



CLIMATE INFORMATION AND EARLY WARNING SYSTEMS

CLIMATE CHANGE ADAPTATION CLIMATE INFORMATION AND EARLY WARNING SYSTEMS

Adaptation Scenarios Factsheet Series, Factsheet 2 of 7

THE LONG-TERM ADAPTATION SCENARIOS FLAGSHIP RESEARCH PROGRAMME (LTAS) FOR SOUTH AFRICA

The LTAS (April 2012 – June 2014) aims to respond to the South African National Climate Change Response White Paper (2011) by undertaking climate change adaptation research and scenario planning for South Africa and the Southern African sub-region.

The **Adaptation Scenarios Factsheet Series** has been developed to communicate key messages emerging from LTAS Phase 2 (June 2013 – June 2014) to policy- and decision-makers, researchers, practitioners and civil society. The Factsheet Series complements the LTAS Phase 2 technical reports. For further details on this factsheet, see the LTAS Phase 2 full technical report entitled *Climate Information and Early Warning Systems to Support Disaster Risk Reduction and Management under Future Climate Conditions in South Africa*.

1. Introduction

At the global scale, the frequency, extent and severity of natural disasters have increased notably over the last several years. As a result, economic losses from weather- and climate-related disasters have increased. Climate change is projected to increase the frequency and magnitude of extreme weather events, which, without reductions in vulnerability, will increase the risk of disasters. Southern Africa is widely recognised as one of the most vulnerable regions to climate change, because of low levels of adaptive capacity, particularly among rural communities. The expected increase in weather-related disasters as a result of climate change poses significant challenges for South Africa and is expected to negatively impact infrastructure, food security, health and tourism, amongst other sectors.

An important area for building resilience to expected increases in the frequency and intensity of extreme weather-related hazards is the strengthening of early warning systems (EWS). These provide an important mechanism for the improved alignment between climate change and disaster risk reduction and management (DRR-M). They are an example of a low regret measure that provides co-benefits for DRR-M and climate change adaptation.

2. Socio-economic impacts of past extreme weather events

The impacts of extreme weather events are wide ranging and impact multiple sectors. The impacts range from primary or direct effects, such as loss of life and damage to infrastructure, to secondary or indirect effects, such as health issues and the loss of livelihoods. Weather-related events in South Africa to date have caused extensive damage to the economy and society at large and have resulted in a significant increase in direct and recovery costs. It is estimated that the total cost of weather-related disasters between 2000 and 2009 was approximately R 9.2 billion, with provincial and district municipalities carry the greatest financial burden to effect rehabilitation and recovery. Box 1 provides some examples of a range of weather related disasters in South Africa.

BOX 1: EXAMPLES OF SOME OF THE WORST WEATHER-RELATED DISASTERS IN SOUTH AFRICA

Drought: The 1991/1992 drought is ranked as the worst natural disaster in South Africa. It resulted in approximately 70% of crops failing and maize having to be imported into the country. It has been estimated that 50,000 jobs were lost in the agricultural sector, with a further 20,000 in related sectors, in total affecting about 250,000 people. Financial losses are estimated to have been R 5 billion.

Floods: In March 2003 and April 2005 the Western Cape experienced floods, as a result of cut off lows, which resulted in up to R 260 million in damages.

Fires: In 2002, fires in Mpumalanga destroyed 24,000 ha of pasture and left four people dead, with damages amounting to more than R 32 million. Between 2007 and 2008 KwaZulu-Natal and Mpumalanga experienced fires that resulted in significant loss of revenue, estimated at R 4,3 billion.

Storm surge: In 2007 and 2008 the damage to coastal property and infrastructure was estimated at R 1 billion. In the Western Cape, losses of up to R 12.5 million were experienced between 2003 and 2007.

