

**A STUDY ON A
DISASTER RISK MANAGEMENT
PLAN FOR THE
SOUTH AFRICAN AGRICULTURAL
SECTOR**

**Submitted to:
Agri SA, TAU SA,
NAFU SA and Total SA**

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ABBREVIATIONS

DM - Disaster Management
DoA - Department of Agriculture
DMP - Drought Management Plan
DRM - Disaster Risk Management
DWAF - Department of Water Affairs and Forestry
LDC - Less Developed Countries
MDC - More Developed Countries
MDMC - Municipal Disaster Management Centre
NAFU SA - National African Farmers Union of South Africa
NDMC - National Disaster Risk Management Centre
NCO -National Commodity Organisations
NDRMF - National Disaster Risk Management Framework
PDMC - Provincial Disaster Management Centre
SAWS - South African Weather Services

EXECUTIVE SUMMARY

The management of risks is one of the great challenges of the 21st century. The ever-growing population, economic and environmental losses due to natural or human-made disasters, provide the necessity for a systematic approach to the management of risks.

Organised agriculture, by way of its organisational structures in Agri SA, NAFU SA and TAU SA, with the financial backing of Total SA, is truly concerned about natural hazards and disasters facing the sector and how risk management should be perceived, working in close collaboration with Government.

This study was commissioned to underpin the specific concerns of the sector and to put a framework in place taking the features of assessment, prevention or reduction of disasters, mitigation, preparedness, response, recovery and rehabilitation, captured in the Disaster Management Act, 57 of 2002, into consideration.

A comprehensive literature study was the basis for this report intended as the first phase of private sector input to compile a disaster risk management framework for the agricultural sector, in collaboration with the Government.

South Africa, with its specific profile of scarce natural resources, demonstrate why disaster risk management is such a vital issue.

In order to create clarity the concepts commonly used regarding disaster risk management such as risk, risk management, hazards, disasters etc., were discussed and defined.

Following this, attention was turned to the risks associated with of droughts and floods as it present itself as prominent hazards normally resulting in disasters.

During the literature study it became clear that most countries worldwide experience similar problems regarding risks and disasters and the management of the disasters they encounter, whilst there are great similarities amongst the approaches to deal with these disasters. The study included an evaluation of approaches to disaster management frameworks in other parts of the world, as well as the national framework applicable to South Africa.

The Disaster Management Act, 57 of 2002 and the National Disaster Risk Management Framework, 2005 (NDRMF), were studied at length and summarised into a digestible format of what is applicable to the agricultural sector.

Following this, the relationships between the provisions of the Disaster Management Act, 57 of 2002, NDRMF, disaster management plans of the various organs of State were discussed. The next chapter deals with the involvement of the agricultural sector in stakeholder participation, technical advice, planning and financial aid in respect of disaster risk management.

It was advisable to sketch the perceived goals of the agricultural sector in relation to disaster risk management.

The implementation of disaster risk management measures, within the different commodity groups of the sector as well as the integration, was discussed.

It became evident that there is a host of cross cutting factors that are impacting on the vulnerability of current and future participants in the agricultural sector. A list of known factors like disasters, climate change,, legislation, were set up. It is necessary to expand and define these factors.

Attention was given to an estimation of risks, hazards or events and the probability of the occurrence of such hazards or events.

A summary of the probable impact of disaster risk management on the agricultural sector concludes the study.

In summary, the recommendations are -

One. That a national indaba or summit be arranged with the role players in the agricultural sector, relevant Government officials, academics and other interested parties, to discuss disaster risk management in the agricultural sector on the basis of this document and to agree on a common approach and implementation strategy.

Two. To utilize the proposed pro forma or template contained in the study for the development of disaster risk management strategies for the respective groupings i.e. horticulture, agronomy and animal husbandry. Further adjustment of the template for adoption by Commodity Groupings with the view to their peculiar disaster risk strategy development might be necessary. The involvement of the structures of Organised agriculture, especially at local municipality level, within the National Disaster Risk Management Framework, need to be developed and implemented.

A condensed disaster risk management strategy for purposes of an input to Government could be considered

Three. To consider a further study on the impact of the cross cutting factors on the risk profile and vulnerability of agriculture. A general evaluation of the impact of agricultural legislation as it relates to risks, should be considered and possibly a more immediate focus on the Fertilizer, Farm feeds, Agricultural Remedies and Stock Remedies Act, 1947(Act no 36 of 1947) and the Animal Health Act, 2002(Act no.7 of 2002), with the view of putting proposals forward for the revision or amendment thereof. A study also needs to be considered in the manner agricultural legislation is generally managed.

CHAPTER 1

INTRODUCTION

The management of risks is one of the greatest challenges of the 21st century. The ever-growing population, economic and environmental losses due to natural or human-made disasters, provide the need for a systematic approach to the management of risks. It is generally accepted that a multi-disciplinary understanding of disaster risk management is required. The established World Institute for Disaster Risk Management, a network for applied research, implementation and dissemination in the field of disaster risk management, provides the framework for major contributions towards an integrated risk management culture.

A complicating factor is that disaster risk management has become increasingly complex, compared to previous responses to natural and human-caused events. For example, emergency drought relief has been a priority for many governments, because in severe droughts, governments are the only bodies able to intervene on the required scale. Most recently, the rising costs of drought relief in the industrialised countries has led to a policy shift away from emergency subsidies provided by the taxpayer, towards more long term self-reliance by rural communities.

Disaster risk management has become a focus area for scientific endeavours to achieve a better understanding of the hazards that shape our natural and built environments, and to set standards to bring about a safer world. It encompasses, for example, interpreting the early warning signals of natural phenomena, such as too little or too much rainfall. Similarly, it involves contingency planning and response to emergency events triggered by both natural and non-natural (including technological) forces.

Disaster risk management seeks to reduce the vulnerability of those communities most at risk through improved access to services, development opportunities, information, education and empowerment.

Disaster risk management seeks to involve communities at all levels to uphold the optimal use, conservation and protection of the natural resources of the country.

1.1 Scope of the study

Given the magnitude of the disaster risk management for the private sector and in particular the agricultural sector, the implementation of initiatives by Government in this regard, is of utmost importance. Agri SA, NAFU SA and TAU SA with the financial support of Total SA, took the initiative to investigate methods whereby organised agriculture can support Government bodies and particularly the National Department of Agriculture, in devising and implementing a national disaster risk management strategy or plan for the agricultural sector, in line with the Disaster Management Act, 57 of 2002 (referred to as "the Act") and the related National Disaster Risk Management Framework. This study also gives content to the key elements of the Act, which stipulates that community participation and consultation must be adhered to in the development of integrated development plans.

It was thus decided to commission the following study:

"A comprehensive evaluation of current policy initiatives towards disaster management and the required participation by the private sector and particularly organised agriculture in the process."

It was agreed that the following elements should be covered by the study:

- Identification of goals pertaining to disaster risk management in agriculture: what is to be achieved and with what purpose in mind, e.g. food security?
- How can the diversity of agriculture (horticulture, agronomy and animal husbandry as well as commercial and emerging agriculture), be catered for within the full context of disaster risk management, and response and recovery in particular?
- Identification of meaningful integration between risk assessment, reduction, mitigation, response and recovery in the agricultural sector.
- Desktop research and collaboration with international and local experts in the particular field, to find common ground on appropriated disaster risk management systems for the agricultural sector.
- Identify and describe the definitions of disasters and hazards relating to the Act and the agricultural sector.
- Identify the tangent plane between the provisions of the Disaster Management Act, 57 of 2002, the National Disaster Risk Management Framework, the disaster management plans of the various organs of State, and the agricultural sector.
- Identify the legally and otherwise required involvement of the private sector with all three tiers of government, pertaining to disaster management systems.

1.2 Conceptual framework of the study

Based on a literature review it was found that a large number of studies on the various aspects of disaster risk management and particularly hazards have been conducted. To set up a detailed framework for a sector such as agriculture, with its diversity of horticulture, agronomy and animal husbandry as well as commercial and emerging agriculture, is an immense task that must be done in collaboration with each sub sector. It was agreed that this study should form the outlines or "blue print" for possible further studies.

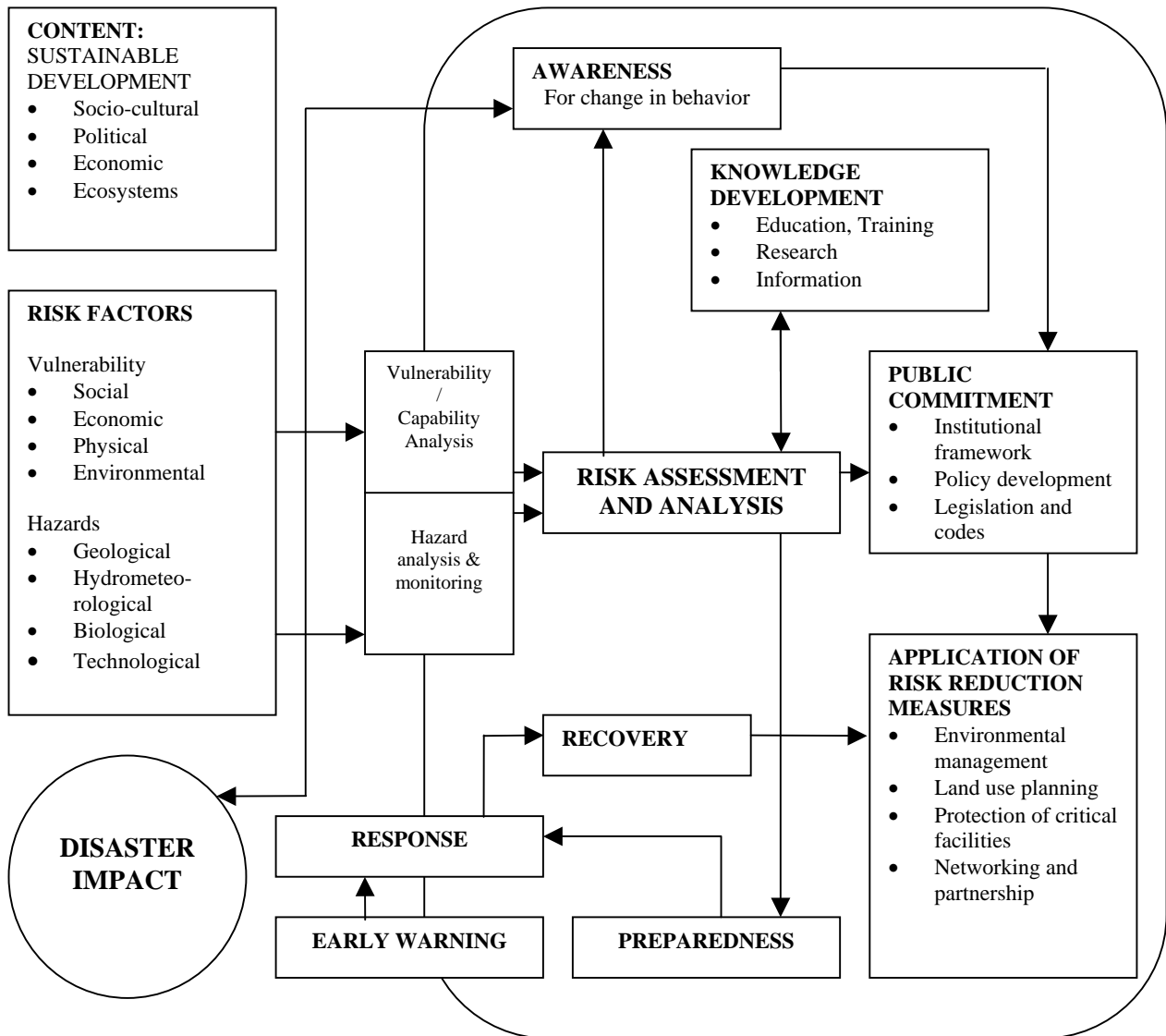
As an entrance to the framework it was deemed necessary to evaluate firstly the South African agricultural profile and its vulnerabilities, secondly to evaluate certain approaches to disaster risk management that were/are followed by different countries. In the third place, to discuss disaster management legislation in South Africa and the impact thereof on the agriculture sector, followed by an overview of how the sector can be accommodated within the full context of disaster risk management. Fourthly to provide a pro forma, which the relevant National Commodity Organisations can modify to implement, their disaster risk management strategies. Lastly the recommendations and conclusions.

It is worth noting that although risks and disasters have been there since the existence of mankind, the subject of disaster risk management is still not concluded. The long line of documents, and in particular the Disaster Management Act, 57 of 2002, also triggered the necessity for a comprehensive and thorough look at the challenge of disaster risk management at all spheres of Government, with the involvement of communities.

Although this study is based on available scientific information, it is meant to be a discussion document, which can be refined as further inputs of role players are gathered.

As a basis for the study the principles contained in the diagram below, developed by the United Nation's International Strategy for Disaster Reduction (ISDR), was used to explain the disaster risk management environment.

It is important to note that diagram promotes the holistic nature of disaster risk management keeping sustainable development in mind. The different elements of disaster risk management namely risk assessment, awareness, reduction, response, recovery are displayed in a useful manner.



CHAPTER 2

PROFILE OF SOUTH AFRICAN AGRICULTURE, FORESTRY AND WATER RESOURCES

2.1 Introduction

In order to give the reader an insight in the landscape in which agriculture has to operate, the main features were highlighted.

2.2 Agriculture

The recently completed South African National Land Cover Data Set provides estimates of the relative land use in the country, Agriculture uses 86% of the land (mostly natural veld), of which 13% is used for cultivation of crops and 2.5% for settlements. However, due to the increasing population and other land uses, the agricultural land available per capita of the population is significantly decreasing. In 1970 there were 0.86 hectares of agricultural land available per person in South Africa, 0.5 hectares per capita in 1980, and it is estimated that it will further decrease to 0.2 hectares per capita by the year 2020.

Approximately 8% of South Africa has been invaded by alien vegetation, and millions of hectares are affected by bush encroachment. The introduction of alien plant species has serious implications for water availability. South Africa's forestry plantations use about 3% per annum of the available surface water, while alien plants consume 7% of the available surface water per annum. Production pressures on agricultural land have resulted in the degradation of the vegetation and soil, and have rendered the land less fertile. 5% of the land has been affected by water erosion, and the average soil loss is estimated at 2.5 tonnes per hectare per year

The value of commercial agricultural production in South Africa was R67 billion in 2005, while the contribution to the GDP was around R35 billion. Nominal growth in agricultural production has been 11.5% per annum since 1965, while the economy as a whole grew by 14.4% per annum over the same period, resulting in a decline of agriculture's share of the GDP from 9.1% in 1965 to 2.6% in 2004. Despite its relatively small share of the total GDP, agriculture is an important sector in the South African economy. It remains an important provider of employment, especially in the rural areas, and a major earner of foreign exchange. Agriculture's strong indirect role in the economy is a function of backward and forward linkages to other sectors. Purchases of goods such as fertilisers, chemicals and implements form backward linkages with the manufacturing sector, while forward linkages are formed through the supply of raw materials to industry. About 70% of agricultural output is used as intermediate products in the industrial sector. Agriculture is therefore a crucial sector and an important engine of growth for the rest of the economy.

The agricultural industry in South Africa is divided into two sectors, namely the commercial sector and the predominately subsistence-oriented sector in the traditionally rural areas.

