style="list-style-type: none"> <li>• Old technology and approaches (now known to have negative impacts on natural systems) are still being used in some areas - e.g. flood irrigation</li> <li>• There is significant room for efficiency improvements</li> <li>• Lack of comprehensive and robust information and knowledge on natural systems - for example, many municipalities do not know the quality status of their water</li> </ul> | <p><b>Legal (Institutional)</b></p> <ul style="list-style-type: none"> <li>• NEMA (National Environmental Management Act, 1998) - makes provision for EIAs on all major developments</li> <li>• Western Cape Spatial Development Framework, Nov 2005 (DEA&amp;DP)</li> <li>• LUPO (Land Use Planning Ordinance)</li> <li>• Biodiversity Act</li> <li>• National Water Act (NWA)</li> <li>• WSSA</li> <li>• Reform processes under way dealing with fair access / equity</li> </ul> | <p><b>Environmental</b></p> <ul style="list-style-type: none"> <li>• Interdependencies between systems</li> <li>• Natural systems depend on fresh water flow</li> <li>• Mountain catchments exposed to alien vegetation = a threat</li> <li>• Marginal lands used for conservation</li> <li>• Extreme events and fires</li> <li>• Loss of land to development and agriculture</li> </ul>   |





- Western Cape particularly sensitive to water issues – warm, dry summers
- General scarcity
- High level of competition for the resource





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## Review of the Impacts of Climate on Economic Sectors



All economic sectors are vulnerable to climate change, some more directly than others. Sectors prioritised in the Western Cape are those that are economically important, are significant employers, stimulate SMME development and create jobs and in addition, are the most vulnerable to climate change. These are agriculture, tourism and fisheries. As sectors considered at risk, these are likely to require government intervention to facilitate timeous and efficient response.

Droughts, variability in climate patterns (e.g. rainfall) and increasing temperatures all affect agriculture - 'burnt' crops, reduced yields and an increase in pests and livestock diseases are some examples. Changes in water temperature and winds (direction and strength) can lead to changes in fish stock and numbers and loss of beaches due to coastal erosion makes tourist attractions (beaches) less appealing - as does loss in biodiversity. A key result is likely to be increased political pressure and potential fall-out.

Climate change has discernible impact therefore on the economic development and growth of these sectors as well as on their social benefits. Agricultural job loss in rural areas is likely to increase the rate of urbanisation (notwithstanding that climate change is not the only factor). At the same time as CC having the potential to impact negatively on achieving sustainable development goals as described, economic growth in these sectors strains already pressurised natural resources, economic resources and infrastructure (e.g. transport).

South Africa and the Western Cape are in the process of undergoing much socio-economic and political reform - largely in an effort to redress imbalances existing in our social structures. This process can place extra burden on economic resources, thus affecting their sustainability. Mainstreaming climate change into economic development processes should assist in alleviating this.

Vulnerabilities in these sectors vary depending on a range of factors - many of which are policy lead. For example, vulnerabilities in agriculture are different in environments following a path of rapid industrialisation, or which aim for self reliance in food production or which choose a path of export-led growth. A common vision for sector growth in the Province is therefore an important factor when planning for climate change. If for example, the Western Cape chooses a path of export lead growth in its agriculture sector, then the climate change thresholds for fruit farmers could differ. Size of fruit is an important competitive factor in the export market. Climate change - cooler temperature for example may not wipe a fruit crop out, but could well reduce the size of the fruit thus removing the Province's competitive edge.

31 There is evidence of a level of adaptation already in some of the sectors - particularly agriculture. Farmers are looking at alternative crops and sustainable farming practices for example. Again, the need for integrated economic development planning with consideration to climate change can be highlighted.



