Management of Water Extremes: A South African Perspective on Guidelines for Policy and Strategy Development

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Abstract

This presentation endeavours to present some guidelines for policy and strategy development with regard to the effective management of floods and droughts. Insights are gained from a literature study about the social, economic and political impacts of irrigation droughts, research done on the impacts and management of floods and water restrictions in South Africa as well as analysing the disaster management policy process in South Africa since 1994. The South African experience in terms of the management of water extremes, serves as basis for policy and strategy development and should benefit all involved – including other regions.

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1 Introduction

Utilising insights gained from a literature study about the social, economic and political impacts of irrigation droughts, research done on the impacts and management of floods and water restrictions in South Africa as well as analysing the disaster management policy process in South Africa since 1994, this presentation endeavours to present some guidelines for policy and strategy development with regard to the effective management of floods and droughts. After pointing out some characteristics of South Africa's hydrology, the need for policy reform is motivated and a conceptual framework for policy and strategy development presented. New policy and strategy development in South Africa is then reflected on and some general guidelines for policy and strategy development formulated.

2 S A Hydrology characteristics

South Africa is a relatively dry country with an average rainfall of 500 mm/a. Rainfall declines from above 800 mm/a in the east to below 200 mm/a in the west. Clear cycles of approximately 9-10 years below average rain followed by above average rain have been observed in summer rainfall areas (Tyson, 1987 as cited by Backeberg & Viljoen, 2003: 1). Although the occurrence of drought is the most general hydrological characteristic, floods are also not too infrequent.

On average floods causing significant damage occur once every two years somewhere in the country (Smith *et al.*, 1981: 1), while the incidence of drought (broadly defined as less than 70 per cent of normal precipitation) is about one year in three, with disaster droughts only once in fifteen or more years (National Department of Agriculture, 2003: 15). Recent big floods occurred in 1974, 1998 and 2000 while general droughts occurred in 1983-87,

1991-92 and at present since 2002 in various parts of the country.

3 Need for policy reform

3.1 New political dispensation

The New Constitution of South Africa that came into effect after the 1994 Referendum makes it necessary to review all legislation. For example, in the Water Policy White Paper (RSA, 1997: 9) it is stated that the necessity to review South African water law and change the approach to water management is underpinned by the Constitution. The motivation is to create a more just and equitable society and to promote appropriate sustainable use of scarce natural resources, driven by the duty to achieve the right of access to sufficient water.

3.2 Deficiencies in existing policy

Even without the command by the Constitution it was necessary to change the existing Flood and Drought Management policies in South Africa owing to inefficiencies. With regard to floods and droughts, the Water Policy White Paper (RSA, 1997) mentions for instance that the unpredictable nature of the South African climate results in floods and droughts of varying degrees of severity. These can cause wide-scale suffering and disruption of human activities if they are not provided for in the planning, development and management of water resources (Principles 6 and 21). Disaster management, however, has generally been uncoordinated, and has focused on remedial action after the event rather than on preventative mechanisms.

3.3 Social developments

Due to population increases (as well as predicted climate changes) the possibility of South Africa becoming water stressed increases. Dinar and Keck as cited by Wilhite (2000: 129-48) pointed out that South Africa would be classified as a water-scarce country by 2003 with less than 1000m^3/capita per annum.

Large scale urbanisation has contributed and still is contributing to large numbers of people, especially the poor, living in flood plains in and around urban areas. This increases the vulnerability of flooding for these communities. Soweto-on-Sea near Port Elizabeth and Alexandra in Johannesburg are good examples.

3.4 Climate change

Climate change as a result of global warming and the greenhouse effect should change the characteristics of the weather and thus the impacts of floods and droughts in South Africa, requiring adaptations in policies and strategies to manage them effectively. The World Meteorological Organization (2001: 2) mentions that the climate trend is longer periods of drought and shorter periods of heavy rainfall.

4 Conceptual framework for policy and strategy development

4.1 Relevant factors

Based on the literature review by Viljoen *et al.* (2001: 64-113) it was found that a variety of factors must be taken into account when developing effective drought management policies and strategies for a local community or region. These factors include aspects such as:

- socio-economic development level of the country
- available institutions (degree of institutional capacity)
- indigenous traditions, culture and beliefs
- sectors and people at risk
- relative importance of irrigation
- frequency of severe droughts
- causes and impacts of droughts
- country-specific circumstances
- available resources
- knowledge level
- level of political stability.

Social, institutional, cultural, religious, economic, environmental, hydrologic, geographic, educational and political factors are thus all important.