Livestock is the most important contributor to the agricultural sector, generating 32 billion Rand in 2005. Horticultural products generated 20 billion Rand in 2005, with deciduous fruit and vegetables being the major contributors. Field crops, mainly maize, sugar cane and wheat, generated over 15 billion Rand in the same year.

2.3 Forestry

South Africa has one of the largest human-made forestry resources in the world, utilising 1.5% of the cultivated land. In 1996/7 the total turnover for forestry was around 13.1 billion Rand and the industry employs more than 150 000 people. The exports are mainly converted, value-added products, with raw material exports only making up 1.8% of the total. The main products that are exported are pulp and paper sawn lumber, wood chips and wattle extract. The private sector currently owns 70% of the total plantation area, as well as virtually all the processing plants. The Department of Water Affairs and Forestry is currently involved in a process of restructuring the State's commercial forests and of transferring ownership of these forests to the private sector.

2.4 Water Resources

Due to the topography of the land, the natural availability of water is unevenly distributed across the country, with more than 60% of the river flow arising from only 20% of the land area. South Africa has very little groundwater as it is mainly underlain by hard rock formations. No major groundwater aquifers have been found that can be utilised on a national scale. The groundwater that is available is mostly used for agricultural purposes and rural water supply. Most metropolitan and industrial growth centres have developed around mineral deposits and harbour sites, which are remote from major river courses. This has resulted in water requirements exceeding the natural availability of water in several river catchments. Supply and needs therefore have to be balanced by large water resource development projects and the inter-basin transfer of water. Surface water resources are impounded and diverted not only within the country, but also through co-operation from adjacent countries.

A review of water availability in 1996 estimated that the total average annual surface runoff was 50 150 million cubic metres, the maximum potential annual system yield was 33 290 million cubic metres, and total water annual requirements were 20 045 million cubic metres.

According to the Department of Water Affairs and Forestry (DWAF, 2000a) water requirements could increase by about 50% by 2030. Careful planning of water resources is essential to mitigate low annual rates of rainfall, highly variable patterns of rainfall from one year to the next and low levels of water runoff. Contamination of water resources through industrialisation, urbanisation and a rapid population growth, also has an adverse effect on water resources.

Management of South Africa's water resources has been achieved through the introduction and implementation of legislation, particularly during the second half of the 20th century. The National Water Act (Act 36 of 1998) provides the principles and legal framework for water resources management, within a framework of equitable access, beneficial utilisation and environmentally sustainable practices.

2.5 Geographic Profile

The Republic of South Africa occupies the southernmost part of the African continent, stretching latitudinally from 22°S to 35°S and longitudinally from 17°E to 33°E, with a surface area of 1 219 090 km². It has common boundaries with the Republics of Namibia, Botswana, Zimbabwe and Mozambique and the Kingdom of Swaziland. Completely enclosed by South African territory, is the Kingdom of Lesotho. To the west, south and east, South Africa borders on the Atlantic Ocean and southern Indian Ocean respectively. Prince Edward, Marion and Gough Islands, which are situated southeast of Cape Town in the Atlantic Ocean, also form part of the South African Republic. The surface area of South Africa has two distinct features, namely: an interior plateau, and the land between the plateau and the coast. Forming the boundary between these two areas is the great escarpment, the most prominent and continuous relief feature in the country. Its height above sea level varies from approximately 1 500 to 3 482 m. Inland from the escarpment lies the interior plateau, which is the southern continuation of the great African plateau stretching north to the Sahara. The plateau itself is characterised by wide plains with an average height of 1 200 m above sea level. Between the Great Escarpment and the coast lies an area which varies in width from 80 to 240 km in the east and south to a mere 60 to 80 km in the west.

The South African coastline stretches for about 3 000 km from Namibia in the west to Mozambique in the east. The coastline is rugged and its rocky shores are exposed to high wave energy with few sheltered coastal inlets. Two major ocean currents, the Mozambique Agulhas and the Benguela systems, sweep the South African coastline. The former is a warm, south-flowing current skirting the east and south coasts as far as Cape Agulhas. The Agulhas current is relatively warm (20 to 25°C), and the plant and animal diversity is high. The Benguela Current on the other hand, is cold (16 to 21°C) and flows northwards as far as southern Angola along the west coast.

2.6 Climatic Profile

The climate in South Africa is typically warm and dry, with daytime winter temperatures rarely falling below 0°C, and summer maxima often above 35°C. The subtropical location, on either side of latitude 30 degrees S, accounts for the warm temperate conditions. The country also falls within the subtropical belts of high pressure, making it dry, with an abundance of sunshine. The wide expanses of ocean on three borders have a moderating influence on its climate, although gale force winds frequently occur along the coastlines.

South Africa lies within a drought belt with an average annual rainfall of only 464mm, compared to a world average of 857mm. 21% of the country has an annual rainfall of less than 200mm, 48% has between 200 and 600mm, while only 30% records more than 600mm. In total, 65% of the country has an annual rainfall of less than 500mm. Furthermore, the rainfall is typically unreliable and unpredictable. The central and eastern parts of the country receive summer rainfall, whilst the south western part of the country is a winter rainfall region.

Frost often occurs on the interior plateau during cold, clear winter nights. The frost season is longest, from April to October in the eastern and southern plateau areas, which border on the escarpment. Frost decreases to the north, while the coast is virtually frost-free. Average annual relative humidity readings show that the air is driest over the western interior and over the plateau. Along the coast, the humidity is much higher and at times may rise to 85%.

CHAPTER 3

DISCUSSION ON CONCEPTS COMMONLY USED PERTAINING TO DISASTER RISK MANAGEMENT AND DISASTERS

3.1 Introduction

It was decided to study the various concepts and terminology used in the field of disaster risk management in order to speak the same 'language'.

3.2 Disaster management in terms of the Disaster Management Act, 2002

Disaster management in terms of the Disaster Management Act, 2002, means a continuous and integrated multi-sectoral, multi-disciplinary process of planning and implementation of measures aimed at -

- Preventing or reducing the risk of disasters;
- Mitigating the severity or consequences of disasters;
- Emergency preparedness;
- A rapid and effective response to disasters; and
- Post-disaster recovery and rehabilitation.

3.3 Disaster Risk Management

Disaster risk management aims to increase the likelihood that a household, community, city or any area will be able to anticipate, resist or recover from the losses sustained from a hazard or other threat, without external assistance.

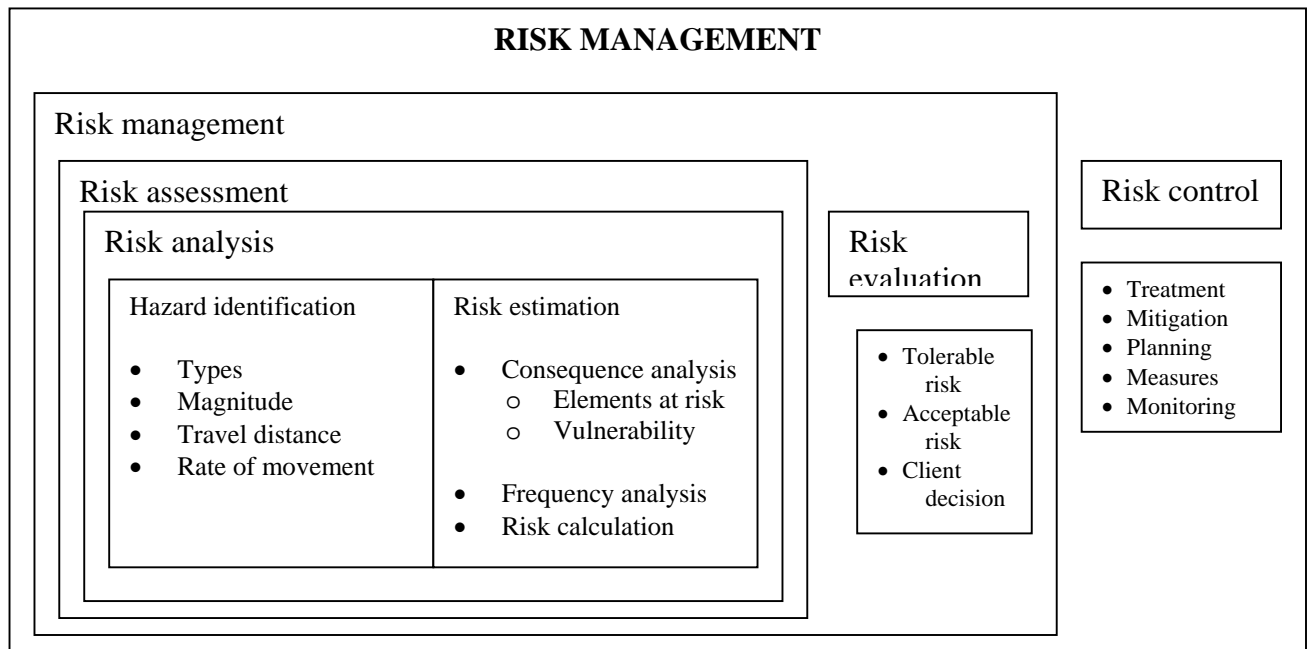
Risk management is a concept that may be implemented in various ways.

Effective risk management approaches include the following characteristics:

- There is a planned and documented risk management process.
- The process is based on a prospective assessment.
- The assessment is periodically reviewed in order to validate the initial findings and to uncover new problem areas.
- A defined set of evaluation criteria is applied in order to cover all aspects of the process.
- The on-going results of the risk management process are formally documented.

Risk Management can also be described as the process of identifying, measuring and assessing risks posed by various hazards and then developing the strategies to manage the risk of hazards becoming disasters. *See figure below.*

(Note: The activities of the World Institute for Disaster Risk Management are based on this general framework.)



3.4 Elements of Disaster Risk Management

The following measures are intended to strengthen the management of risks and the consequences of disasters or to reduce losses:

3.4.1 Risk assessment

Risk assessment is contained in three distinct steps -

- The identification of hazards likely to result in disasters;
- The estimation of the risks of such events; and
- The evaluation of the social and economic consequences of the derived risk (Kates and Kasperson, 1983).

3.4.2 Prevention or reduction of risks

Measures designed to provide permanent protection or reduce the intensity of a hazardous event so it does not become a disaster e.g. reforestation an unstable slope to prevent landslides.

3.4.3 Mitigation

Measures taken well in advance of a hazard alert to minimise the severity or consequences of disasters and the vulnerability of communities and households to a known or expected threat e.g. protecting deep wells in cholera-prone areas, crop diversification to drought tolerant varieties.

3.4.4 Preparedness for emergencies

Advance measures taken to predict, respond to and manage a hazard event. Measures that prepare people to react appropriately before, during and after an emergency, e.g. dissemination

of early warning information on approaching cyclone, or intensified health education before the rainy season.

3.4.5 Response / Relief to disasters

Measures taken to alleviate immediate hardship and meet basic needs for shelter, water, sanitation, health care as well as search, rescue and protection of those affected.

3.4.6 Recovery / rehabilitation - post disasters

Process undertaken by a disaster-affected community to fully restore itself to its pre-disaster level of functioning and which enables it to become even more disaster-resistant e.g. planting/harvest of drought resistant crops, storm-proofing essential community buildings, schools and clinics.

3.4.7 Vulnerability

Vulnerability means the degree to which an individual, a household, a community or an area may be adversely affected by a disaster. Vulnerability, like risk and hazard, is a possible future state that implies high risk combined with an inability to cope. Human vulnerability is a more complex term. Timmerman (1981) viewed it as the degree of resistance offered by a social system to the impact of a hazardous event. In turn, resistance depends on either resilience or reliability.

Resilience is a measure of the capacity to absorb and recover from the impact of a hazardous event. Traditional resilience is common in the LDCs where disaster is a 'normal' part of life and group coping strategies are important.

Reliability reflects the frequency with which protective devices against hazard fail. This approach is more applicable to the MDCs where technology ensures a high degree of reliability for most urban services.

Blaikie et al. (1994) argued that it is people - not systems - that deal with disasters.

3.5 What are hazards?

Hazards are normally classified in the following broad categories -

Natural hazards. Atmospheric, geologic and hydrologic hazards like storms, earthquakes and floods, as well as the spread of infectious diseases. There is mounting evidence that worldwide environmental changes, especially climate change, will exacerbate the probability of natural hazards. This is also a sign that large-area hazards, as opposed to site-specific threats, will become more prominent.

(Note: Drought is defined as a slow-onset environmental hazard).

Technological hazards. Major accidents, industrial failures, hazardous materials threats to human life and unsafe public buildings. The dependence on electricity supplies and mass

communications to support the key functions of large cities and modern economies means that power failures and computer viruses can quickly disable urban life.

Context hazards: (global environmental change). International air pollution deforestation, desertification, loss of natural resources, intensive urbanisation - climate change.

Super hazards: catastrophic earth changes, impact from near earth objects.

New-concern threats. The ongoing spread of technology and urbanisation, together with growing social diversity and political tension creating opportunities for international violence and terrorism.

3.6 What are disasters?

Disaster in terms of the Disaster Management Act, 2002, means a progressive or sudden, widespread or localised, natural or human-caused occurrence which -

- (a) Causes or threatens to cause-
 - (i) Death, injury or disease;
 - (ii) Damage to property, infrastructure or the environment;
 - (iii) Disruption of the life of a community; and
- (b) Is of a magnitude that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources.

A disaster is also described as an event or hazard that overwhelms the capacity of a household, community, city, business or area, to resist or recover from the impacts without external assistance. Disasters are also social phenomena that occur when a community suffers exceptional, non-routine levels of disruption and loss.

3.7 What is risk?

Risk assessment involves evaluating the significance of a risk, either quantitatively or qualitatively.

According to Keith Smith (2004), quantitative risk assessment can be expressed as:

$$\text{Risk} = \frac{\text{Hazard (probability) X Loss (expected)}}{\text{Preparedness (loss mitigation)}}$$

Risks also need to be assessed in a qualitative way more accessible to lay people. The key step in disaster reduction is risk management that aims to lower the threats from known hazards whilst maximising any related benefits. As Keeney (1995) stated, a sound approach to risk requires both good science and good judgement.

Neither risk assessment nor risk management can be divorced from choices that in turn are conditioned by individual beliefs and circumstances.

Many people make decisions and take action about hazards based on their personal perception of risk.

Therefore, risk perception has to be regarded as a valid component of risk management alongside more scientific assessments. Distinctions are drawn between objective and perceived risks. This is because individuals perceive risks intuitively and often quite differently from the results obtained by more objective assessments that are based on financial cost-benefit models (Starr and Whipple, 1980). Resolving the conflict between the outcome of technical risk analysis and more subjective risk perception is a major problem in hazard management.

The type and degree of perceived risk varies greatly according to location, occupation and lifestyle, even between individuals of the same age and sex factors, and between nations (Rohrmann, 1994). It is common to classify risks into two main categories:

- Involuntary risks are not knowingly or willingly undertaken. Where they relate to rare events with catastrophe potential, the risk may be unknown to the exposed person, e.g. meteorite impact. If the risk is perceived, it may be seen as inevitable or uncontrollable, as in the case of droughts or earthquakes.
- Voluntary risks are more willingly accepted. Such risks are likely to be more common, have less catastrophic potential and are capable of control.

The scope for control is exercised either through modifications of individual behaviour (stopping smoking or ceasing participation in a dangerous sport), or by government action (the introduction of safety legislation or pollution control). Human-made hazards, including risks from technology, are usually placed in this group.

