



Climate Change and South Africa's Natural Resources

1. Introduction

Over recent years the world has begun focusing more and more on climate change, an issue that affects the sustainability of the planet and the human race as a whole. There has been considerable effort to reduce carbon dioxide emissions (CO₂) and other greenhouse gasses (GHGs), as these are believed to promote global warming. It is predicted that, if the world does not make considerable advances in its efforts to adopt suitable laws to reduce these emissions, there will be dire consequences for all nations, and for South Africa and its economy in particular.

This briefing paper will look at the effect that climate change is having on our natural resources, namely biodiversity, forestry, agriculture, and the marine sector. It will also look at the COP21 summit, where leaders banded together to formulate climate change agreements that, if implemented, ought to allow for a far more sustainable future.

2. Roundtable Discussion

The morning of 18 March 2016 saw the CPLO host a roundtable discussion on *The Impact of Climate Change on South Africa's Natural Resources*. Speaking at the event were Dr Amos Madhlopa from the Energy Research Centre at UCT; Ms Zuziwe Jonas from the South African National Biodiversity Institute; Mr Obed Phahlane from the Agricultural Research Council; and Mr Floid Chauke representing the Department of Environment Affairs. Dr Madhlopa presented the findings of his investigations about renewable energy choices and water requirements in South Africa. He found that conventional fuels (such as nuclear and fossil fuels) withdraw significant quantities of water over the life cycle of energy

production, especially for wet-cooled thermal power plants, and that there is sporadic data on water usage in renewable energy in the country. It was enlightening to hear that solar photovoltaic (PV) and wind energy were found to exhibit the lowest demand for water; more PV and wind initiatives should be implemented as they use less water – this should be promoted in policy. The speakers agreed that the manner in which research is being created and supported must be transformed to a way that will help plan for a more sustainable future.

The discussion section of the event allowed people to enquire and comment on the presentations and topic. A participant was concerned that it seemed that the national priority picture regarding energy security is not in line with current policy, which calls for more swift phasing out of the use of fossil fuels for energy purposes. Another concern was that the cost of some of the available climate solutions seems astronomical to the everyday person. Another guest suggested that legislation such as the National Environmental Management Acts should be used more in planning inter-departmental activities, since most environmental matters are inter-related and cross-sectoral.¹ It was also suggested that personal action in avoiding certain environmentally detrimental behaviours should be emphasised, as should the importance of communities undertaking local environmental activities. The participants agreed that biodiversity should be earnestly used to adapt to climate change. Another noteworthy recommendation that was echoed by both participants and speakers had to do with the Department of Basic Education getting curriculum input from the Departments of Environment, Energy, Agriculture, Forestry and Fisheries, and Water and Sanitation, so that children were given substantial knowledge about climate change and issues relating to nature at an early age, as this

would hopefully inform their current and future behaviour.

3. Effects of Climate Change on South Africa's Resources

The continued rising of land and sea temperatures, and the compounding effects of overgrazing and deforestation, are likely to have adverse effects on the agricultural and forestry sectors of the economy. In addition, the unpredictability of weather patterns² and rainfall has knock-on effects for land, soil fertility and biodiversity.

3.1. Marine impacts

SA's coastline stretches more than 3 000 km, with the cold Atlantic Ocean in the west and the warm Indian Ocean in the east contributing to the differing climates experienced in these regions. Thus, our environmental conditions are peculiarly characterized by different oceanic dynamics. Climate change is also affecting marine ecosystems, and is expected to continue to affect fisheries. The main pressures on these ecosystems are over-fishing, pollution, ocean acidification, habitat alteration and destruction, and species invasion, many of which can be linked to climate change. For instance, rising temperatures of the upper 700 m of the global ocean; rising sea levels caused by the melting of ice; and ocean acidification are all attributed to global warming.³ The heating and expansion of sea water also alters ocean chemistry and circulation, leading to stratification and changes in nutrient availability. Indicators such as the Red List index⁴ have been used internationally to track the conservation status of groups of organisms, and the index shows that globally the conservation status of seabirds has deteriorated more rapidly than that of some other groups of birds. South Africa's seabirds (many endemic to southern Africa) are not an exception to this trend, with two thirds being classified as threatened or near threatened. In this regard, South Africa is making ongoing contributions to global research aimed at determining thresholds for ecosystem resilience.⁵

3.2. Biodiversity impacts

Biodiversity is defined as the variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems. South Africa is recognised as one of the 35 global

biodiversity hotspots; special attention is given to the Succulent Karoo, the Cape Floristic Region, and the Maputaland-Pondoland Region. The value of biodiversity lies in the fact that it is a national asset and a powerful contributor to economic development; it plays a major role in meeting human needs directly, while maintaining the ecological processes upon which our survival depends. The problem we face as a result of climatic changes can be seen in South Africa's National Biodiversity Assessment from 2011. This study found that 40% of terrestrial; 57% of river; 65% of wetland; 44% of estuary; 41% of offshore; and 59% of coastal and inshore ecosystems, are threatened, with few of these threatened ecosystems currently afforded any formal protection.⁶

Climate change affects biodiversity and causes complex interactions across sectors. For example, it appears to be changing species distribution through shifting habitat, changing life cycles, and development of new physical traits. Research conducted on the famous desert tree aloe, the Kokerboom, for instance, shows that populations may be declining in the warm north, and expanding in the cooler south of its range.