4.2 Theoretical framework

From a theoretical perspective the procedure to determine effective strategies to manage floods/droughts for a country or region can be summarised as follows (deduced from Smith *et al.,* 1981: 2-18 and Van Zyl & Viljoen, 1988: 2-30):

- Determine the probabilities of floods/droughts of different dimensions to occur in a country or region.
- Determine the extent and nature of the impacts (social, environmental, political: direct and indirect: short and long term; positive and negative; etc.) for floods/droughts of different dimensions and probabilities.
- Determine the cost and effectiveness of different measures and application levels of measures as well as for different combinations of measures and strategies to reduce the negative impacts of floods/droughts of different dimensions and probabilities.
- Integrate the above information within a cost-benefit or multi-criteria decision analysis framework to determine the most effective combination and level of measures and strategy to manage the impacts of floods/droughts optimally.

From this brief synopsis it should be noted that information about the causes and impacts of floods and droughts and the effectiveness of different measures to reduce the negative impacts, are crucial for determining effective management strategies.

5 Policy change in South Africa since 1994

5.1 The Constitution and the Bill of Rights (1996)

In order to evaluate any policy, it should firstly be done against the framework of the principles that guide its development. A first set of principles for South Africa is captured in the Constitution of the Republic of South Africa (RSA, 1996). Chapter 2, the Bill of Rights, states *inter alia* that "The Bill of Rights applies to all law, and binds the legislature, the executive, the judiciary and all organs of state." Of the 26 fundamental rights specified in the Bill of Rights the one regarding the environment is of relevance. The right reads that "everyone has the right

- to an environment that is not harmful to their health or well-being; and
- to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
  - prevent pollution and ecological degradation;
  - promote conservation; and
  - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

5.2 Water Policy White Paper (1997)

Moving next to the Water Policy White Paper (RSA, 1997), 28 fundamental principles and objectives were formulated through a process of consultation, to guide the development of the New Water Law in S.A. Regarding floods and droughts, Principles 6 and 21 are especially relevant. Principle 6 states that the variable, uneven and unpredictable distribution of water in the water cycle should be acknowledged, and Principle 21 that the development and management of water resources shall be carried out in a manner which limits to an acceptable

minimum the danger to life and property due to natural or manmade disasters

It is further mentioned that flood management requires both proactive and reactive measures including monitoring and warning systems, and managed dam releases, and that in the case of drought management, which has traditionally been associated with measures to compensate for the effects of reduced rainfall (particularly through the payment of drought relief to farmers) risks should be recognised and appropriate agricultural practices encouraged.

The Water Policy White Paper then refers these issues to the new Disaster Management Policy, which will provide the policy framework to manage all types of disasters.

5.3 White Paper on Disaster Management (1998)

According to the White Paper on Disaster Management (Department of Constitutional Development (DCD), 1998): Sections 1 and 2, the primary responsibility for disaster management in South Africa rests with the government. In terms of section 41(1)(b) of the Constitution of the Republic of South Africa (1996) all spheres of government are required to "*secure the well-being of the people of the Republic*". The scope and purpose of government policy is *inter alia* the following (cited in Backeberg & Viljoen, 2003: 8-11):

"The proposed disaster management policy pursues the above-mentioned constitutional obligations. It also aims to give effect to various rights contained in the Bill of Rights of the Constitution. This includes the right to life, equality, human dignity, environment, property, health care, food, water and social security.

A further fundamental purpose of the policy is to advocate an approach to disaster management that focuses on reducing risks – the risks of loss of life, economic loss, and damage to property, especially to those sections of the population who are most vulnerable owing to poverty and a general lack of resources. It also aims to protect the environment.

This approach involves a shift away from a perception that disasters are rare occurrences managed by emergency rescue and support services. A shared awareness and responsibility need to be created to reduce risk in our homes, communities, places of work and in society generally.

This requires a significantly improved capacity to track, monitor and disseminate information on phenomena and activities that trigger disaster events. It needs the support of institutional emergency preparedness and response capacity at local, provincial and national levels. It also implies an increased commitment to strategies to prevent disasters and mitigate their severity.

The policy also seeks to integrate this risk reduction strategy into existing and future policies, plans and projects of national, provincial and local government, as well as policies and practices of the private sector.