This division between risk categories is less clear than it appears. For example, while cigarette smoking and mountain climbing are obvious cases of voluntary lifestyle activities, the same cannot be so firmly stated for driving a car, which may be essential for people in remote areas. The alternative to working in a dangerous chemical factory may be unemployment. In other words, a risk is more voluntary than another risk if its avoidance is connected with a greater personal sacrifice on the part of the risk-bearer. Some floodplain dwellers may elect to buy a home that is cheaper than an equivalent property in a safer part of town. Such a decision can be both voluntary and economically rational. Voluntary risk-takers are sometimes seen as more identifiable than 'statistical' risk-takers because they are grouped in a specific hazard-prone setting. But, even if the group probability of risk can be estimated fairly accurately, as in the case of a large population of cigarette smokers, it is still not possible to know exactly which individuals will die from tobacco-related diseases.

Risk is the actual exposure of something of human value to a hazard and is often regarded as the product of probability and loss. Keith Smith (2004) defines risk as the (likely consequence) probability of a hazard occurring and creating loss.

Risk and uncertainty relate to situations where there is more than one possible outcome. F. Knight (1921) first formally distinguished between risk and uncertainty as:

- Risk: We can identify the probability of each possible outcome.
- Uncertainty: We can identify the outcome, but not the corresponding probabilities.

Risk cannot be avoided as long as we do not know what the future holds. Risks also continuously evolve and change. Assuming and managing risk is the essence of any decision-making process.

(Note. The difference between hazard and risk can be illustrated through two people crossing an ocean, one in a large ship and the other in a rowing boat (Okrent, 1980). The hazard (deep water and large waves), is the same in both cases but the risk (probability of capsizing and drowning), is very much greater for the person in the rowing boat. This analogy shows that, whilst the type of danger posed by earthquakes, for example, may be similar throughout the world, people in the poorer, less developed countries are more vulnerable and at greater risk than those in the richer, more developed countries. Clearly, the relationships between hazard and risk are much altered by human conditions and actions. When large numbers of people are killed, injured or affected in some way, the event is termed a disaster. Unlike hazard and risk, a disaster is an actual happening, rather than a potential threat, so we may define disaster (actual consequence), as the realisation of hazard (After Environmental hazards - Keith Smith -2004).

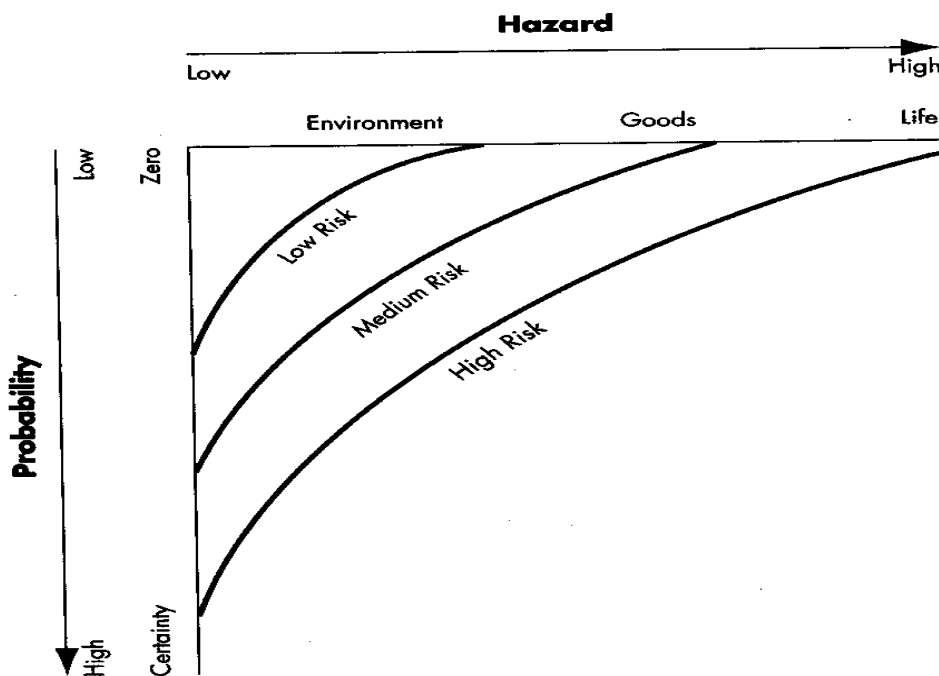


Figure 1.6 Theoretical relationships between the severity of environmental hazard, probability and risk. Hazards to human life are rated more highly than damage to economic goods or the environment.

Source: After Moore (1983).

3.8 What is Risk Transfer?

Refers to measures adopted by individuals and Governments and transfer of a portion of the risk of financing recovery/reconstruction after a disaster to another party, usually an (re) insurance company.

3.9 Examples of Risk Transfer Mechanisms

- Insurance and reinsurance.
- Reserve funds via the Income Tax system.
- Financial market instruments (i.e. catastrophe bonds).
- Privatisation of public services with safety regulations.
- Emergency funds.
- Savings clubs, stokvels, burial societies, cooperatives.

3.10 Insurance as mitigation tool

Insurance arises when a risk is perceived and the owner pays a fee (premium), usually on an annual basis, to buy a contract (insurance policy) that transfers the risk to a financial partner (insurer) (Munich Re, 2002). The insurer, a private company or the government, guarantees to meet specified costs in the event of damage to property. By this means, the policyholder is able to spread the cost of a potentially unaffordable disaster over many years. A commercial insurer takes the chance either that no loss will occur or that any claims will be less than the premiums paid. A government insurer will pay claims out of tax revenues.

Private insurance companies cover (underwrite) property such as buildings or crops against flood, storm or other specified environmental peril. Policy underwriters try to ensure that the property they insure is varied and is spread over diverse geographical areas so that only a fraction of the total at risk could be destroyed by a single event. By these means, the cost of payouts to a few claimants is spread over all policyholders and, assuming that the premiums are set at an appropriate rate, the money received will be sufficient. The insurance company makes its profits largely by investing the money received from premiums.

Environmental hazards create special problems, because the claims after events such as earthquakes or tropical cyclones, concentrate within short timescales and relatively small areas. The typical pattern of large claims following years with few losses also makes premium setting difficult and the funding of claims unpredictable. For example, in 1994 the insurance industry in California collected about US \$500 million in earthquake premiums but paid out over US \$15 billion over a long period for damage caused by the Northridge disaster. Six months after the event less than half of the ultimate loss had emerged and significant costs were still being paid more than four years after the earthquake. Adverse selection occurs when the policyholder base is either too narrow or is dominated by bad risks (Keith Smith, 2004). However, insurance companies can increase profitability by -

- Raising and re-rating the premiums.
- Restricting the cover.
- Widening the policyholder base.
- Re-insurance.
- Reducing the vulnerability of policyholders (Reciprocation).

The creation of a national insurance disaster fund backed by government solves some problems associated with commercial insurance. If made compulsory, state insurance not only widens the policyholder base as far as possible, but can also be used to raise public awareness of hazards and provide the information required for strengthening of buildings to national standards. In theory, this would enable premiums to be related more sensitively to the potential loss and

government would be in a stronger position than the insurance industry alone to impose restrictions on the sale of insurance in order to reduce adverse selection. The National Flood Insurance Act (1986) was an early attempt by the US government to reduce losses and to shift federal costs to state governments and the private sector. It is quite common for countries to have obligatory insurance cover for natural disasters through schemes involving public-private partnerships between the government and the insurance industry. Spain has had such a scheme for natural and technological disasters since 1954. New Zealand introduced government cover for earthquakes through the Earthquake and War Damage Act (1944), which was subsequently extended to cover damage from storms, floods, volcanic eruptions and landslips. The scheme was financed by a surcharge on all fire insurance policies. The Earthquake Commission (EQC) retains a fund of some NZ \$2.5 billion as a first call on disaster claims, and also has re-insurance arrangements, although the New Zealand government remains liable for any shortfall in disaster payments.

In South Africa, the Department of Agriculture commissioned a study on agricultural insurance as a mitigating instrument for the agricultural sector. A draft bill on agricultural insurance and a re-insurance agreement, whereby the local insurance industry and international re-insurance companies can be involved, has been drafted. Discussions on this issue are ongoing.

The following can be regarded as general advantages and disadvantages -

Advantages

- It guarantees the disaster victim compensation after loss.
- It provides an equitable distribution of costs and benefits, provided that owners pay a premium that fully reflects the risk and insurance payments fully compensate the insured loss.
- Insurance can be used to reduce vulnerability, provided that owners in hazardous areas pay the full-cost premium, this would be a financial disincentive to locate in such areas. existing owners can be encouraged to reduce their vulnerability and enjoy lower insurance premiums.

Disadvantages

- Insurance might be unobtainable in high-risk areas.
- There is frequently a low voluntary uptake of hazard insurance.
- A significant proportion of policyholders will be under-insured for the full value and therefore unlikely to be fully reimbursed in the event of a claim.
- Unless premiums are scaled directly to the risk, hazard zone occupants will not bear the cost of their location.
- Although insurance can be employed to reduce losses, the existence of moral hazards increase damages, when insured persons reduce their level of care and thus change the risk probabilities on which the premiums were based.

3.11 Income tax provision as mitigation tool

(Note: This paragraph must be read in conjunction with paragraph 12.22.)

This arrangement could be the first step in creating a reserve fund to mitigate disasters. Although this concession is presently only available to stock farmers encountering drought conditions, there is a case to be made to extend it to other farming activities. Such a reserve fund could be used as a mechanism to bolster the envisaged initiatives to create a system pertaining to insurance.

3.12 Early warning

Early warning on the one hand is being described as timely and effective information, through identified institutions, that allows individuals, households, areas and communities exposed to a hazard to take action to avoid or reduce the risk and prepare for effective response. On the other hand the early warning system allows for detecting and forecasting impending extreme events to formulate warnings on the basis of scientific knowledge, monitoring and consideration of the factors that affect disaster severity and frequency. Early warning systems include a chain of concerns, namely: understanding and mapping the hazard, monitoring and forecasting impending events, processing and disseminating understandable warnings to political authorities and the population, and taking appropriate and timely actions in response to warnings. It is clear that early warning systems relies heavily on clear and reliable information and communication which in turn relies heavily on local community participation. As early as April 2003, early warnings of below normal rainfall were communicated by the Interdepartmental Disaster Management Committee (IDMC) to all national and provincial departments. It became apparent that certain communities heeded the warnings whereas others ignored them. Others, it would seem, have not taken on the country-wide implications of government advice. Early Warning Systems are still essential but longer-term, interactive approaches that link current development plans to longer-term risk reduction have become important. It is imperative that funding and capacity for research on early warning by the State must be increased.

CHAPTER 4

DISCUSSION ON DROUGHTS AND FLOODS AS PROMINENT HAZARDS RESULTING IN DISASTERS

4.1 Introduction

It is generally recognised that there are a large number of risks and hazards resulting in disasters with its own peculiar circumstances known to plague the agricultural sector. It is however, for various reasons not the intension to discuss each and every one in this document. Since droughts and floods are the most common and devastating disasters in South Africa, it is appropriate to discuss it in more detail. Other hazards or impediments impacting on agriculture will be discussed later in the document.

4.2 Droughts

South Africa has long been recognised as a country subjected to recurring droughts of varying spatial and temporal dimensions. The 1923 final report of the Drought Investigating Commission remains a classic publication on the subject, while the great droughts of the 1930s, which coincided with the *Great Depression*, have been the local drought benchmark for decades (Bruwer, 1990).

Drought is a major feature of the climate of Southern Africa and often has a devastating impact. Drought is a normal condition of almost all climates on earth. Drought is a condition of climatic dryness that is severe enough to reduce soil moisture and water levels below the minimum necessary for sustaining plant, animal, and economic systems. Drought is different from the rapid-onset environmental hazards. It is called a 'creeping' hazard because droughts develop slowly and have a prolonged existence, sometimes over several years. Unlike earthquakes or floods, droughts are not constrained to a particular tectonic or topographic setting, so their impact can extend over very extensive areas. Thus, drought has similarities to large-scale context hazards. Finally, the impact of drought varies greatly according to climatic conditions and national wealth. The effects are most serious in the developing countries, which depend on dry land agriculture. Today, there are no deaths from drought in the MDCs, but in LDCs, the effect of unusually low rainfall on already precarious food supplies often creates a link between drought and famine-related death.

Famine is the most serious potential outcome of drought although the linkage is not simple. Drought is the most important environmental hazard in semi-arid regions for two reasons. First, a low mean annual rainfall is associated with high variability. It is the lack of rainfall reliability, rather than rainfall amounts in these areas -from season-to-season or year-to-year, which creates uncertainty about the available water supplies and leads to drought hazards. Second, the duration of drought is longer in the drier lands. In wetter areas, a rainfall deficit is likely to persist for a few months only.

Unlike most hazards, drought can be difficult to recognise, especially in the early stages, and it is defined in terms of effects rather than causes. The simplest definition is 'any unusual dry period which results in a shortage of water'. Rainfall deficiency is therefore the 'trigger', but

it is the shortage of useful water -in the soil, in rivers or reservoirs -which creates the hazard. Furthermore, it is important to view any water shortage in relative terms of need rather than in absolute rainfall amounts. In other words, drought and aridity are not the same. This is because humans adapt their activities to the expected moisture environment: a yearly rainfall of 200 mm might be reasonable for a semi-arid sheep farmer but could be a disastrous drought for a wheat farmer accustomed to an average of 500 mm per year. Droughts are not confined to areas of low rainfall any more than floods are confined to areas of high rainfall, and drought should always be viewed in the context of a specific climatic regime and the associated demands for water. Partly because of the difficulty to adhere to these features, crisis management has been the typical human response to drought.

Emergency methods focus on highly invisible measures of government intervention like water rationing, cash aid or food distribution. Longer-term adjustments favour increasing the supply of water to meet anticipated demands, for example, by building more storage reservoirs. Much less attention has been given to improving efficiency in water use and to promoting the management of water demand as well as supply. A demand-based approach means developing more sustainable responses to water shortages, like water re-cycling in urban areas, better irrigation practices and the increasing selection of drought-resistant crops. Wilhite and Easterling (1987) criticised the failure of governments in the MDCs to distinguish between such differing objectives when formulating drought policies. Any response and recovery initiatives in South Africa will also have to take cognisance of this reality.

4.2.1 Types of drought

4.2.1.1 Meteorological drought

The South African Weather Service defines drought on the basis of the degree of dryness in comparison to "normal" or average amounts of rainfall for a particular area or place, and the duration of the dry period. Meteorological drought is therefore linked to the average rainfall in a certain area. A deviation from normal measured rainfall could indicate a meteorological drought. Meteorological drought is therefore region specific. The South African Weather Service normally monitors meteorological droughts.

Rainfall deficiency in itself may not create a hazard, because the links between precipitation and the useful water that is necessary to meet normal demands, are indirect. Thus, rainfall does not supply water to plants: the soil does this. Equally, rainfall does not supply water for irrigation or domestic use: rivers and groundwater do this.

The Australian Bureau of Meteorology uses such a period-specific rainfall system. A drought is declared if the rainfall in an area fails to exceed 10% of all previous totals for the same period of the year, and if the situation persists, for at least three months.

Droughts are a regular feature of the weather pattern of the southern tip of Africa, the incidence of drought (broadly defined as less than 70% of normal precipitation), being about once in three years.