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA



On behalf of:



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SANBI

Biodiversity for Life

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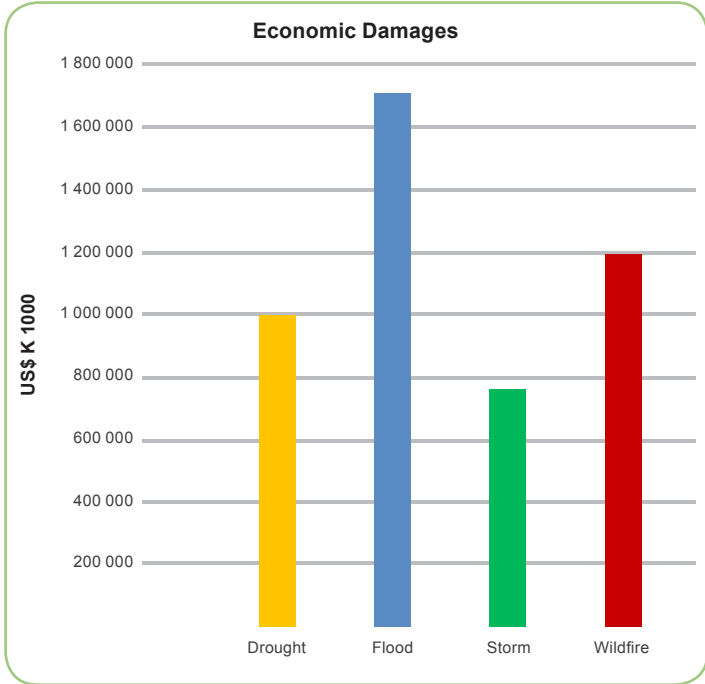


Figure 1: Summary of the relative cost of the four major categories of weather-related events; droughts, floods, fires and storms in South Africa between 1900 and 2014.

BOX 2: DISASTER RISK REDUCTION AND MANAGEMENT LEGISLATION IN SOUTH AFRICA

South Africa's disaster management legislation has served as a model for other countries and is considered one of the most advanced institutional frameworks for disaster management in the world. The Disaster Management Act (2002) and the National Disaster Management Policy Framework (2005) focus on prevention, decentralisation of disaster risk reduction, governance, mandate the integration of disaster risk reduction into development planning, and require stakeholder inclusiveness. Each level of government (national, provincial and local) is required to establish structures to ensure that disaster risk reduction, response and recovery are coordinated and implemented. These efforts are coordinated through the National Disaster Management Centre (NDMC). The functions of the NDMC include monitoring of disasters, mobilisation of resources and coordination and response to disasters and the maintaining a repository of information relating to disasters, as well as a database of relevant stakeholders. The implementation of South Africa's benchmark legislation, however, has proven to be challenging.

3. Climate information and early warning systems in South Africa

The South African Weather Service (SAWS) is mandated by the Weather Service Act (2001) to produce weather and climate information as well as provide early warning alerts. SAWS is the main source of early warning information in South Africa, and collaborates with government departments, private institutions, community and research organisations to produce, interpret, package and disseminate climate information and advisories for different hazards and extreme weather events. SAWS provides these severe weather warnings and advisories to the National Disaster Management Centre (NDMC), provincial government departments, municipalities, communities and all potentially affected members of the public. The weather advisories, watches and warnings are used by Disaster Management Centres in preparation and readiness for emergency actions, such as evacuation in the face of a weather-related hazard.



South Africa has adopted a Multi-Hazard Early Warning System (MHEWS) which is based on international best practices. It makes use of multiple monitoring systems and uses meteorological, hydrological and climate information to prepare for and respond to multiple hazards. Hazards included in this system are floods, heavy rain, wild fires, storm surges and wind storms. The NDMC is mandated in the National Disaster Management Framework



to be the custodian of MHEWS, although it is operated by SAWS. MHEWS requires collaboration between disaster management structures at all levels of governance i.e. national, provincial and local level, to plan and respond to the warnings together.