# Review of the Impacts of Climate on key Economic Sectors: PESTLE

|   |  |  |
|---|--|--|
| <p><b>Political</b></p> <ul style="list-style-type: none"> <li>• Equity - e.g. quota allocations in fisheries</li> <li>• Lack of common vision in some sectors for the Province - e.g. agriculture, tourism</li> <li>• Tensions in some instances between smaller communities, large private sector players and government</li> <li>• Emerging issue of political and social change vis-a-vis climate change - for example when looking at issues such as land reform policy, access and equity against climate change impacts</li> </ul> | <p><b>Economic</b></p> <ul style="list-style-type: none"> <li>• CC impacts in economic sectors considered could lead to job losses whereas these have been growth employment sectors</li> <li>• Export revenues are significant in each - CC can for example impact on the size of export fruits resulting in a loss of export market share</li> <li>• Energy &amp; water supply and cost</li> </ul>                       | <p><b>Social</b></p> <ul style="list-style-type: none"> <li>• Labour dependency stats for the WC average at 7:1. Job loss has significant social impact</li> <li>• Poor socio-economic conditions exist in most rural areas - education, health etc leads to urbanisation which impacts on sectors such as agriculture</li> </ul>  |
| <p><b>Technological</b></p> <ul style="list-style-type: none"> <li>• Unsustainable inefficient use of resources is common</li> <li>• Insufficient R&amp;D</li> <li>• CC and dwindling resources is causing adaptation such as fishing further a field, new crops - with technology and infrastructure impacts and cost</li> </ul>   | <p><b>Legal (Institutional)</b></p> <ul style="list-style-type: none"> <li>• NEMA</li> <li>• MLRA (Marine Living Resources Act 1998)</li> <li>• DEAT MCM Policy for Allocation and Management of commercial fisheries</li> <li>• Land Reform</li> <li>• NWA</li> <li>• Property tax law</li> <li>• LUPO</li> <li>• WC Spatial Development Framework, Nov 05</li> <li>• Integrated Tourism Development Framework</li> </ul> | <p><b>Environmental</b></p> <ul style="list-style-type: none"> <li>• All sectors considered depend heavily on the integrity of natural systems - for example availability and quality of water - tourism and agriculture</li> <li>• Land availability</li> <li>• Soil quality</li> <li>• Climate variation and CC</li> <li>• Industry growth == increase demand for resources</li> <li>• Increasing pressure on eco-systems</li> </ul> |



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## Review of the Impacts of Climate on Economic Resources and Infrastructure



Service providers including local authorities, the health sector, transport and energy sectors are at the forefront of a changing climate. Local authorities, service providers and infrastructure partners are in a unique position to provide integrated responses to climate change, to include the sustainable development of land, the encouragement of water and energy efficiency, the sustainable use of transport and waste minimisation and recycling services. The need for the integration of Climate Change will require changes in systems and approaches - all against a backdrop of meeting the need for social justice and equity in the Western Cape and South Africa.

Local authorities, health service providers and authorities and emergency services need to be in a position to adapt to changing patterns of flooding, fire risk, transport, health and energy demand. Services must be proactively in place to deal with disastrous events - Hurricane Katrina in August 2005 in the USA is a resounding example of a city that did not have structures in place with incrementally disastrous results. They thus have a primary function in ensuring integration.

Whilst the majority of climate change impacts are negative, there are some benefits. Energy is an example - increased temperatures place a demand on refrigeration and air conditioning - both energy intensive technologies. On the other hand, warmer climates mean fewer cold nights and so less demand on electricity and fuels for space heating.

Economic resources, services and infrastructure are also placed under considerable pressure by factors such as population growth and development. In many areas, the pace of development in the Western Cape is accelerated as authorities and government attempt to redress past inequities. This development as well as economic growth in turn places increasing pressure on demand for services such as energy and transport. Both have an impact on air quality in the Western Cape, particularly in peri-urban areas concentrated around major cities and towns. Air quality also impacts health - as does other direct climate change aspects - disease spread can be exacerbated by increased temperatures, lack of water for sanitation and hazards and disasters.

There is an apparent, direct impact of extreme weather events on infrastructure. Transport and energy are indirectly impacted by climate change but at the same time, place pressure on climate, as well as on social systems and on health and safety. Achieving the goals and objectives of sustainable development for the Province and integrating climate change into these should alleviate these pressures. This approach constitutes the basis for a response strategy for the Western Cape.