4.2.1.2 Hydrological drought

Hydrological drought refers to shortages in surface and subsurface water supplies. This occurs when natural stream flow or ground-water levels are sufficiently reduced to impact

adversely on water resources. Therefore, hydrological drought tends to be measured by relating a shortfall of water supply to water demand.

4.2.1.3 Agricultural drought

Agricultural drought occurs when there isn't enough soil moisture to meet the needs of a particular crop at a particular time. Rain-fed crops are the crops dependent on adequate rainfall during a specific period of time.

(Note: The following types of droughts have been defined by the Department of Agriculture)-

- ***Drought:*** A prolonged, abnormally dry period when there is insufficient water for users' normal needs. Agriculture suffers first and eventually everyone feels the impact. No definition of drought is all-inclusive. In addition, there are various types of drought:
- ***Seasonal drought:*** This is a predictable drought and an annual event, e.g. a dry winter in a summer rainfall region, or a dry summer in a winter rainfall region. Other seasons may also be much drier than normal. Where overgrazing prevails, a seasonal drought may be mistaken for a severe drought, which qualifies for assistance. Seasonal droughts do not qualify for assistance unless the preceding seasons were disastrously dry.
- ***Periodic drought:*** This occurs at more or less regular intervals and is largely the result of normal fluctuations in rainfall below the expected average. Overgrazing aggravates such droughts. Periodic droughts are also those that must be provided for in the form of veld and fodder reserves.
- ***Disaster drought:*** Although there is no single all-encompassing definition for a disaster drought that would satisfy all perceptions, rainfall is a factor that determines the incidence and severity of such a drought. Disaster droughts tend to develop gradually in grazing lands, usually from chronic lower rainfall over many months and seasons. In crop production areas a disaster drought could occur over the short term, such as when the soil has already reached an advanced stage of drying out, followed by little or no rain. Disaster droughts are not predictable and occur at uneven intervals of years. The incidence of disaster droughts is low, usually only once in 15 or more years. A major aggravating factor in disaster drought is overstocking. This leads to a progressive deterioration of veld quality and quantity. Disaster droughts could last very long, but usually end within 12 to 36 months.

Disaster drought (The following definition could be useful in the final analysis of accepting a definition of drought in the DMP)

In the paper presented to a SARCUS called Drought Policy in the Republic of South Africa, 1989, Bruwer broadly defined drought in South Africa as occurring at 70% of normal rainfall. It becomes a disaster or severe drought when two consecutive seasons experience 70% or less rainfall. A disaster drought also implies that an area qualifies for State relief schemes, is associated with abnormally low rainfall conditions over more than one season and a marked reduction in agricultural production concomitant with a high risk of

stock/crop losses. A "normal" drought as discussed in the relevant paper refers to temporary periods of moisture deficits of less than one-year duration.

(Note: In the context of disaster drought it is important to view the definition of "disasters" as previously described in this report as "A disaster is also be described as an event or hazard that overwhelms the capacity of a household, community, city, business or area, to resist or recover from the impacts without external assistance. Disasters are also social phenomena that occur when a community suffers exceptional, non-routine levels of disruption and loss".)

- **False drought:** This type of "drought" occurs when rainfall is normally below the long-term average, but as a result of overgrazing the veld and fodder supply becomes prematurely depleted, giving the impression of a prevailing drought. In some instances false droughts have been declared as disaster droughts.
- **Premature drought:** This type of drought occurs when a chronic dry situation is so aggravated by overgrazing that a disaster drought is prematurely declared. In many instances, adjoining farms may differ widely as to the intensity of a drought as a result of veld management practices and the exploitation of grazing capacity.
- **Prolonged drought:** A drought situation can be prolonged for months where high stock numbers are maintained. This result in a more or less chronic food shortage even after rains has fallen. Plants become severely damaged. It is also possible that areas, which have been declared drought stricken, do not recover after moderate rainfall. After a few months the drought could be even worse.
- **Green drought:** Green drought occurs when excessive grazing pressure is maintained in semi-dry periods. This causes food shortages even though the vegetation appears green and soil moisture reserves are favourable, or where natural causes such as rain showers during a drought promote a short spell of green growth, but not enough for breaking the drought. A green drought can also occur where insects severely attack plants and deplete the fodder to such a degree that it takes on the appearance of a drought situation. There is thus a shortage of fodder in spite of favourable circumstances. The most common pests are locusts, Karoo caterpillar and the commando caterpillar.
- **Financial drought:** Farmers exert pressure to obtain financial assistance in order to improve cash flow. Therefore a region is sometimes declared drought stricken even though a drought does not prevail. (The declaration of such a region as a disaster drought area has a negative effect on the interpretation of rainfall records because a drought is indicated when it does not exist.)

(Note: According to the National Department of Agriculture the following need be observed - "Excluding a disaster drought, none of the droughts defined above qualified for drought assistance under the previous Disaster Drought Scheme. It should be reiterated that a disaster drought is caused by a below normal rainfall, and that overgrazing is the most common drought-aggravating factor. Where grazing capacity is strictly observed and veld management is sound, the drought problem can be greatly eliminated.")

4.2.1.4 Socio-economic drought

Socio-economic drought (sometimes called famine drought) occurs when the demand for economic goods exceeds supply as a result of a weather-related shortfall in water supply. The supply of many economic goods, such as water, forage, food grains, fish, and hydroelectric power, depend on weather. Due to variability of climate, water supply is sufficient in some years but not satisfactory to meet human and environmental needs in other years. The demand for economic goods is increasing as a result of increasing population. Supply may also increase because of improved production efficiency and technology. (Figure 11.2 after Keith Smith, 2004).

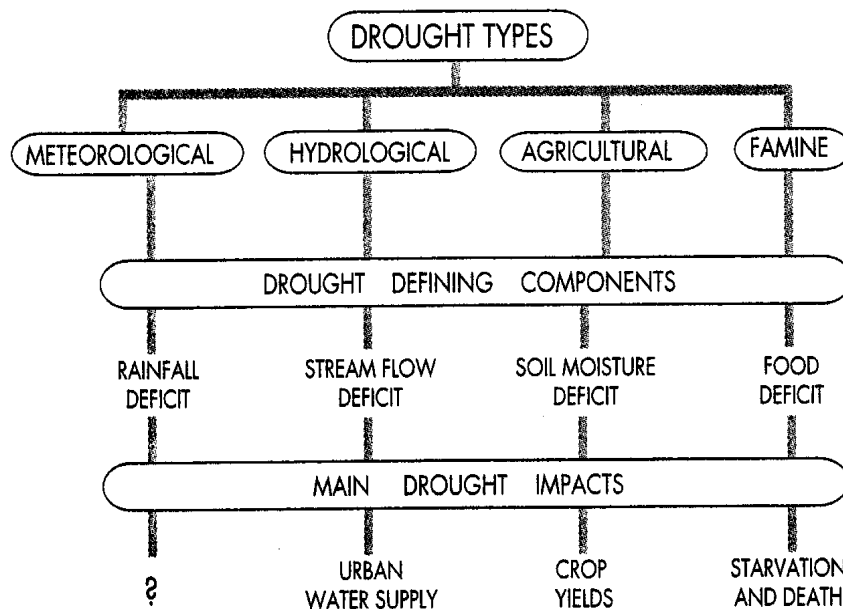


Figure 11.2 A classification of drought types based on defining components and hazard impacts. Disaster potential increases from left to right across the diagram. Rainfall deficit alone may not produce visible impacts.

4.2.2 Causes of drought

4.2.2.1 Physical factors

The atmospheric processes that cause drought are not well understood but they can be traced to anomalies in the general atmospheric circulation. Research has concentrated on the search for *tele-connections*, the linkages between climatic anomalies occurring at long distances from each other. In particular, there is growing evidence that large-scale interactions between the atmosphere and the oceans may be implicated. This view emphasises the importance of sea surface temperature anomalies (SSTAs), since it is known that these influence the flux of sensible heat and moisture at the ocean atmosphere interface.

Moisture conditions are as important as temperature because they influence both the subsequent latent heat release and the amount of precipitable water in the atmosphere. Drought is most likely to be initiated by negative (relatively cold) SSTAs leading to descending air and anti-cyclonic weather. The probable starting point for the drought over northwest Europe in 1975-6 was abnormally low sea surface temperatures over the Atlantic

Ocean north of 40 degree N. This SSTA typically causes near-surface stability in the atmosphere and a high frequency of blocking anticyclones over Western Europe. The same phenomenon exists when El Niño conditions (ENSO) bring descending air to the western Pacific and Southeast Asia. ENSO events are well recognised as a cause of drought. According to Dilley and Heyman (1995), worldwide drought disasters double during the second year of an El Niño episode compared with all other years. For example, during 1982/3, droughts in Africa, Australia, India, northeast Brazil and the United States coincided with a major El Niño phase. Most severe droughts in Australia are related to the below-average rainfall in northern and eastern Australia associated with an El Niño event (Allan et al., 1996).

The 1988 North American drought was linked to a shift in the Southern Oscillation associated with a widespread decrease in Pacific sea surface temperatures. This led to a northward displacement of the Inter-tropical Convergence Zone southeast of Hawaii and the eventual appearance of a strong anticyclone at upper levels over the American Midwest (Trenberth et al., 1988). Related attempts have been made to link SSTA's in the tropical Atlantic to rainfall in the Sahel zone of Africa. It is known that there are recurring SSTA patterns and that these tend to differ around the globe depending on wet or dry conditions in Africa. As indicated by Gray (1990), a season-to-season link has been found between the frequency of Atlantic hurricanes and rainfall in the Sahel. Other research has suggested that the underlying forcing agent might be the global transport of oceanic water that is dependent on the sinking of cold, salty water in the North Atlantic Ocean.

4.2.2.2 Human factors

Major drought disasters are concentrated in the semi-arid, developing countries where they are often best described as 'complex emergencies'. This feature is well illustrated in Africa, a continent where two-thirds of the area is dry land and where the onset of drier conditions in the late twentieth century highlighted endemic problems of food supply. Population growth, with the need for more food supplies, has led to increased pressure on the land.

One consequence of this has been soil erosion, as cultivation has spread into the drier areas formerly used for livestock. In turn, the rangelands have been over-grazed with degradation of the resource base. Thus, African agriculture faces many problems of which the lack of rainfall is just one. Poverty is also a factor. Sub-Saharan Africa contains over two-thirds of the world's poorest countries. These are all serious problems but it is important to attempt a balanced view.

4.2.3 Mitigation

Of disaster aid in financial terms, food aid is the most important humanitarian response from the international community (Leader, 2000). For some LDCs, food aid has become almost synonymous with drought relief.

Food aid can be controversial and was described as a 'blunt instrument' by de Waal (1989). This is partly because it is the form of overseas aid most likely to be diverted from the needy, and because it is based on the Western view of famine as a mass starvation event.

Given this interpretation of famine, the large-scale distribution of food appears to be a sensible strategy.

Emergency drought relief has been a priority for governments in the MDCs too. In a comparison of drought policy in the USA and Australia some years ago, Wilhite (1986), showed that actions have taken a loss-sharing character, dependent on loans and grants from the State, and that most drought mitigation has occurred in a crisis management framework similar to that for emergency overseas aid. In severe droughts, governments are the only bodies able to intervene at the scale required and the costs can be high. For example, the total cost of federal drought relief programmes in the form of loans and grants during the 1974-7 droughts in the USA has been estimated at US \$7-8 billion.

More recently, the rising cost of drought relief in the industrialised countries has led to a policy trend away from emergency subsidies provided by the taxpayer towards more long-term self-reliance by rural communities. In 1989, the Australian government removed drought from the terms of the Natural Disaster Relief Arrangements (O'Meagher et al., 2000). The new National Drought Policy, in belated recognition that drought is an integral part of the Australian climate, viewed drought as an element in all agricultural decisions, rather than as a random factor requiring an emergency response. But, during the 1990s, this policy became increasingly confused with farm poverty in the public mind, and the continued government acceptance of 'severe droughts' has enabled 'exceptional' relief payments to continue (Botterill, 2003). Central government responsibility for drought assistance has also declined in New Zealand with the progressive tightening of the definition of a drought eligible for support (Haylock and Ericksen, 2000). In 1996 this definition was restricted to a one in fifty year event (2% annual probability of exceedance). In the Republic of South Africa the 1991/92 drought and the unprecedented build-up of carry-over debt to R2,4 billion necessitated the introduction of the "Aid to Agriculture" schemes (Department of Agriculture, 1992) in order to prevent the collapse of the rural economy and the country's crop production.

The present aim is to devolve drought response to rural communities, within a more sustainable approach to natural resources, but it is still unclear how these changes in national policy will affect long-term drought management.

4.2.4 Protection

In theory, the artificial stimulation of rainfall by cloud seeding could reduce the hazard. The technique can only work with clouds that have natural precipitation potential. Such clouds are unlikely to be present in large numbers during drought conditions and there is, therefore, little practical scope for this option although experiments continue.

The additional supply of water is not necessarily a solution. The drilling of new boreholes in dry areas is an example of how aid and technology, without proper local management, can actually increase disaster. Without the imposition of effective control the borehole sites provided an attractive focus for many cattle and humans. The water there for artificially encouraged the growth of herds beyond the available feed until the new areas were stripped and the cattle died.

4.2.5 Adaptation

4.2.5.1 Preparedness

In general, the standard defence against hydrological drought has been the use of dams and pipelines for the artificial storage and transfer of water supplies. The emphasis on these 'tech-fix' engineering solutions is symbolised by the global spread of large dams.

Regulated rivers smooth out the seasonal variations in river flow and, in particular, provide artificially enhanced dry weather flows for water abstraction purposes. Reservoirs have been used extensively to maintain urban water supplies. The greatest buffering against drought exists for those areas with a large margin between the daily supply capacity of the system and the maximum daily use.

According to Wilhite (2002), preparedness is the key to drought hazard reduction. Arguably, such adaptation has been most successful amongst traditional societies in dry rural areas that have evolved 'coping' strategies to anticipate food insecurity.

During a severe drought therefore, many of the poor are squeezed out of the pastoral economy and forced to settle in towns to live on famine relief or from wages paid to herders or labourers.

However, crisis management is no substitute for preparedness and longer-term planning for water conservation in urban areas. Where hydrological drought is a more common feature, the management of water demand is a central issue of policy.

4.2.5.2 Predictions, forecasts and warnings

In order to be effective, drought forecasts need to be available many months ahead so as to aid farming decisions on crop planting and water management.

The best hopes probably lie with the use of meteorological models that couple the atmosphere and the oceans. For example, effort has been put into the refinement of ENSO-based methods. However, they are not effective in all years and can only provide rainfall results for broad regions averaged over several months, information that lacks sufficient precision for many individual decision-makers.

4.2.5.3 Land use planning and management

Drought increases pressure on land resources. Overgrazing, poor cropping methods, deforestation and improper soil conservation techniques may not create drought but they amplify drought-related disasters. There is a need, therefore, for better agricultural land use practices. Sustained dry land farming is dependent on soil conservation measures against water and wind erosion. A grass or legume cover is an effective control against water erosion, as are strip cropping and contour cultivation, which retard the flow of water down the slope. Wind erosion can be greatly reduced by maintaining a trash cover at the soil surface plus the use of crop rotations and shelterbelts to lower the wind velocity at the soil surface. Proper management by farmers and land users in the optimal use, conservation

and protection of the natural resources is key to the concept of land use planning and management.