Biodiversity experts and activists are responding to climate change in various ways, which include:

- Reducing existing threats to biodiversity to promote the resilience of natural ecosystems and species, especially in priority areas for climate change identified in spatial biodiversity plans;
- Enhancing understanding of and increasing the value and application of ecosystem-based adaptation responses. This intervention is cost-effective and generates social, economic and cultural co-benefits while also contributing to the conservation of biodiversity. Many ecosystem-based approaches are being demonstrated within South Africa, from reforestation of riparian areas, clearing of alien vegetation, and conservation of intact grasslands for soil carbon-retention;
- Ongoing development and expansion of a comprehensive, adequate and representative protected areas network, incorporating adaptation to the impacts of climate change; and
- Drawing on indigenous and traditional knowledge to support climate change adaptation and mitigation through biodiversity and ecosystem strategies.

3.3. Agricultural impacts

The African Union regards climate change as a very real threat to the future of the African continent, and one that will specifically threaten African ecological sustainability. But the persistent needs and wants of the developing continent, Africa, will continue to hamper the fight for a greener way of living and the sustainable use of natural resources. In addition to the call to reduce carbon emissions, the African population must also take into account its own poor agricultural practices. The high occurrence of African droughts over the past 40 years has renewed concerns about how poor agricultural practices could amplify the effects of climate change.

The worst burdens are borne by subsistence farmers in the poorest countries, but even the sophisticated agricultural economies of southern Africa stand to suffer immensely. Those who make a living within these economies will have to deal with the ramifications of a global community that has not done enough to reduce the effects that GHGs have had on the atmosphere for the last few centuries.

Fortunately, there are ways to mitigation, and adapt to, climate change through innovative initiatives such as integrated livestock/crop systems; different types of rainwater harvesting; and the use of bio-digesters by small-scale farmers. A number of research projects are being implemented to help farmers cope with climate variability and change through the adoption of conservation agriculture techniques and the use of climate information.⁷

3.4. Forestry impacts

The Reduced Emissions from Deforestation and Forest Degradation (REDD) mechanism is built around the notion that deforestation and forest degradation contributes greatly to the emission of GHGs which, in turn, contributes to climate change. The Stern Review blames deforestation and degradation for 10%-25% of global GHG emissions.⁸ Forests absorb the CO₂ emissions released into the atmosphere through trees and soil, thus when forest degradation or deforestation occurs, the likelihood of enough CO₂ being absorbed decreases dramatically. Thus, South Africa needs to monitor its forestry sector carefully, as forests are critical in maintaining a sustainable ecological environment. Developing

countries in Africa and South America contribute hugely to deforestation, and through REDD, the idea is to pay these developing countries for the carbon value of their trees, as long as they are left standing.⁹

4. Adaptation & Mitigation

Various protocols have been followed over the years to reduce or substitute fossil fuels and to promote more sustainable modes of living. Improved crop management practices and carbon conservation have been earmarked as having great potential for rapid mitigation of climate change.¹⁰ South Africa's Department of Environmental Affairs commissioned the Long Term Adaptation Scenarios project to help organizations within the agricultural and forestry sectors develop strategies to become more 'climate resilient' if they found themselves in a specific scenario.¹¹ Natural resource management institutions within South Africa need to ensure that they continually study climate change effects on the environment. These various institutions can in turn construct policy and legislation that foster adaptive approaches in terms of planning for potential catastrophes or for the effects that climate change might have on infrastructure.¹²

The 21st Conference of the Parties (or COP21) was held between 30th November and 11th December 2015. It brought together policy makers from across the globe to discuss a way forward in dealing with climate change, and policies for adaptation. The goal of the summit was to reiterate the importance of climate change adaptation and policy work. A key aspect of the meeting was to ensure that nations would construct definite plans to enable their ecological and socioeconomic systems to remain resilient through economic diversification, especially by creating various sources of income which would not only focus on traditional areas such as agriculture.¹³ But COP 21 also acknowledged that climate change does not only affect natural resources; it will impact on human activities and regional and international relationships in diverse and complex ways.¹⁴

5. Conclusion

Climate change is a likely threat not only to our survival, but to the survival of many life-forms and ecosystems all over the planet. Despite long-term

damage having been done to the environment, certain mitigation and adaptation policies are able to help countries to cope with the expected consequences. While as much as possible must be done to reduce emissions of CO² and other greenhouse gases, developing countries must also ensure that, as far as possible, their agricultural,

marine, and forestry practices and policies are conducive to the maintenance of healthy and diverse ecosystems. If they fail to do so, they should prepare for an era in which this continent's hitherto abundant natural resources will no longer be sufficient to sustain its growing population.

Palesa Ngwenya
Researcher

Craig Hendricks
Research Intern

Craig Hendricks is completing a Master's degree in political philosophy at the University of the Western Cape, and is about to complete a six-month internship at CPLO.

¹ Section 24 of National Environmental Management Act (NEMA) addresses the manner in which (governing) authorities need to have a co-operative relationship. This is a section that could be used more often in forcing government departments to work together.

² "Climate change indicators in the United States," epa.gov, last modified 2015, <https://www3.epa.gov/climatechange/science/indicators/>.

³ Ocean Acidity refers to the ongoing decrease in the pH of the Earth's oceans, caused by the uptake of anthropogenic carbon dioxide from the atmosphere.

⁴ Red List Index

⁵ Mr Floid Chauke - CPLO Roundtable: The Impact of Climate Change on South African Natural Resources held on 18 March 2016.

⁶ Ms Zuziwe Jonas - CPLO Roundtable: The Impact of Climate Change on South African Natural Resources held on on 18 March 2016.

⁷ Mr Phahlane - CPLO Roundtable: The Impact of Climate Change on South African Natural Resources held on on 18 March 2016.

⁸ (van Wyk, 2010, p.225)

⁹ (van Wyk, 2010, p.226)

¹⁰ (Mwiturubani & van Wyk, 2010, p.140)

¹¹ (Ziervogel, 2014, p.607)

¹² (Climate change implications, 2013, p.42)

¹³ (Economic Diversification in Africa, 2011, p.28)

¹⁴ COP21 reference - Paris Agreement

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