# Review of the Impacts of Climate on Economic Resources and Infrastructure



|  |  |   |
|--|--|---|
| <p><b>Political</b></p> <ul style="list-style-type: none"> <li>• The primary political concern is access for all - equity</li> <li>• Increasing political pressure to supply, improve infrastructure and to manage pollution</li> <li>• A need for better coordinated public resources and integrated policy development</li> </ul>  | <p><b>Economic</b></p> <ul style="list-style-type: none"> <li>• Established need for major investment</li> <li>• The WC is not energy independent</li> <li>• There is under funding for service maintenance and in some instances, a malfunction of services</li> <li>• Staff retention and capacity issues in some public sectors</li> </ul>                  | <p><b>Social</b></p> <ul style="list-style-type: none"> <li>• Infrastructure and health services need to be accessible to poor communities</li> <li>• The urban sprawl results in employees being located further from jobs with long commutes</li> <li>• The demand on energy resources is increasing - both as a result of development and of climate change - need for air-conditioning, refrigeration etc</li> <li>• Urban communities are vulnerable to increasingly poor air quality</li> </ul> |
| <p><b>Technological</b></p> <ul style="list-style-type: none"> <li>• Rail needs upgrading</li> <li>• Air quality management systems across the province needed</li> <li>• Increased demand on energy infrastructure</li> <li>• Further research and cost benefit analysis needed on new technologies (water desalination, ground water access); need for efficiency improvements</li> <li>• Ports productivity is low and inadequate rail services is increasing the strain on road infrastructure and on pollution</li> </ul> | <p><b>Legal (Institutional)</b></p> <ul style="list-style-type: none"> <li>• NEMA</li> <li>• NERSA</li> <li>• REDs and electricity industry reform</li> <li>• Constitutional law</li> <li>• Air Quality Management Act</li> <li>• CT City Pollution Control by-law</li> <li>• CT City Energy Strategy</li> <li>• Khayalitsha air pollution strategy</li> </ul> | <p><b>Environmental</b></p> <ul style="list-style-type: none"> <li>• Pollution impacts health and water</li> <li>• Weather impacts infrastructure</li> <li>• Coal based grid - energy demand increase = increased emissions nationally</li> <li>• Biodiversity impacts</li> <li>• Transport and demand for local fuels for cooking and heating increases local emissions</li> <li>• Inadequate waste and water sanitation facilities impact health and environment</li> </ul>                         |



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### **Approach:** Refining socio-economic impacts?

Action plan versus longer-term research  
Cascading uncertainties in models

Earlier economic studies on costs of climate change assume:

- Impacted system does not autonomously respond to climate change
- Adaptive human behavior assumed exogenous adaptation treated arbitrarily (what if)
- No evaluation realism or desirability of level and type of adaptation

**Propose:** shift focus towards action plan based on analysis of socio-economic adaptive capacity adaptation assessment matrix, including stakeholder participation

### **What is adaptive capacity?**

Adaptive capacity is the ability of a system to adjust to climate change, including climate variability and extremes, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (UNFCCC 1995).

Adaptive capacity varies significantly from system to system, sector to sector and region to region. This means that it is critically important, in any assessment of adaptation, to identify immediately who is adapting to what (Yohe & Tol 2002)

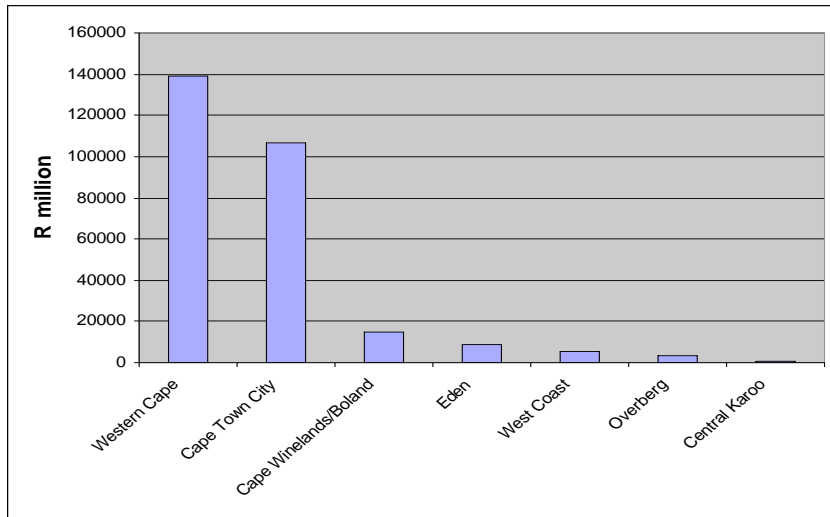
Potentially significant determinants of adaptive capacity include economic, social, political and cultural variables: the fraction of people in absolute poverty, the average per capita income, income distribution, literacy, enrolment in secondary and tertiary education, democracy, religion, individualism and uncertainty avoidance (Tol & Yohe 2006)