In short, the policy aims to:

- Provide an enabling environment for disaster management.
- Promote proactive disaster management through risk reduction programmes.
- Improve South Africa's ability to manage emergencies or disasters and their consequences in a co-ordinated, efficient and effective manner.
- Promote integrated and co-ordinated disaster management through partnerships between different stakeholders and through co-operative relations among all spheres of government.
- Ensure that adequate financial arrangements are in place.
- Promote disaster management training and community awareness.

There are seven key policy proposals set out in the White Paper:

- The urgent integration of risk reduction strategies into development initiatives.
- The development of a strategy to reduce the vulnerability of South Africans – especially poor and disadvantaged communities – to disasters.
- The establishment of a National Disaster Management Centre to:

  - Ensure that an effective disaster management strategy is established and implemented.
  - Co-ordinate disaster management at various levels of government.
  - Promote and assist the implementation of disaster management activities in all sectors of society.
- The introduction of a new disaster management funding system which:
  - Ensures that risk reduction measures are taken.
  - Builds sufficient capacity to respond to disasters.
  - Provides for adequate post-disaster recovery.
- The introduction and implementation of a new Disaster Management Act which:
  - Brings about a uniform approach to disaster management.
  - Seeks to eliminate the confusion created by current legislation regarding declarations of disasters.
  - Addresses legislative shortcomings by implementing key policy objectives outlined in this White Paper.
- The establishment of a framework to enable communities to be informed, alert and self-reliant and capable to supporting and co-operating with government in disaster prevention and mitigation.
- The establishment of a framework for co-ordinating and strengthening the current fragmented training and community awareness initiatives."

Based on this policy, the Disaster Management Act has been promulgated (Republic of South Africa, 2002). It focuses mainly on preventing or reducing the risk of disasters, mitigating the severity of disasters, emergency preparedness, rapid and effective response to disasters and post-disaster recovery.

5.4 Drought Management Strategy (2003)

Arising from the provisions of section 25 of the Disaster Management Act, a Disaster Management Plan (DMP) needs to be drafted to cater for the specific needs of the Agricultural sector. The Drought Management Strategy (DMS) that will form part of the DMP will be the sole responsibility of the National Department of Agriculture, while it will strengthen the organisational structure with the establishment of a Directorate of Agricultural Disaster and Risk Management. The following is stated (National Department of Agriculture, 2003: 7-9):

"The vision contained in the Drought Management Strategy is to develop for the South African Agricultural Sector, an effective integrated management system, with special reference to the reduction of risk caused by disasters whether by 'natural triggers' or those that are more human-induced.

The target goal is to create a culture where preparedness and awareness to minimise the impact of disasters, as a daily activity, will play a pivotal role.

The strategic objectives will begin with a process of reducing risk to disasters and the management of disasters through:

- Utilising the existing legislation and organisational structures to manage risk and more specifically the management of disaster reducing measures;
- setting up a comprehensive drought plan in a system of information management, monitoring and evaluation that may assist in determining various vulnerabilities to disasters (both biophysical and social) and hereby minimising the impact of disasters;
- compiling disaster indicator 'maps' as to provide an overview (weekly or bi-weekly) of the disaster situation in South Africa, as to where it is emerging, subsiding or forecast;
- improving and implementing early warning systems; and
- establishing and implementing priority programmes for risk reduction.

The strategy represents a marked departure from the existing approach to drought management. Risk management and therefore risk reduction is the core principle of the

strategy and is aimed at reducing the vulnerability of the farming communities, especially the poor and disadvantaged. Furthermore it will follow an approach where farmers must learn to live with disasters, especially drought, in a sustained, ongoing daily activity.

The strategy signifies a shift away from the disproportionate emphasis given to rare major disasters and the Government's intention to move away from direct financial intervention and rather improve South Africa's ability to manage emergencies or disasters and their consequences in a co-ordinated, efficient and effective manner. The strategy recognises the fact that Government should provide relief only where sustainable agricultural management is employed over the long-term, which presents the question of reciprocation by way of a partnership between the Government and the farming community."