Rural areas rarely have the massive water storages and the options for reducing consumer demand that are available in the cities. Therefore, the most prudent long-term drought strategies prepare agricultural production to withstand unexpected shortfalls of precipitation. This involves the adoption of appropriate stocking rates, so that the pasture is not easily exhausted, the build-up of a reserve of fodder and the improvement of on-farm water supplies. The installation of an irrigation system may offer some security against drought but the reliability of supplies may not be high enough to provide complete drought proofing. Heavy losses sustained by irrigators of in South Africa, during the latter stages of droughts when water allocations were suspended in the middle of the irrigation season. Flexible decision taking is necessary to make the most of predicted water shortages, and drought resilience will be strengthened by a greater diversity of cropping patterns and income sources in drought-prone areas. Scope still exists for the development of more drought-resistant crops and crops with varying production cycles.

4.3 Floods

Flooding is the most common environmental hazard worldwide, after disease and transport accidents.

This is because of the widespread geographical distribution of river floodplains and low-lying coasts and their long-standing attractions for human settlement. Every year, floods claim around 20 000 lives and adversely affect at least 20 million people worldwide, mostly through causing homelessness. These figures are less reliable than for some other types of disaster because floods are linked to several other environmental processes, and can be difficult to classify. For example, floods are the consequence of some storms and tsunamis, but they are also the cause of some epidemics and landslides. Although flood-related deaths and homelessness are concentrated in the LDCs, many industrialised countries, which have invested heavily in flood defence and emergency measures, suffer large economic losses.

The degree of flood hazard is dependent on various factors - such as the depth and velocity of the water, the duration of the flood and the load carried, such as sediment, salts, sewage and chemicals.

The number of flood events and flood impacts appears to be increasing on a global scale (Fig. 10.2 after Keith Smith). However, it is difficult to identify major trends in the physical causes of floods. The consensus is that increased losses are mainly due to more detailed monitoring, a growing population and those at risk through continued floodplain invasion.

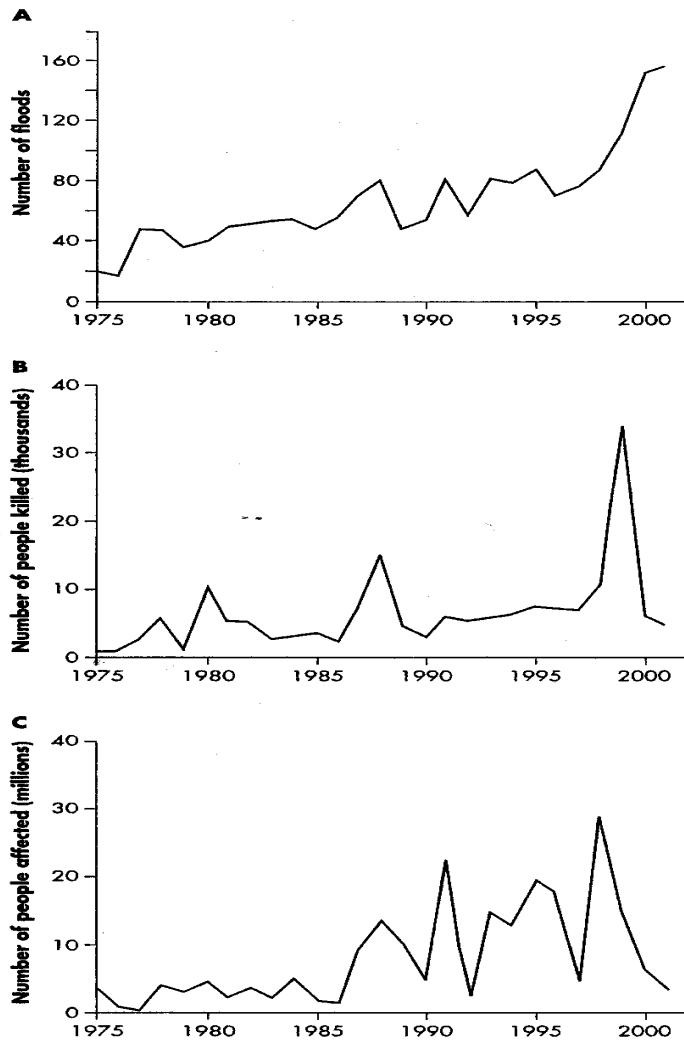


Figure 10.2 The annual pattern of global floods and flood losses 1975–2002. (A) number of flood disasters; (B) number of people killed; (C) number of people affected. All categories display an upward trend. *Source:* Adapted from CRED database.

4.3.1 Types of floods

4.3.1.1 River floods

A river flood is a high level of water that overtops the river banks, albeit it natural or artificially made. However, such an event is not a hazard unless it threatens human life and property. For a hydrologist, flood magnitude is best expressed in terms of instantaneous peak river flow (discharge), whilst the hazard potential will relate more to the maximum height (stage), that the water reaches. Smith and Ward (1998), distinguished between the primary causes of floods mainly resulting from widespread climatologic forces, and secondary flood-intensifying conditions that are more drainage basin-specific. It is also possible to relate the physical causes of floods to other environmental hazards.

Flooding along rivers is a natural and inevitable part of life. Some floods occur seasonally with summer (northern parts of South Africa), or winter rainfall (southern parts of South Africa), which cause river basins to fill with too much water, too quickly. Torrential rains

from tropical cyclones (also called hurricanes and typhoons), can also produce river flooding; as was the case in the 2000 floods in Mozambique and the northern parts of South Africa.

4.3.1.2 Coastal floods

Winds generated from tropical storms and cyclones or intense offshore low-pressure systems, can drive ocean water inland and cause significant flooding in coastal zones or in river deltas and floodplains. Escape routes can be cut off and blocked by high water. Coastal flooding can also be produced by sea waves called tsunamis, sometimes referred to as tidal waves, as in the case of the 2004 East-Asia tsunami disaster.

4.3.1.3 Urban floods

Our urban development creates a number of areas, which cannot absorb natural rainfall, for example: parking lots, roads, buildings etc. Urbanisation increases runoff 2 to 6 times over what would occur on natural terrain. During periods of urban flooding, streets can become swift moving rivers, and houses and buildings can sustain damages.

4.3.1.4 Flash floods

Flash floods occur when an excessive amount of rain falls within a short period of time (in dried up streams and -wetlands, river valleys and also urban areas), or when a massive amount of water is suddenly released by dams or the release of blockages in rivers. Rainwater causes a small but fast moving river, which can gain velocity in a matter of minutes. Many areas in South Africa, such as Alexandria in Johannesburg and the Cape Flats in Cape Town, experience annual flash floods.

4.3.2 Causes of floods

4.3.2.1 Physical causes

Atmospheric extremes, especially excessive rainfalls, are the most common cause of floods. They vary from the semi-predictable seasonal rains over wide geographic areas, which give rise to the annual wet-season floods in tropical areas, to almost random convectional storms over small basins. Prolonged rainfall over large drainage basins is also associated with tropical cyclones or the intense depressions of mid-latitudes.

Hazardous flooding of coasts and estuaries tends to occur when the sea surface is raised above the normal fluctuations created by waves and tides. Such increases in height result either from short-term factors or from very much longer-term processes.

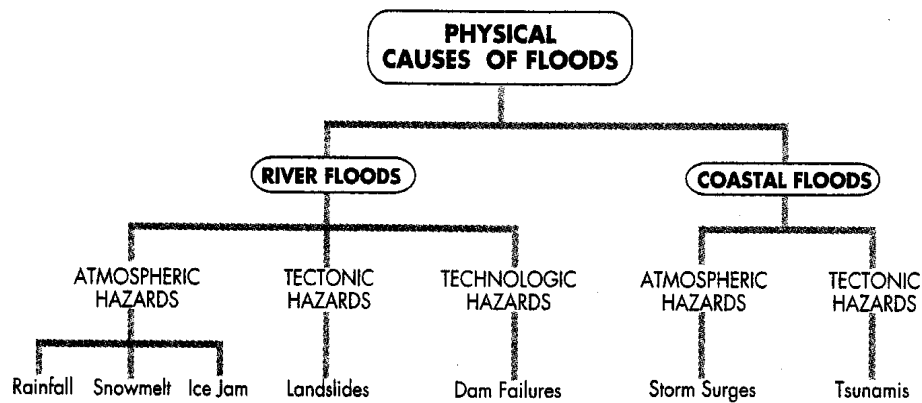


Figure 10.4 The physical causes of floods in relation to other environmental hazards. Atmospheric hazards creating large amounts of rainfall are the most important cause but this diagram also illustrates the problems of separating floods from other hazards.

(Fig. 10.4 Source Keith Smith).

4.3.2.2 Human causes

The earliest settlers were usually aware of the dangers of flood-prone land. In many countries, major floodplain invasion did not occur until the late nineteenth century but then expanded rapidly. For example, by 1975 more than half of the floodplain land in the USA was developed and urban areas were spreading onto floodplains at the rate of 2% per year. Rapid City, South Dakota, is a typical case.

4.3.3 Mitigation

Disaster aid calls for government relief following flood disasters are common, but there is recognition in the MDCs that the taxpayer cannot be expected to fund all the losses. This attitude is sometimes enforced by legislation limiting any disaster relief to uninsurable losses like floods and tornados. For many of the LDCs, international aid is an important factor in flood mitigation. Large flood disasters in the LDCs overwhelm local resources, but there can be a tendency to exaggerate aspects of the contribution by international agencies. For instance, the Mozambique floods of 2000 attracted thousands of emergency aid workers attached to 250 different organisations.

4.3.4 Protection

Flood protection can be undertaken either by abatement or control measures.

Flood abatement or flood reduction, involves decreasing the amount of runoff contributing to a flood peak within a drainage basin. Watershed treatment through land use management is the method used. To be effective, treatment practices have to be adopted over a majority area of the drainage basin.

Typical strategies include reforestation or reseeding of sparsely vegetated areas, increased evaporative losses, mechanical land treatment of slopes, such as contour ploughing or terracing, to reduce the runoff coefficient, comprehensive protection of

vegetation from wildfires, over-grazing, clear-cutting of forest land or any other practices likely to increase flood discharges and sediment loads. In addition, peak flows downstream can be reduced by the clearance of sediment and other debris from headwater streams, construction of small water and sediment holding areas (e.g. farm ponds), and the preservation of natural water detention zones such as sloughs, swamps and other wetland environments. Within urban areas some water storage can be achieved by the grading of building plots, detention ponds and the creation of parkland.

4.3.5 Adaptation

4.3.5.1 Preparedness

Some countries rely on the routine civil emergency arrangements, including voluntary organisations and the armed forces, to combat flood losses. However, specialised flood preparedness programmes have increased with the spread of forecasting and warning systems. The greatest need for advice exists in flash flood events with short warning times.

4.3.5.2 Prediction, forecasts and warnings

Flash floods present different problems because forecasts and warnings are not always accurate, timely or heeded in small river basins (Montz and Grunfest, 2002).

4.3.5.3 Land use planning and management

During recent decades, urban communities have adopted more regulatory approaches whereby land use management is employed to restrict further floodplain development.

In the future, land use planning is likely to include a much greater element of what has been called the 'living with floods' approach.

CHAPTER 5

DISCUSSION ON APPROACHES AND POLICIES FOR DISASTER RISK MANAGEMENT

5.1 Introduction

In the past 1 000 years, about 15 million people have died as a result of at least 100 000 natural disasters (Munich Re, 1999). About 80% of the deadliest disasters in history occurred as a result of just four hazard types:

- Earthquakes,
- Tropical cyclones,
- Floods and
- Drought (famine is excluded although it is often linked with drought).

Global disaster statistics for 1996-2000 revealed staggering economic costs estimated at US \$235 billion, and 425 000 lives lost (CRED International Disaster Database). Disasters caused by natural hazards alone reportedly affected an average of 211 million people per year in the past decade. Asia bears much of the brunt. Nearly half of the world's major natural disasters, recorded over more than three decades, occurred in that region. As a result, Asia has become the world's most disaster-prone region, absorbing 80 percent of the total affected populations, 40 percent of the total deaths, and 46 percent of the total economic losses (CRED statistics for 1997-2001).

A report produced by researchers from Columbia University, the World Bank, the Norwegian Geotechnical Institute and other partners, indicates that 3.4 billion people, more than half the world's population, live in areas where at least one hazard could significantly impact them. Other key findings include:

- Approximately 20% of the earth's land surface is exposed to at least one of the natural hazards evaluated;
- 160 countries have more than one quarter of their population in areas of high mortality risk from one or more hazards;
- More than 90 countries have more than 10 percent of their population in areas of high mortality risk from two or more hazards;
- In 35 countries, more than 1 in 20 residents live at relatively high mortality risk from 3 or more hazards;
- More than one-third of the United States' population live in hazard-prone areas, but only one percent of its land area ranks in the highest disaster-related mortality risk category;
- Taiwan may be the place on Earth most vulnerable to natural hazards, with 73 percent of its land and population exposed to three or more hazards;

- More than 90 percent of the populations of Bangladesh, Nepal, the Dominican Republic, Burundi, Haiti, Taiwan, Malawi, El Salvador, and Honduras live in areas at high relative risk of death from two or more hazards; and
- Poorer countries in the developing world are more likely to have difficulty absorbing repeated disaster-related losses and costs associated with disaster relief, recovery, rehabilitation and reconstruction.

5.2 International approaches to disaster risk management frameworks

(Note: From the drafter of this document: Due to the enormous amount of literature and case studies available, only selected sources were used - mainly on approaches - for comparison reasons only).

5.2.1 The conceptual development of the Total Disaster Risk Management Approach (TDRM) in the Philippines

5.2.1.1 Introduction

The TDRM Approach builds on the gains of the International Decade of Natural Disasters, the International Strategy for Disaster Reduction, and other existing endeavours. It integrates existing knowledge and techniques on disaster reduction and response, and risk management. Inherent to this approach is effectively communicating these knowledge and techniques at all levels, and facilitating the appreciation of governments of the relevance of disaster risk management in achieving sustainable development objectives.

In pursuit of more effective disaster reduction and response, the TDRM Approach aims to address holistically and comprehensively the various concerns and gaps in the different phases of the disaster management cycle. It goes beyond responding to disaster events by considering the broader set of issues associated with disaster risk and its management. It addresses the underlying causes of disasters by focusing on the conditions of disaster risks engendered by unsustainable development, and enables concerned sectors and the community to appreciate them and to examine ways to reduce their vulnerability.

The approach also promotes effective integration of stakeholders' action through multilevel, multidimensional and multi-disciplinary co-ordination and collaboration, a critical strategy toward improving disaster reduction and response. Also, it facilitates broad-based participation in policy and programme development in disaster reduction and response and in other related development concerns (i.e. poverty alleviation, land use, environmental protection, food security, etc.).

In implementing the TDRM Approach, accurate and reliable hazard, vulnerability and disaster risk information are vital and relevant to all phases of the disaster management cycle. The approach attaches great importance to hazard mapping and vulnerability assessment as a fundamental tool for good decision-making and efficient sharing of disaster risk information.