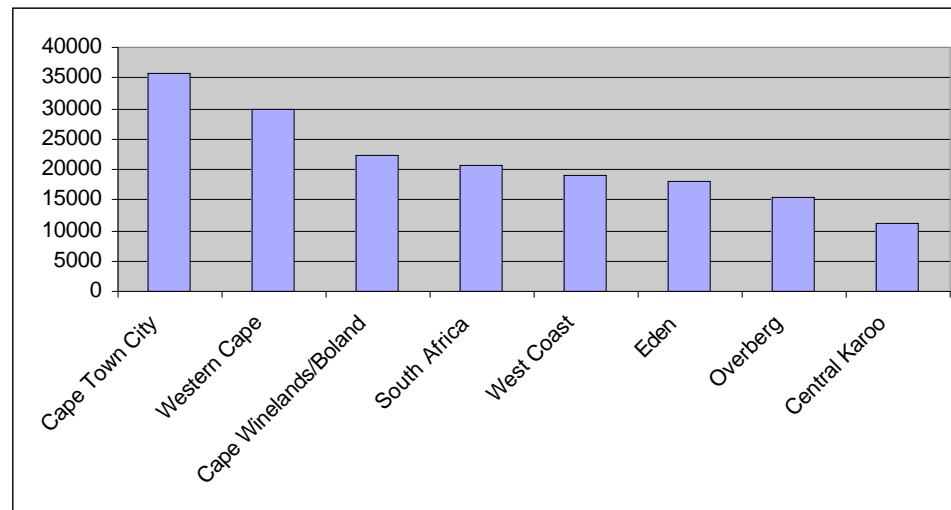
# Impact Review: Social Systems/Socio-economic and development context



**GDP per region (R million, current prices 2004)**



**GDP per capita (Rand per annum, 2004)**



## Impact Review: Social Systems/Employment



In 1996, employment in agricultural sector was at 13.4% of total employed in the Western Cape, in 2001 at 15.3% and in 2004 estimated at 9% (WCPT 2006, Wesgro).

In 2000, employment is estimated to have totalled 235 000 individuals, declining to 152 000 by 2004, a decline of 83 000 individuals, equivalent to an annual reduction of over 10 per cent in employment in the primary sector (WCPT 2006).

But still *very high employment dependence* on primary sector:

|                |                                | % share GDP | Annual growth<br>1994 - 2004 | % employed |
|----------------|--------------------------------|-------------|------------------------------|------------|
| West Coast     | Agriculture, forestry, fishing | 18.86%      | 2.34%                        | 40.49%     |
| Cape Winelands | Agriculture, forestry, fishing | 14.24%      | 1.61%                        | 38.30%     |
| Overberg       | Agriculture, forestry, fishing | 20.57%      | 1.51%                        | 36.60%     |
| Central Karoo  | Agriculture, forestry, fishing | 10.13%      | 0.81%                        | 30.31%     |
| Central Karoo  | CSP services                   | 5.60%       | 1.61%                        | 18.34%     |
| Eden           | Wholesale & retail trade       | 18.58%      | 4.91%                        | 17.55%     |
| Eden           | CSP services                   | 5.40%       | 3.47%                        | 17.04%     |
| Central Karoo  | Wholesale & retail trade       | 16.90%      | 5.68%                        | 14.74%     |
| Cape Winelands | CSP services                   | 4.72%       | 4.80%                        | 13.40%     |
| Overberg       | Wholesale & retail trade       | 18.39%      | 6.63%                        | 13.20%     |
| Overberg       | CSP services                   | 6.12%       | 2.06%                        | 13.00%     |
| West Coast     | CSP services                   | 6.00%       | 4.63%                        | 12.15%     |
| Cape Winelands | Wholesale & retail trade       | 14.99%      | 5.58%                        | 11.60%     |
| West Coast     | Wholesale & retail trade       | 15.88%      | 4.73%                        | 10.71%     |
| Cape Winelands | Manufacturing                  | 22.05%      | 0.76%                        | 10.40%     |
| West Coast     | Manufacturing                  | 20.50%      | 1.84%                        | 10.16%     |
| Eden           | Construction                   | 6.22%       | 2.95%                        | 10.08%     |