5.5 Flood management

With regard to flood management, a new Flood Management Strategy is not yet formalised for South Africa but it should be like the Drought Management Strategy. Focusing more on pro-active risk management than on reactive crisis management, apply a continuous strategy involving proactive as well as reactive measures and a package of measures (relief, preparedness, mitigation and rehabilitation), and to involve all government levels and affected people and to decentralise wherever possible. Research conducted in the Department of Agricultural Economics at the University of the Free State has provided flood control planning models (FLODSIM and TEWA) which are presently applied in flood plains to address the issues of quantifying and managing flood risk in Disaster Management plans and strategies

6 Integrating disaster management into development planning

Disaster Management must be integrated with development planning as part and parcel of a total approach towards disaster management. Backeberg and Viljoen (2003: 11-12) state in this regard:

"The integration of Disaster Management into development planning and programming can only be effective and realistic if governments and disaster managers are committed to see it through. The following needs to be considered:

- There must be a political will and commitment to implement the programme. The higher the level of the political authority, the better the potential for success.
- If governments are serious about the implementation of such programmes, then resources have to be available to ensure effective implementation.
- Disaster Management is of a multi-sectoral nature. Thus, the ability to co-ordinate effectively is a major requirement as is the clarity with which the responsibilities and tasks of the sectors are laid down. This is practical integration – an acceptance by the sectors that disaster management is an integrated part of their programmes, to be implemented by them by staff whose job descriptions also carry the disaster management commitment.
- Implementing of such programmes must be cost-effective. This involves looking for ways in which disaster management can be implemented without the programme becoming a huge extra cost to government. Existing resources and programmes must be used, rather than creating new ones.
- Effective developmental disaster management programmes will only be effective if true ownership of the programme is accepted. True ownership must rest with those who are targeted under the programme. These are the vulnerable and, by implication, the poor – the people who do not have options or choices (Westgate, 1999). To assure this, there must be first the political will to ensure success in disaster management.
- Disaster management must be sustainable. This means keeping the issues alive. Westgate (1999) indicates two useful

approaches to keep the issues in the public mind, namely training and public awareness. Training cannot only take place when money is available or once every five years. Therefore, the training process must be integrated and ensure that people are being trained on a regular basis so that people can know what their responsibilities are in the implementation of disaster management programmes. In the same way public awareness can contribute to sustainability. 'Ongoing public awareness, with the momentum shifting to community representatives, can lay the foundation of this ownership.' Public awareness must be a two way process which establishes dialogue, rather [than] to focus too much on officials passing onto communities what they feel communities should know (Westgate, 1999).

Finally, mitigation actions and development are not synonymous and therefore not too much emphasis must be placed on mitigation. Mitigation actions aim to reduce the impact from future disasters, while development aims to build community capacity and to promote self-reliance in relation to social and economic parameters. According to Westgate (1999) the precursor to any effective risk and vulnerability reduction is not purely the implementation of a comprehensive disaster management programme; it is the implementation of a sound development programme (Viljoen *et al.,* 2001: 69-70)."

7
Concluding remarks on policy and strategy guidelines

- In the dynamic world we are living in, the development of effective policies and strategies to manage floods and droughts is an ongoing process because the factors determining efficient policies and strategies are continuously changing.
- Looking at and comparing the disaster (drought) situations in different countries and regions shows some similarities, but also a wide diversity in the impacts experienced as well as in the response to these impacts. Where the nature of the direct impacts of disasters is quite similar in various countries, the nature and extent of the indirect impacts are country-specific, depending on the particular circumstances in a country. Also, differentiate strategies to manage disasters and their impacts between countries.
- Effective policy/strategy development should happen within a theoretical optimising framework. Within the optimising framework the various factors identified must all receive due consideration. Of special relevance also are the principles that should guide policy formulation, where the examples cited from the South African scenario are cases in point.
- Determining an efficient event (flood or drought) management strategy for a country needs to incorporate the characteristics of various factors (which are country-specific) within a theoretical framework for optimal disaster management. The factors include socio-economic development level of the country; degree of institutional capacity; indigenous traditions, culture and beliefs; sectors and people at risk; frequency of severe events; causes and impacts of events; available resources; knowledge level and level of political stability. The theoretical framework for determining an optimal event management strategy involves a four-phase procedure, integrating information on an event, occurrence probabilities, impacts and measures/strategies to combat events within a cost-benefit or multi-criteria decision analysis framework.
- Reality learns that an optimal disaster management strategy for any country will always remain a theoretical ideal (an upper boundary). The best that can be achieved is an efficient strategy requiring a continuous commitment and dedication for improvements.

- Recent developments in drought policies in the more developed countries are to view agricultural droughts as a normal farming risk, to focus more on proactive risk management than on reactive crisis management, to apply a continuous strategy involving proactive as well as reactive measures and a package of measures (relief, preparedness, mitigation and rehabilitation), and to involve all government levels and affected people and to decentralise wherever possible. This also applies to floods.
- Disaster management must form an integrated part of developmental planning and requires a multi-departmental and multi-sectoral approach with the will and commitment of all role players to take true ownership and make it work or be successful.

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