The SAWS Severe Weather System, which is part of MHEWS, covers potentially damaging weather events that are common in the country and can result in severe impacts. These include heavy rain, flash floods, heat waves, destructive coastal waves, wildland fires, gale force winds, severe thunderstorms and very cold weather. National warnings and advisories are compiled and issued with the longest possible lead-time. The weather alerts are based on 4 levels:

- No alert: no hazard is expected.
- Advisory: a potential hazard may occur in the next 2 to 6 days.
- Watch: hazardous weather is likely to occur in the next 1 to 3 days.
- Warning: hazardous conditions are occurring or are about to occur in the next 1 to 24 hours.

4. Gaps and opportunities

There are many opportunities to strengthen legislative, institutional and mandate gaps in DRR-M in the country. Roles and responsibilities should be clearly delineated. This is particularly relevant to local municipalities, and includes the identification of focal points for DRR-M. Capacity is required to improve the understanding of the principles of DRR-M – the current limited capacity is preventing mainstreaming of DRR-M activities at both national and local levels. While capacity is being built, there is an opportunity to improve DRR-M structures at all levels. At a national level, not all essential government departments have implemented the required disaster risk reduction activities. At a district level, many district municipalities have not established the required systems for DRR-M. This includes the non-establishment of Disaster Management Centres, advisory forums, inter-departmental committees for cross-sectorial collaboration and integration of disaster risk reduction into planning.

DRR-M at the local level, including district and metropolitan levels, is not adequately funded or incentivised, suggesting that DRR-M is not perceived as a high priority. There is thus a need for the allocation of the required funding. There could also be improvements in the coordination and collaboration between line departments – despite the link between DRR-M and climate change adaptation, these two aspects are driven by two different ministries which can result in certain coordination challenges. Consideration could be given to the integrative role of the NDMC, given its coordinating role across various sectors.

From a technical perspective, the required climate and socio-economic information should be collected at the local level, and local municipalities as well as other organisations operating at local level could play a key role in facilitating this process. The EWS process should also be simplified at the municipal level, to enhance dissemination of warnings in local languages and in an appropriate format.

From a socio-ecological perspective, there is need for active engagement of vulnerable communities in community-based risk and vulnerability assessments. Communities should be given the opportunity to inform the disaster risk profiles of their municipalities by identifying their needs and priorities. Civil society, with support of NGOs, could play a role in disseminating early warning information in communities and could also play a role in collecting local level climate change-related data that can be used by local, provincial and national government. In the former regard, the role of social media is growing rapidly and is becoming an important vehicle for providing easily accessible information. Social media can be used to disseminate early warning information to a wide audience in the eleven official South African languages.



5. Policy and research recommendations

The following recommendations are suggested for further consideration:

- Mainstream disaster risk reduction (not simply disaster response) into policy and planning for all sectors and levels of government.
- Support the continued shift from a reactive to a proactive approach to disaster management.
- Improve collaboration between DRR-M and climate change adaptation line departments.
- Improve DRR-M coordination within and between government departments at all levels of government.
- Improve delineation of roles and responsibilities around DRR-M, emphasising the importance of disaster risk reduction within all sectors and levels of government.
- Support the establishment of DRR-M structures, including forums and nodes, at all levels.
- Strengthen institutional capacity to response to EWS information at all levels and especially support local level engagement in collating and sharing information.
- Provide adequate funding and technical support for DRR-M at all levels.
- Provide additional support to assist local government with post-disaster costing and reporting, as well as with initiatives such as acquiring finance to support disaster risk reduction.
- Support local municipalities in efforts to map community vulnerability to all weather-related hazards and to integrate this into local planning.
- Build capacity in relevant institutions to understand the principles of DRR-M, including continued and enhanced development of standardised guidelines and operational procedures.
- Encourage efforts to provide appropriate reports on the costs of the damages caused by weather-related disasters at all levels.
- Undertake robust needs assessments and gap analyses at all levels.
- Acknowledge the role of healthy ecosystems and ecological infrastructure in reducing the impacts of climate vulnerability and change and integrate this into DRR-M planning.
- Invest in research and development for forecasting, and specifically forecast tailored to relevant sectors, including an audit of research and development gaps.

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SANBI, DEA and GIZ in consultations with relevant sector stakeholders

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