The strategic objectives of the TDRM approach are the following:

- To address holistically and comprehensively the various concerns and gaps in the different phases of the disaster management cycle, by considering the underlying

- causes of disasters (i.e. the conditions of disaster risks), and the broader set of issues and contexts associated with disaster risk and its management.
- To prevent, mitigate, prepare for, and respond effectively to the occurrence of disasters through the enhancement of local capacity and capability, especially in disaster risk management (i.e. recognizing, managing and reducing disaster risks, and ensuring good decision-making in disaster reduction and response, based on reliable disaster risk information).
- To promote multilevel, multidimensional and multidisciplinary co-ordination and collaboration among stakeholders in disaster reduction and response, as they ensure the participation of the community, the integration of stakeholders' action, and the best use of limited resources.

The proposed implementation strategies for the TDRM Approach are the following:

- Achieving effective disaster reduction and response through multilevel, multi-dimensional and multidisciplinary co-operation and collaboration.
- Decision making is based on reliable disaster risk information from hazard mapping and vulnerability assessment. The TDRM Approach ensures sound decision-making.
- Enhancing co-ordination and integration of stakeholders' action through good communication and efficient exchange of relevant and reliable information.
- Ensuring that appropriate enabling mechanisms are in place, including policy, structure, capacity building, and resources.

The TDRM Approach as a strategy addresses effectively the prevalence of disaster risks, the current state of disasters, and the existing gaps in the disaster management cycle.

5.2.2 Approach for developing improved risk assessment, prevention and management in pastoral areas of North Western China

5.2.2.1 Introduction

Strategic Risk Management (RM) aims at comparing what are actually in place and functional, with what is actually required (in addition/modification), to better address and manage risks. To facilitate the analytical process, strategic risk management planning is broken down into 4 different stages as presented below. For each of the stages a series of hypotheses are presented against which the current status quo in a particular study area can be assessed.

5.2.2.2 Phasing of risk management activities

Pastoral risk management involves a four-stage process, each with different actors and characteristic activities:

- Stage 1** Preparation for risk reduction and risk avoidance (long-term, ongoing).
- Stage 2** Risk planning (annually).
- Stage 3** Reacting to risk (when disaster occurs).
- Stage 4** Recovering from risk (when detriment has occurred).

5.2.2.3 Identifying location-specific key components for improved risk management planning

Stage 1 Preparation for risk reduction and risk avoidance (long-term)

Key actors, elements and required activities at this stage should include:

- Herder organisations for integrated risk reducing environmental management.
- Appropriate financial institutions. There is an urgent need for savings, credit and insurance institutions appropriate for the remote countryside.
- Risk-avoiding herd management techniques.
- Strategic fodder reserves. Strategic fodder emergency stores at decentralised levels can be pivotal corner stones of a pastoral risk management strategy in high risk environments.
- Incentive systems to reduce animal stocking rates where overgrazing take place.
- Participatory technology development. Existing local knowledge on risk management and pastoral livestock production can be ideally complemented and matched with farm research and extension approaches.
- Better co-ordination among key risk actors at provincial and county level.
- Early warning. There needs to be an institutional base at provincial level to monitor potential emergencies, and provide early warning to herders and to provincial authorities.
- Market development. The development of more efficient marketing of livestock and livestock products, for example through assistance to marketing co-operatives, or the organisation of livestock auctions at provincial level, would reduce market risks to herders, and would assist responses to other types of risk.
- Creation of emergency grazing reserves at local/county level.
- Pastoral mobility: any pastoral system in the Central Asian Region requires the flexibility of moving animals on seasonal (e.g. transhumance) and/or periodic basis between different grazing areas.
- Infrastructure.

Stage 2 Risk planning

Key risk planning activities include:

- Winter preparation by herders.
- Annual winter/drought fodder storage by households.
- Seasonal pastures allocation planning.
- Long-term weather forecasting and improved broadcasting.
- Herders risk planning capacities.

Stage 3 Reacting to risk

Key tasks once an emergency occurs include:

- Co-coordinated emergency management.
- Facilitate herder mobility and access to emergency fodder reserves/ grazing.
- Labour mobilisation.

- Emergency food distribution.

Stage 4 Recovering from risk

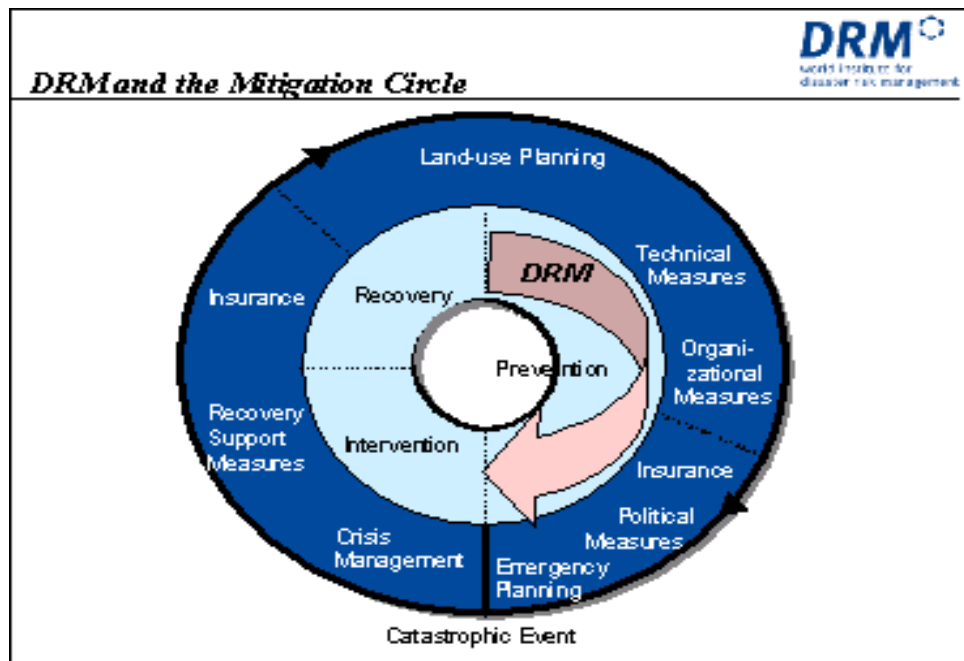
Important activities include:

- Appropriate credit for restocking.
- Alternative livelihood strategies for impoverished herders.
- Assistance where necessary with short-term consumption needs.

5.2.3 Disaster Risk Management (DRM) and the Systems Approach by the World Institute for Disaster Management

5.2.3.1 The Mitigation Circle of Disaster Risk Management

The recent natural disasters, such as earthquakes, floods, storms, avalanches, land slides, and fires are familiar. The need lies in the creation of a network for applied research, implementation, and dissemination in the field of disaster risk management. The planned work shifts away from the post-disaster response, towards an integrated risk management and sustainable risk prevention culture.

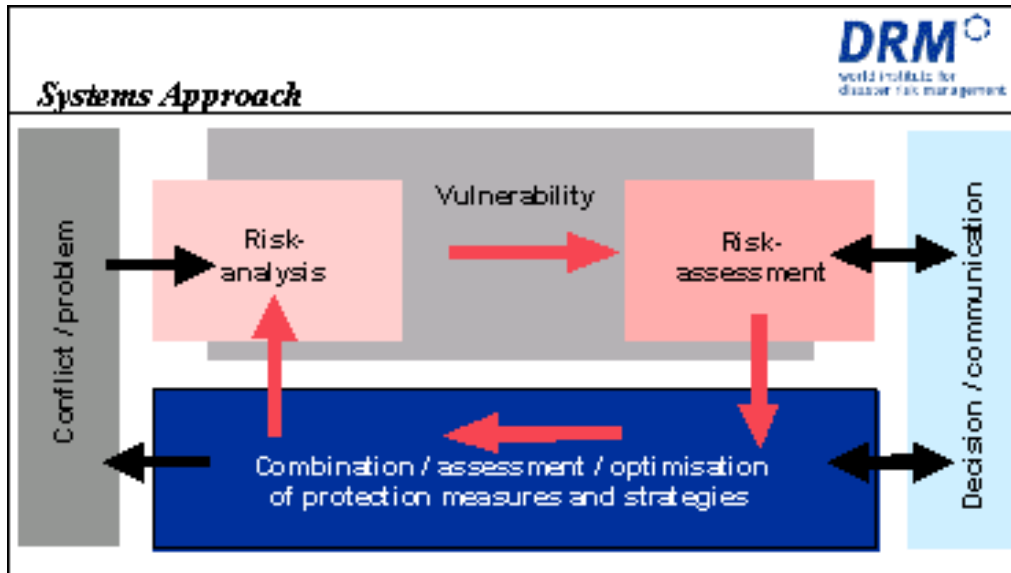


DRM and the Mitigation Circle.

The main need is for the integration of sectoral results, the modelling of multidisciplinary systems, and for implementation-oriented approaches.

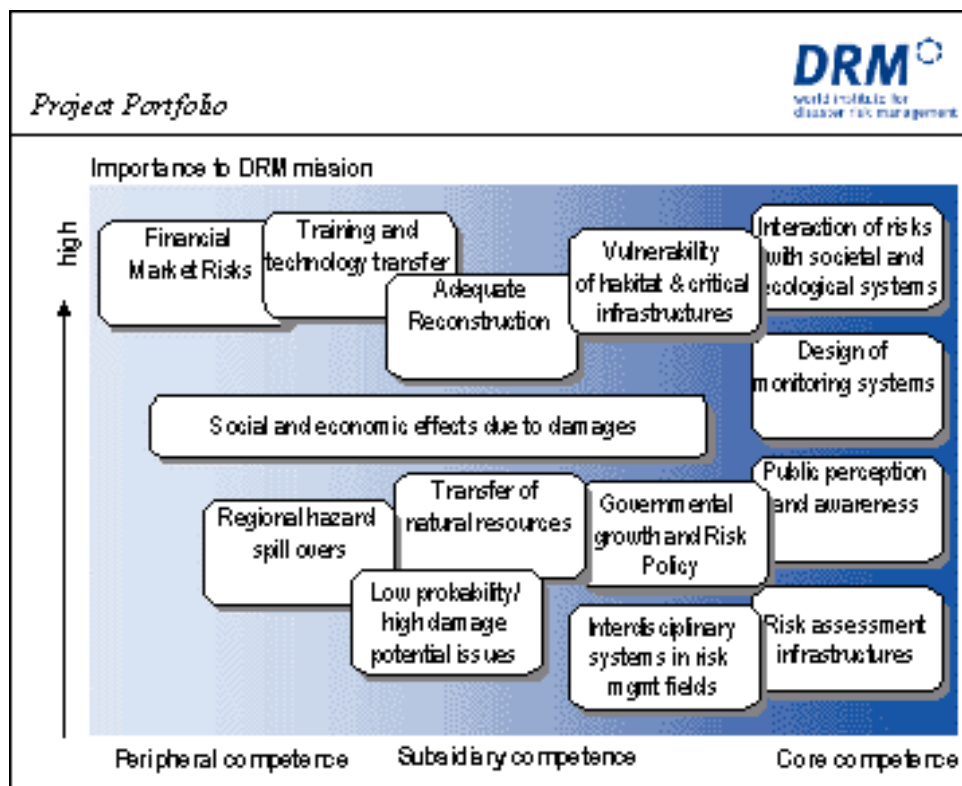
5.2.3.2 Application of the systems approach

The starting point of an integral risk management concept is the relation between hazard, vulnerability, risk and risk management. The approach of the World Institute for Disaster Risk Management includes the systems approach (e.g. Wilhelm, 1999):



The model links together the elements risk analysis, vulnerability, and risk assessment. It requires the *development of tools* for an overall risk mitigation. The development of methods and measures to support prevention and intervention activities such as monitoring, registration, forecasting, early warning and decision-supporting tools for frontline decisions, become particularly important.

Following the systems approach and applying different sectoral research results, a first project portfolio for DRM has been developed.



Firstly, a better understanding of the fundamental relations between natural and human-made risks, and the process of globalisation with three important fields in the context of interdependence:

- Interdependence between disaster and economic development,
- Interdependence between disaster and sustainability,
- Interdependence between disaster and resource allocation, especially capital and technology.

Secondly, to deal with principles of welfare theory, such as discussing old-fashioned criteria of inter-regional and inter-temporal measures of government.

5.2.4 The Disaster Risk Management Approach in South Africa

5.2.4.1 Introduction

Disasters in South Africa have been dominated by localised incidents, such as veld fires, seasonal flooding, hail, wind and snowstorms, and outbreaks of diseases as well as accidents in the mining industry.

On national level, the 1982/83 and 1991/92 droughts were the most severe meteorological droughts over Southern Africa. In the 1991/92 drought 70% of the crops failed. It was estimated that half of the population in the affected area was at risk of malnutrition, other related health problems and even starvation. In neighbouring countries the situation was even worse with an import requirement of 6.1 million tons of grain.

The South African rail network and rolling stock played an indispensable role in the transport of imported grain from our harbours to our neighbouring countries. During the drought the natural grazing deteriorated to such an extent that more than 829 000 large stock units and in excess of 107 000 small stock units died. South Africa was spared the more serious health consequences that were experienced by some of our neighbouring countries during the drought. Cholera pandemics were reported from Angola, Malawi, Swaziland, Mozambique, Tanzania, Zimbabwe and Zambia. Outbreaks of other diseases with high fatality rates were recorded. These included dysentery, gastro-enteritis, diarrhoea and typhoid fever. The effect that a severe drought might have on the economy of South Africa can be seen by looking at the contribution of agriculture, forestry and fisheries to the Gross Domestic Product. The contribution of these activities dropped with 27% from 1991 to 1992.

5.2.4.2 The White Paper on Agriculture, 1995

The White Paper on Agriculture of 1995 states that *"a careful and realistic assessment of the underlying risks posed and opportunities presented by the environment and the economy should therefore be made before the Government will implement a policy incentive aimed at agricultural development and marketing"*.

The White Paper recognised the following basic principles namely:

- That agricultural production systems and practices will be organised in such a manner as to improve national as well as household food security. Drought will be recognised as a normal phenomenon in the agricultural sector, and it will be accommodated as such in farming and agricultural financing systems.
- The Government should not support measures that soften the negative impact on farm incomes caused by poor risk management, as this will cause farmers to use high-risk methods which could endanger resource conservation.
- Farming systems, which make provision for droughts as normal phenomena in South Africa, should be developed and used.
- The Government should therefore support the full spectrum of production systems and practices, from urban food gardens and small-scale production for household income and food security, to large-scale production systems, which can add considerably to national food security.
- In the case of natural disasters the Government will be responsible for giving assistance to counter unacceptable consequences as far as possible. Natural disasters such as floods, runaway veld fires, severe droughts and untimely frosts can totally disrupt communities and can force farmers, over the whole spectrum of farm sizes, out of business. Such disasters do not include natural phenomena, which occur on a regular basis, such as intermittent droughts in the stock-production areas and hailstorms in hail-prone areas. In the case of natural disasters it is in the interest of the country as a whole that the Government should take steps to counter unacceptable consequences for the rural economy. Such steps could include financial assistance to the agricultural sector.

The risk factors underlying a disaster occurrence have become increasingly inter-linked. For instance, declining livelihood opportunities in rural areas are associated with urban migration. The result is rapid growth of under-serviced settlements close to industrial or manufacturing areas, which increases the potential for human death and injury in the event of an industrial accident. The disaster 'trigger' may be an industrial accident, but the overcrowding and poor living conditions in the settlement nearby, place many more at risk, and may result in a much bigger and more serious disaster.