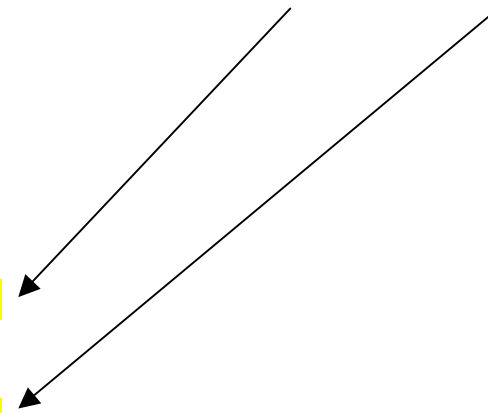


# Impact Review: Social Systems/Share of regional GDP (>10%)



|                |                                |        |
|----------------|--------------------------------|--------|
| Central Karoo  | Agriculture, forestry, fishing | 10.13% |
| Cape Winelands | General government services    | 11.34% |
| Eden           | General government services    | 11.43% |
| Central Karoo  | General government services    | 11.84% |
| Cape Town      | Transport & communication      | 11.88% |
| West Coast     | Financial & business services  | 13.38% |
| Cape Winelands | Agriculture, forestry, fishing | 14.24% |
| Cape Winelands | Wholesale & retail trade       | 14.99% |
| Overberg       | Manufacturing                  | 15.08% |
| Overberg       | Financial & business services  | 15.13% |
| West Coast     | Wholesale & retail trade       | 15.88% |
| Eden           | Manufacturing                  | 16.65% |
| Central Karoo  | Wholesale & retail trade       | 16.90% |
| Cape Town      | Wholesale & retail trade       | 16.93% |
| Cape Town      | Manufacturing                  | 17.77% |
| Central Karoo  | Financial & business services  | 18.35% |
| Overberg       | Wholesale & retail trade       | 18.39% |
| Eden           | Wholesale & retail trade       | 18.58% |
| West Coast     | Agriculture, forestry, fishing | 18.86% |
| Cape Winelands | Financial & business services  | 20.33% |
| West Coast     | Manufacturing                  | 20.50% |
| Overberg       | Agriculture, forestry, fishing | 20.57% |
| Central Karoo  | Transport & communication      | 21.36% |
| Cape Winelands | Manufacturing                  | 22.05% |
| Eden           | Financial & business services  | 22.51% |
| Cape Town      | Financial & business services  | 31.69% |