Reciprocation is the commitment of farming communities to satisfy certain prerequisites before drought assistance may be accessed. This implies that the Government will provide assistance on condition that mitigation procedures are followed. The aims of reciprocation are to promote resource conservation and long-term sustainability of economic farm production.

5.2.4.3 The Strategic Plan for South African Agriculture 2001

The Strategic Plan for South African Agriculture, 2001 describes agriculture per definition as an industry that is confronted by risk in the form of climatic variations, pests, disease and price risks, as well as natural disasters such as droughts and floods. In the South African context HIV/AIDS, crime, natural disasters and unstable prices caused by the unpredictable climate are the most important factors that increase cost and constrain competitiveness in the agro-food and fibre complex.

An effective risk management strategy is critical in the promotion of risk management tools such as crop insurance products, asset protection and the agricultural futures market. Another component of a comprehensive risk management strategy is an early-warning system that includes adequate access to, and utilisation of, timely, accurate, relevant and free information about the weather, through the Agricultural Geographic Information System.

5.2.4.4 The White Paper on Disaster Management 1999

The White Paper on Disaster Management 1999, came out as a far-reaching strategic document, describing the primary responsibility of the Government in relation to disaster management, as laid down in section 41(1) (b) of the Constitution of the Republic of South Africa, namely "All spheres of government are required to secure the well-being of the people of the Republic".

The purpose of the White Paper was to set out the Government's disaster management policy for South Africa. The policy applies to all Government institutions and other role players, as well as all activities related to disaster management.

The purpose is twofold:

- To inform the public of the government's objectives and how the government intends to achieve these objectives.
- To inform government agencies and state bodies of these objectives and what needs to be done to achieve these objectives.

Furthermore defining, inter alia, the promotion of an integrated and co-ordinated disaster management strategy, through partnerships between different stakeholders, and through co-operative relations within all spheres of government as well as the private sector.

5.2.4.4.1 Key policy proposals

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

- 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 of 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.

5.2.4.4.2 Developing a new approach

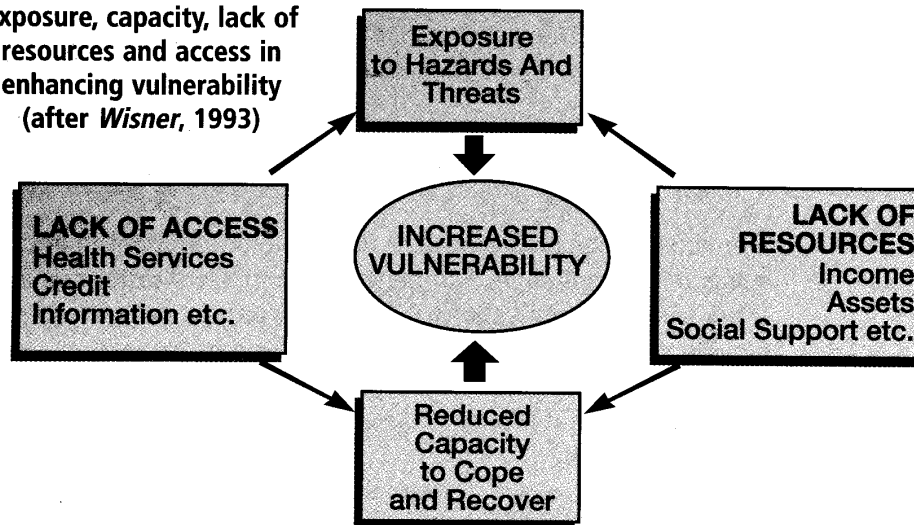
Current perceptions of disasters have to change. Disasters are not primarily rare occurrences managed by emergency rescue services. Rather, there needs to be a common awareness and shared responsibility for risk reduction in every aspect of our daily lives.

From these policy aims a new approach was developed towards disaster management: i.e. from a reactive dispensation to a more proactive approach. Thus while emergency response is still an essential part of disaster management, the need to adopt longer-term, risk-reduction disaster management methods, have become essential. Previously, droughts as well as other disasters were largely regarded as physical hazards requiring a response after it had occurred. The focus, moreover, was mainly on impacts of the event and post-disaster relief and response. In South Africa a similar response to disaster management, including agricultural disasters such as drought, can be tracked.

Although emergency responses are still important, the approach, both internationally and locally, towards fostering and implementing sustainable programmes in which a longer-term perspective, that focuses on marshalling risk-reduction efforts is considered alongside shorter-term emergency responses. With such an approach, for example, in agriculture the need to twin land care initiatives with other practices that may support long-term agricultural sustainable development, should be considered as part of a disaster risk-reduction strategy that enhances both the land and the communities depending on the land. Such an approach ensures that communities are able to live and adapt, not only during periods of repeated disasters like droughts, but also on a daily basis supporting their efforts to secure a sustainable livelihood. In this wider approach there is thus a need to consider both disasters with 'natural triggers' and those, which may be human-induced. Thus physical hazards e.g. droughts, floods, hail, fire and insects are viewed together with other symptoms of 'disasters' e.g. socio-economic hazards. The proposed disaster risk management plans should therefore also include mechanisms to co-ordinate the efforts of various Government agencies in reducing disaster risks on an ongoing basis i.e. in the absence of a disaster.

It is clear that the risk factors for disaster occurrences are interconnected and increasingly driven by patterns of developmental vulnerability. As discussed above, a disaster event can cause human, property, environmental and economic losses, which divert energies and resources away from opportunities for sustainable growth. (See model below).

Interrelationships between exposure, capacity, lack of resources and access in enhancing vulnerability (after Wisner, 1993)



The development of a new approach to disaster management called for a two-pronged approach:

- A significantly strengthened capacity to track, collate, monitor and disseminate information on phenomena and activities known to trigger disaster events, such as droughts, floods, epidemics and fire. This needs to be supported by institutional emergency preparedness and response capacity primarily by government at local, provincial and national levels.
- An increased commitment to prevention and mitigation actions that will reduce the probability and severity of disaster events. These actions should be incorporated into existing and future policies, plans and projects of national, provincial and local government, as well as policies and practices of the private sector.

5.2.4.4.3 Summary of significant features of the policy

This policy represents a marked departure from the existing approach to disaster management.

It introduces a coherent national framework for disaster management aimed at integrating risk reduction measures into all development initiatives, in order to avoid human, economic, environment and property losses.

Risk reduction is, therefore, the core principle of the policy and is aimed at reducing the vulnerability of sectors or communities, especially the poor and disadvantaged, to disasters.

This approach is in keeping with international trends. It is also in line with the principles accepted during the United Nation's International Decade for Natural Disaster Reduction. It encourages greater investment in prevention and mitigation measures by both the public and private sectors.

The policy signifies a shift away from the disproportionate emphasis given to rare major disasters. It seeks to include relatively smaller household and community disasters and the resulting losses borne by different sectors of society. This is of particular significance in the Southern African context, with its mixture of developed and developing economies.

The policy addresses the importance of regional co-operation and the establishment of joint standards of practice in the Southern African region.

The policy recognises that the primary obligation for disaster management rests with government. It is mindful, however, of the need for the establishment of partnerships between government and the private sector and the sharing of responsibilities for risk reduction.

The policy recognises that successful disaster management can only be achieved, if the spirit of partnerships with the private sector and communities as well as co-operative governance emphasised in the Constitution, is adhered to by government agencies, particularly due to the crosscutting nature of disaster management.

The White Paper was followed by the Disaster Management Act (No. 57 of 2002), and the related National Disaster Risk Management Framework, essentially stating the particular obligations of all organs of State. However, the Act and related documents also prescribe private sector participation.

CHAPTER 6

THE DISASTER MANAGEMENT ACT, 2002 (NO. 57 OF 2002)

6.1 The objectives of the Act

The Disaster Management Act, 2002 that commenced on 1 April 2002 in respect of the national and provincial spheres of government and commenced on 1 July 2002 in respect of the municipal sphere of government, provides for -

- An integrated and co-ordinated disaster management policy that focuses 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;
- The establishment of national, provincial and municipal disaster management centres;
- Disaster management volunteers; and
- Matters incidental thereto.

6.2 Main applications

The following are some of the main areas developed in terms of the Disaster Management Act, 2002:

- The integration of risk reduction strategies into all development initiatives.
- The development of a strategy to reduce the vulnerability of people, especially poor and disadvantaged communities, to disasters.

The establishment of Disaster Management Centre -

- To ensure that an effective disaster management strategy is established and implemented by all spheres of government and other disaster management role players;
- To co-ordinate disaster management in all spheres of government; and
- To promote and assist the implementation of disaster management measures in all sectors of society.

The introduction of a new disaster management funding system which -

- Ensures that risk reduction initiatives are taken;
- Builds sufficient capacity to respond to disasters; and
- Provides for adequate post-disaster recovery.

The empowerment of communities to be informed, alert, self-reliant and capable of supporting and co-operating with government in disaster prevention and mitigation.

The establishment of a National Disaster Risk Management Framework that provides for a coherent, transparent and inclusive policy on disaster management that is appropriate for the Republic as a whole.

CHAPTER 7

THE NATIONAL DISASTER RISK MANAGEMENT FRAMEWORK (NDRMF) 2005

7.1 Objectives of the NDRMF

The NDRMF as prescribed by the Disaster Management Act, 2002, drives the following Key Performance Areas (KPA) and Enablers:

7.2 Key performance area 1: Institutional capacity for disaster risk management

7.2.1 Objective

Establish integrated institutional capacity within the national sphere to enable the effective implementation of disaster risk management policy and legislation.

Intergovernmental Committee on Disaster Management (ICDM)

The ICDM consists of Cabinet members involved in the management of disaster risk, or the administration of other national legislation aimed at dealing with an occurrence defined as a disaster in terms of section I of the Act. It includes Cabinet members holding the following portfolios:

Agriculture and Land Affairs
Defence
Education
Environmental Affairs and Tourism
Foreign Affairs
Health
Home Affairs
Housing
Minerals and Energy
National Treasury
Provincial and Local Government
Public Works
Safety and Security
Social Development
The Presidency
Transport
Water Affairs and Forestry.

The Member of the Executive Council (MEC) involved in disaster risk management must represent each province on the ICDM or the administration of other national legislation aimed at dealing with an occurrence defined as a disaster in terms of section I of the Act.

National Disaster Management Centre (NDMC)

The NDMC is the principal functional unit for disaster risk management in the national sphere. In essence, the NDMC is responsible for guiding and developing frameworks for government's disaster risk management policy and legislation, facilitating and monitoring their implementation, and facilitating and guiding cross-functional and multidisciplinary disaster risk management activities among the various organs of State.

Disaster Management Advisory Forums

National Disaster Management Advisory Forum (NDMAF)

Objective

The primary purpose of the NDMAF is to provide a mechanism for relevant role players to consult one another and to co-ordinate their activities with regard to disaster risk management issues.

The Forum must make recommendations concerning the National Disaster Risk Management Framework to the ICDM, and may advise any body of state, statutory functionary, non-governmental organisation or community or the private sector on any matter relating to disaster management.

Representation

The representation:

- The Head of the National Centre;
- A senior representative of each national department whose Minister is a member of the Intergovernmental Committee on Disaster Management, designated by that Minister;
- A senior representative of each provincial department whose MEC is a member of that Committee, designated by that MEC;
- Municipal officials selected by the South African Local Government Association.

Representatives of other disaster management role-players designated by the Minister, which may include -

- Organised business;
- The Chamber of Mines;
- Organised labour;
- The insurance industry;
- Organised agriculture;
- Traditional leaders;
- Religious and welfare organisations;
- Medical, paramedical and hospital organisations;
- Organisations representing disaster management professions in South Africa;
- Other relevant non-governmental and international organisations and relief agencies;
- Statutory bodies regulating safety standards in particular industries;

- Institutions of higher education;
- Institutions that can provide scientific and technological advice or support to disaster management;
- Experts in disaster management designated by the Minister; and
- Persons co-opted by the Forum for a specific period or specific discussions.
- The Head of the National Centre is the chairperson of the Forum.

Provincial disaster management advisory forums

Presentation

Provincial disaster management advisory forums consist of -

- The head of the provincial disaster management centre;
- A senior representative of each provincial department designated by the Premier of the province concerned;
- The heads of the respective municipal disaster management centres in the province;
- Representatives of organised local government in the province.

Representatives of other disaster management role-players in the province designated by the MEC, which may include-

- Organised business in the province;
- Representatives of mines in the province;
- Organised labour in the province;
- Organised agriculture in the province;
- Traditional leaders;
- The insurance industry in the province;
- Religious and welfare organisations in the province;
- Medical, paramedical and hospital organisations in the province;
- Other relevant non-governmental organisations and relief agencies in the province;
- Institutions of higher education in the province;
- Institutions that can provide scientific and technological advice or support to disaster management;
- Experts in disaster management designated by the MEC; and
- Persons co-opted by the forum in question for a specific period or specific discussion.

Municipal disaster management advisory forums

In terms of disaster risk reduction, the local sphere of government is the first line of defence and, in the event of a disaster occurring or threatening to occur; the communities are in reality the first responders. The primary responsibility for the co-ordination and management of local disasters rests with the local sphere. Thorough disaster risk management planning and effective co-ordination is key to saving lives and limit damage to property, infrastructure and the environment.

Such a forum should:

- Give advice and make recommendations on disaster-related issues and disaster risk management.
- Contribute to disaster risk management planning and co-ordination.
- Establish joint standards of practice.
- Implement response management systems.
- Gather critical information about the municipality's capacity to assist in disasters and to access resources.
- Assist with public awareness, training and capacity building.

Disaster risk management committees

All metropolitan and district municipalities should establish inter-departmental disaster risk management committees for their areas and all district municipalities establish disaster risk management committees in district management areas. In addition, local municipalities should establish their own disaster risk management committees and ensure the establishment of disaster risk management committees or forums in all municipal wards. It is useful to note that in the previous dispensation District Drought Committees consisted of knowledgeable persons assisted by officials of the Department of Agriculture, appointed by the Minister, played a pivotal role in collecting information on drought and related conditions and monitoring of drought relief schemes. Such types of structure are worth considering.

Community participation

The community is at the coalface of disaster risk management. It is from the conditions of risk that exist in communities that all other disaster risk management activities evolve. It is in the community where all the operational activities related to disaster risk management take place. All disaster risk reduction planning, the development of projects and programmes and the allocation of responsibilities must be founded on the needs and priorities of communities. Disaster risk reduction is a community-driven process.

Participation of volunteers in disaster risk management

Every effort should be made to establish units of volunteers trained in special skills in communities at risk, in accordance with the national inclusive approach to the participation of volunteers in disaster risk management.

Arrangements for national, regional and international co-operation for disaster risk management

Constitutionally, the Government bears primary responsibility for disaster risk management (Schedule 4, Part A, Constitution of the Republic of South Africa, Act No. 108 of 1996). However, political commitment, legal imperatives and institutional processes are not always enough to ensure success. An effective and comprehensive disaster risk management strategy cannot be achieved without participative decision making, involving a wide range of role players. Disaster risk management is a shared responsibility, which must be fostered through partnerships between the various stakeholders and co-operative relationships between the different spheres of government, the private sector and civil society. Furthermore, disaster risk management is an intergovernmental process, with each sphere of government playing a unique role and performing a specific set of responsibilities in the process.