High regional economic dependence on primary sectors, esp. West Coast, Overberg



# Social Systems: Human Development Index



|                |                        |      |
|----------------|------------------------|------|
| Central Karoo  | Beaufort West          | 0.64 |
| Cape Winelands | Breede River/Winelands | 0.65 |
| Eden           | Kannaland              | 0.66 |
| West Coast     | Bergriver              | 0.66 |
| West Coast     | Cederberg              | 0.67 |
| Central Karoo  | Laingsburg             | 0.68 |
| Cape Winelands | Breede Valley          | 0.68 |
| Eden           | Oudtshoorn             | 0.69 |
| Overberg       | Cape Agulhas           | 0.69 |
| Eden           | George                 | 0.69 |
| Eden           | Knysna                 | 0.69 |
| Cape Town      | Khayelitsha            | 0.69 |
| Cape Town      | Nyanga                 | 0.69 |
| Cape Winelands | Drakenstein            | 0.7  |
| Eden           | Mossel Bay             | 0.7  |
| Cape Town      | Langa                  | 0.7  |
| Cape Town      | Elsies River           | 0.7  |
| Overberg       | Theewaterskloof        | 0.71 |
| Central Karoo  | Prince Albert          | 0.71 |
| West Coast     | Matzikama              | 0.71 |
| Eden           | Hessequa               | 0.71 |
| Eden           | Plettenberg Bay        | 0.71 |
| Cape Town      | Gugulethu              | 0.71 |
| Cape Town      | Mitchell's Plain       | 0.71 |
| Cape Winelands | Witzenberg             | 0.72 |
| Overberg       | Swellendam             | 0.72 |
| Western Cape   | Western Cape           | 0.72 |
| Overberg       | Overstrand             | 0.73 |
| West Coast     | Saldanhay Bay          | 0.73 |
| Cape Town      | Kraaifontein           | 0.73 |
| West Coast     | Swartland              | 0.74 |
| Cape Winelands | Stellenbosch           | 0.74 |
| Cape Town      | Atlantis               | 0.79 |
| Cape Town      | Cape Town City         | 0.82 |
| Cape Town      | Somerset West          | 0.83 |
| Cape Town      | Hout Bay               | 0.83 |
| Cape Town      | Goodwood               | 0.84 |
| Cape Town      | Parow                  | 0.85 |
| Cape Town      | Bellville              | 0.86 |
| Cape Town      | Durbanville            | 0.88 |
| Cape Town      | Melkbosstrand          | 0.89 |



# Social Systems: Index of adaptive capacity



**Table 18: Index of adaptive capacity**

|                |                        | econ growth | % no income | Gini region | % <sec educ | Index |
|----------------|------------------------|-------------|-------------|-------------|-------------|-------|
| Overberg       | Theewaterskloof        | 8           | 6           | 10          | 6           | 7.4   |
| Eden           | Kannaland              | 9           | 4           | 8           | 6           | 6.6   |
| Eden           | Plettenberg Bay        | 7           | 7           | 8           | 2           | 6.0   |
| Overberg       | Overstrand             | 6           | 6           | 10          | 2           | 5.9   |
| Overberg       | Swellendam             | 7           | 3           | 10          | 4           | 5.9   |
| Cape Winelands | Witzenberg             | 8           | 4           | 4           | 7           | 5.8   |
| Overberg       | Cape Agulhas           | 7           | 3           | 10          | 3           | 5.8   |
| Eden           | Knysna                 | 6           | 7           | 8           | 1           | 5.5   |
| Eden           | George                 | 6           | 7           | 8           | 1           | 5.5   |
| Eden           | Oudtshoorn             | 8           | 3           | 8           | 3           | 5.5   |
| Cape Winelands | Breede River DMA       | 7           | 1           | 4           | 10          | 5.5   |
| Cape Winelands | Breede River/Winelands | 6           | 6           | 4           | 6           | 5.4   |
| Cape Winelands | Stellenbosch           | 6           | 10          | 4           | 1           | 5.3   |
| Eden           | Hessequa               | 6           | 3           | 8           | 4           | 5.3   |
| Central Karoo  | Laingsburg             | 6           | 3           | 6           | 5           | 5.0   |
| Cape Winelands | Breede Valley          | 7           | 5           | 4           | 4           | 4.9   |
| Eden           | Mossel Bay             | 5           | 5           | 8           | 1           | 4.8   |
| West Coast     | Bergriver              | 10          | 2           | 2           | 5           | 4.8   |
| West Coast     | Cederberg              | 7           | 4           | 2           | 6           | 4.6   |
| Cape Winelands | Drakenstein            | 7           | 5           | 4           | 2           | 4.5   |
| West Coast     | Matzikama              | 9           | 3           | 2           | 4           | 4.5   |
| Central Karoo  | Beaufort West          | 6           | 4           | 6           | 1           | 4.1   |
| Central Karoo  | Prince Albert          | 1           | 4           | 6           | 6           | 4.1   |
| West Coast     | Saldanhay Bay          | 7           | 6           | 2           | 1           | 3.9   |
| West Coast     | Swartland              | 6           | 3           | 2           | 4           | 3.6   |



Note: Concept, based on ordinal ranking and equal weighting, subject to further analysis and testing

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## Moving Forwards: Key Questions for DEA&DP and the PSC



Key issues underpinning the response strategy development are:

Where do we want to be? *and*

What will be the impact?

A risk assessment approach is proposed with some focus on extremities. DEA&DP and the PSC members can help the consulting team establish the key risks for the Western Cape Province **by telling us what they DO NOT WANT TO see happening in the Province in the context of climate change.** The team will then include these “priorities” in the probabilities investigation process. This means that we will be assessing thresholds from a natural systems, economic sector, resource and infrastructure and socio-economics perspective as well as from a political perspective.

**We will obtain feedback from the PSC members at the PSC meeting on the 26th October.**

**Feedback and input is required** to finalise the communications flyer (Annexure C hereto)

**Input and comment is specifically requested** on the Strategy Parameters identified (Pages 9&10 hereto) as well as on the draft stakeholder list as attached in Annexure B hereto.

### **Outstanding documentation and information from DEA&DP:**

SDIP workshop schedule that was held in CT and George as well as the energy and climate change component documentation

- Draft Integrated Energy Strategy
- Millennium ecosystems report
- Treasury Fiscal Review document
- Labour and climate change information



## Moving Forwards: Key Activities



- Approval and circulation of project flier
- Commissioning of project website
- Continued desk research and analysis
- Identification of climate change scenarios regionally across the Western Cape
- Widespread stakeholder engagement both geographically and sectorally on CC impacts across the Western Cape
- Main stakeholder workshops on CC impacts
- Building matrix of climate change adaptation and mitigation options in each sector / system
- Development of prioritisation tools - using criteria & methods such as
  - Ease of implementation
  - Cost benefit analysis
  - Integrated assessment analysis

### Adaptive capacity

- Verification of data, fill data gaps
- Final choice of indicators of adaptive capacity
- Final development of Index on adaptive capacity
- Overlay results on biophysical assessment results

### Adaptation assessment

- Await prioritisation of options for further economic cost-effective analysis
- Follows stakeholder participation and technical listing
- Suggest to inform this listing by spatial socio-economic and biophysical vulnerability assessments



# Key Milestones



|  | 10/9 | 10/16 | 10/23 | 10/30 | 11/6 | 11/13 | 11/20 | 11/27 | 12/4 | 12/11 |  | 1/8 | 1/15 | 1/22 | 1/29 | 2/5 | 2/12 | 2/19 | 2/26 |  |
|--|------|-------|-------|-------|------|-------|-------|-------|------|-------|--|-----|------|------|------|-----|------|------|------|--|
|  | 7    | 8     | 9     | 10    | 11   | 12    | 13    | 14    | 15   | 16    |  | 17  | 18   | 19   | 20   | 21  | 22   | 23   | 24   |  |
| Internal Workshop                                      |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| PSC Meeting (26 Oct)                                   |      |       | 26/10 |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| <b>PESTLE Analysis &amp; Inception Report (13 Oct)</b> |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| Internal Workshop                                      |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| <b>Interim Analysis</b>                                |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| Stakeholder Workshop                                   |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| Internal Workshop                                      |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| <b>Final Analysis Framework, Tools and Criteria</b>    |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| Internal Workshop                                      |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| Stakeholder Workshop                                   |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| Internal Workshop                                      |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| <b>Strategy &amp; Matrix</b>                           |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| <b>Code</b>  |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| Deliverables   |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| Internal Workshops                                     |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| Stakeholder workshops                                  |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |
| PSC Meetings   |      |       |       |       |      |       |       |       |      |       |  |     |      |      |      |     |      |      |      |  |



## Annex D: List of references

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