Co-operation between national, provincial and municipal spheres

- The ICDM provides the political mechanism for the application of the principle of co-operative governance, by bringing together political representatives from the three spheres of government.
- The NDMAF provides a further mechanism for co-operative governance by providing a forum for input, including technological and specialist input, by a wide range of stakeholders from, amongst others, civil society and the private sector.

Mutual assistance agreements

In accordance with the Act, national departments, provinces and municipalities must establish their level of capacity to deal with disaster risk reduction, response and recovery. Where necessary, and to strengthen this capacity, they must enter into mutual assistance agreements with their neighbours, the private sector, other organs of State and communities.

Regional co-operation

As specified in the Act, regional co-operation for the purpose of disaster risk management is essential, and the appropriate mechanisms must be initiated to establish a forum in which such co-operation can be achieved. Accordingly, a consultative process must be undertaken to establish a Southern African Development Community (SADC) forum for the purpose of disaster risk management co-operation in the region.

International co-operation

South Africa supports and actively participates in the strategies and efforts of the international community to reduce disaster risk. It must associate itself with selected international development protocols, agendas and commitments, such as the Millennium Development Goals outlined in the United Nations (UN) Millennium Declaration adopted at the UN Millennium Summit in September 2000.

A further aspect of South Africa's involvement in the international disaster risk management arena is that of humanitarian assistance.

7.3 Key Performance Area 2: Disaster Risk Assessment

7.3.1 Objective

To establish a uniform approach to assess and monitor disaster risks that will inform disaster risk management planning and disaster risk reduction undertaken by organs of State and other role players.

Disaster risk assessment and risk reduction planning

Disaster risk assessment is the first step in planning an effective disaster risk reduction programme. It examines the likelihood and outcomes of expected disaster events. This would

include investigating related hazards and conditions of vulnerability that increase the chances of loss.

Disaster risk assessment planning also requires identification of key stakeholders, as well as consultation with them about the design and/or implementation of the assessment and the interpretation of the findings.

Situations requiring a disaster risk assessment

Disaster risk assessments must be undertaken to:

- Anticipate and plan for known hazards or disasters to prevent losses and limit endangering impacts.
- Ensure that development initiatives maximise their vulnerability reduction outcomes.

Undertaking a disaster risk assessment

The general process for assessing disaster risk involves the following stages, namely:

Stage 1: Identify the specific disaster risk(s)

- Identify and describe the hazard with respect to its frequency, magnitude, and speed of onset, affected area and duration.
- Describe and quantify vulnerability to determine susceptibilities and capacities.
- Estimate the likely losses resulting from the action of the hazard on those that are vulnerable, to evaluate likely consequences or impacts.
- Identify relevant capacities, methods and resources already available to manage the risk. Assess the effectiveness of these, as well as gaps, inconsistencies and inefficiencies in government departments and other relevant agencies.

Stage 2: Analyse the disaster risk(s)

Estimate the level of risk associated with a specific threat or hazard to determine whether the resulting risk is a priority or not.

Stage 3: Evaluate the disaster risk(s)

This stage involves the further prioritisation of disaster risks when there are multiple threats or hazards to assess.

Stage 4: Monitor disaster risk reduction initiatives and update and disseminate disaster risk assessment information

This stage involves ongoing monitoring to measure the effectiveness of disaster risk reduction initiatives, identify changing patterns and new developments in risk profiles, and update and disseminate information for the purpose of disaster risk management planning.

Link with disaster risk management planning

The findings of stages 1 and 2 will directly inform the development of a Level 1 Disaster Risk Management Plan (the first level of the planning process), as well as components of a Level 3 Disaster Risk Management Plan, by identifying:

- Known priority risks for the purpose of contingency planning.
- Priorities for vulnerability reduction planning.
- High-risk areas, communities and households exposed to multiple risks, and high-risk developments requiring further evaluation and prioritisation through focused comprehensive disaster risk assessments. (The outcomes of Stage 3 will directly inform the development of a Level 2 Disaster Risk Management Plan as well as components of a Level 3 Disaster Risk Management Plan. The results of Stage 4 will inform the development of a Level 3 Disaster Risk Management plan).

(Note: Levels of Disaster Risk Management Plans to be discussed under KPA 3.)

Community - based disaster risk assessment

In accordance with the Act's intent to increase local capacity so as to minimise the risk and impact of disasters, disaster risk assessment efforts must actively include the participation of vulnerable communities and households, including physically isolated communities and female-headed and child-led households.

Monitoring, updating and disseminating disaster risk information

Just like other risks, disaster risks are not static. They change seasonally and over time. To recognise such changes, and to strategically adjust programmes accordingly, all government departments must have monitoring systems in place that are relevant to their specific functional responsibilities.

These systems form the basis for sounding timely warnings of, or alerts for, impending significant events or disasters. They are also essential for monitoring the effectiveness of ongoing disaster risk reduction efforts. Risk monitoring systems involve:

- Hazard tracking systems to monitor the physical phenomena that can trigger disaster events, for example, systems that track the seasonal build-up of grass fuels over large areas provide critical warning information on potential veld fire conditions.
- Vulnerability monitoring systems to track the ability of areas, communities, households, critical services and natural environments to resist and withstand external threats.
- Disaster event tracking systems monitoring changing patterns in disaster risk.

7.4 Key Performance Area 3: Disaster Risk Reduction

7.4.1 Objective

To ensure all disaster risk management stakeholders develop and implement integrated disaster risk management plans and risk reduction programmes in accordance with approved frameworks.

The successful implementation of the Act critically depends on the preparation and alignment of disaster management frameworks and plans.

Disaster risk management planning

The NDMC must ensure that national, provincial and municipal organs of State, municipal entities and other institutional role players undertake coherent and relevant disaster risk management planning.

Disaster management frameworks and disaster risk management plans

Disaster management frameworks and disaster risk management plans are the strategic mechanisms through which disaster risk management action is co-coordinated and integrated across all spheres.

Level 1: Disaster Risk Management Plan

A Level 1 Disaster risk management plan applies to national or provincial organs of State and municipal entities. It focuses primarily on establishing institutional arrangements for disaster risk management.

Level 2: Disaster Risk Management Plan

A Level 2 Disaster Risk Management Plan applies to national, provincial and municipal organs of State that have established the institutional arrangements, and are building the essential supportive capabilities needed to carry out comprehensive disaster risk management activities.

Level 3: Disaster Risk Management Plan

A Level 3 Disaster Risk Management Plan applies to national, provincial and municipal organs of State that have established both the level 1 and level 2 disaster risk management plans. The level 3 plan must specify clear institutional arrangements for co-coordinating and aligning the plan with other governmental initiatives and plans of institutional role players. It must also show evidence of informed disaster risk assessment and ongoing disaster risk monitoring capabilities, as well as relevant developmental measures that reduce the vulnerability of disaster prone areas, communities and households.

Strategic integrating role of disaster management centres

The national, provincial and municipal disaster management centres play important strategic roles in integrating disaster management frameworks, plans and actions between the three spheres of government and across sectors and other role players within spheres.

Setting priorities for disaster risk management planning

Effective disaster risk management planning by all bodies of State as well as other role players requires careful identification of priority disaster risks and the most vulnerable areas, communities and households to these risks.

Identifying national priority disaster risks

National disaster priority setting is informed by three important considerations:

- The expected magnitude for specific disaster types (variously referred to as 'impact', 'severity' or 'consequences' of a disaster).
- The expected frequency of specific types of disaster (variously referred to as 'the probability' or 'likelihood' of a disaster).
- The expected manageability of specific types of disaster at provincial and municipal levels (which refers to 'how difficult' it is to manage a disaster event, including the level of cross-sectoral management effort involved to reduce the risk).

While a wide range of different disaster events can occur at provincial and local levels, these are relevant as a national disaster risk management planning priority only when disaster risk assessments and/or ongoing risk monitoring processes indicate that:

- A disaster event or process affects more than one province or exceeds the capabilities of a single province to manage it effectively.
- The same type of disaster event or process occurs repeatedly and at different times in more than one province with significant cumulative impact on lives, property and the natural environment, but is not necessarily classified as a national disaster. In this context, national disaster risk management priorities must focus on averting or limiting the impact of the following disaster risks.
- Wide-area events that due to their scale and magnitude, are likely to affect more than one province. These include extreme weather processes, such as cyclones and severe droughts as well as riverine floods.
- Recurrent high- and medium-magnitude events that occur in most provinces and may require national support and/or intervention. These include veld, urban fringe or large informal settlement fires. They can also include destructive windstorms, rainstorms and communicable disease outbreaks affecting people or livestock.
- Low-frequency/rare high-magnitude disaster risks with potential for severe loss and which require levels of specialist support possibly not available within a province. These include nuclear accidents, earthquakes, major transport disasters and maritime disasters such as severe oil spills
- Disaster risks that affect neighbouring countries and have consequences for South Africa. These include unplanned cross -border movements, as well as those events that require humanitarian or other relief assistance.
- In implementing the Act, all national organs of State must identify and prioritise those disaster risks relevant to their respective functional areas.

Identifying provincial and municipal priority disaster risks

While a wide range of different disaster events can occur at district municipality and municipal levels, they are relevant as a provincial disaster risk management planning priority only when a disaster risk assessment and/or ongoing risk monitoring processes indicate that:

- A specific disaster risk affects more than one municipality or district municipality, or exceeds the capabilities of a single district municipality to manage it effectively.

- A disaster risk results in the same type of disaster event occurring repeatedly and at different times in more than one municipality or district municipality with significant cumulative impacts on lives, property and the natural environment, but that are not in implementing the Act, all provincial bodies of State must identify and prioritise those disaster risks relevant to their respective functional areas.

Identifying the most vulnerable areas, communities and households

Not all areas, communities and households face the same disaster risks. In undertaking disaster risk management planning, priority must be placed on those areas, communities and households that are exposed to natural or other threats, and have the least capacity to resist and recover from the resulting impacts. These are called at-risk areas, communities or households.

Priorities for focusing disaster risk protection efforts

For disaster risk management planning purposes, all national, provincial and municipal bodies of State must, according to their functional area or area of jurisdiction, give priority to protecting:

- Strategic infrastructure or lifeline services whose damage or disruption in disaster events would result in serious and widespread consequences.
- Critical economic, commercial, agricultural and industrial zones or sites whose damage or disruption would have serious and widespread consequences.
- Fragile natural ecosystems and environmental assets that offer protective environmental services and which, if damaged or destroyed in a disaster event, would result in serious natural and economic losses.
- Communities in areas exposed to extreme weather and/or other natural and technological hazards and which are therefore likely to sustain serious human and property losses in the event of a disaster.
- Poor and underserved rural and urban communities, including informal settlements, especially those located in fragile ecological areas, which sustain repeated losses from recurrent small, medium, and large disaster events and that lack insurance coverage to facilitate recovery.
- Highly vulnerable households in at-risk areas with limited capacity to resist or recover from external shocks, particularly child-headed households or those headed by the elderly or households affected by chronic illness.

(Note: Where possible, this process must take place in consultation with those most at risk).

Strategic planning: disaster risk reduction

In keeping with the Act's emphasis on vulnerability reduction and the use of international best practice in this regard, strategic planning must focus efforts on reducing disaster risks. This includes the identification of strategies and measures that lessen the likelihood of harmful losses by avoiding endangering hazards or reducing vulnerability, as well as those that increase capacity to prepare for and enable timely response and recovery.

Disaster risk management involves a wide range of role players, especially since it requires both developmental efforts that reduce the risk of disasters as well as strengthen capabilities for

preparedness, response and recovery. In this context, the disaster risk management plans of different organs of State will necessarily differ in their emphasis on disaster risk reduction or on more operational response issues, depending on their respective functional areas.

Core disaster risk reduction principles of disaster prevention and mitigation

All disaster risk management plans must give explicit priority to the core principles of disaster prevention and mitigation. Internationally, disaster prevention, mitigation and preparedness are referred to as disaster risk reduction measures, because they lessen the likelihood of harmful losses by avoiding endangering hazards or reducing vulnerability.

In this way, prevention and mitigation are central to achieving the goal of disaster risk reduction, in which vulnerabilities and disaster risks are reduced and sustainable development opportunities strengthened.

It is often difficult to decide whether an intervention is preventive or mitigating. For this reason, it is more practical to refer to them jointly as disaster risk reduction measures, because both minimise the risk of disasters.

Disaster prevention

Disaster prevention refers to actions that provide 'outright avoidance' of the adverse impact of hazards and related environmental, technological and biological disasters.

Many disasters can be prevented through effective land-use planning, basic public works and effective municipal services that factor in the frequency and severity of natural or other hazards as well as human actions. Examples include:

- Replanting indigenous grasses or trees on a recently burned slope near roads or dwellings to stabilise the soil and prevent damaging land subsidence.
- Locating critical rail, road and telecommunications structures behind a coastal 'setback' line in areas exposed to storm surges to prevent disruption to critical services during violent summer or winter storms.
- Careful positioning of storm-water drainage and its ongoing maintenance, along with protection of natural wetlands, to prevent destructive flooding during heavy rain.

Disaster mitigation

Disaster mitigation refers to structural and non-structural measures that are undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards on vulnerable areas, communities and households. These efforts can target the hazard or threat itself (for example, a fire break that stops a fire spreading close to residential areas). This is often referred to as 'structural mitigation', since it requires infrastructure or engineering measures to keep the hazard away from those at risk.

Disaster mitigation efforts can also target people who are at risk, by reducing their vulnerability to a specific threat (for instance, promoting community responsibility for controlling fire risk in an informal settlement). This is often called 'non-structural mitigation', as it promotes risk avoidance behaviours and attitudes.

Operational planning: preparedness, response and recovery

Disaster risk management plans must also incorporate elements of preparedness, response and recovery appropriate to the respective functional areas of different organs of State.

Preparedness

Preparedness contributes to disaster risk reduction through measures taken in advance to warnings, including the timely and temporary evacuation of people and property from threatened locations.

Preparedness enables organs of State and other institutions involved in disaster risk management, the private sector, communities and individuals to mobilise, organise, and provide relief measures to deal with an impending or occurring disaster, or the effects of a disaster.

Preparedness differs from prevention and mitigation as it focuses on activities and measures taken in advance of a specific threat or disaster.

Preparedness actions include:

- Planning for seasonal threats, such as heavy rainfall, flooding, strong winds, veld or informal settlement fires, and communicable disease outbreaks.
- Anticipating and planning for the potential dangers associated with large concentrations of people at sporting, entertainment or other events.
- Establishing clear information dissemination processes to alert at -risk communities of an impending seasonal threat, such as a potential outbreak of cholera during the rainy season.
- Specifying evacuation procedures, routes and sites in advance of expected emergencies, including the evacuation of schools in areas exposed to flash floods.
- Defining in advance clear communication processes and protocols for different emergency situations, including the dissemination of an early warning for an impending extreme weather threat to isolated or remote communities.

(Note: These actions are key components of the contingency plans that should be developed for specific threats as part of a provincial or municipal disaster risk management plan).

Disaster response

Disaster response refers to the provision of assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people and animals affected. It can be of an immediate, short-term or protracted duration. (See KPA 4.)

Disaster recovery

Disaster recovery (including rehabilitation and reconstruction), focuses on the decisions and actions taken after a disaster to restore lives and livelihoods, services, infrastructures and the natural environment. In addition, developing and applying disaster risk reduction measures at the same time reduce the likelihood of a repeated disaster event.

Disaster recovery includes:

- Rehabilitation of the affected areas, communities and households.
- Reconstruction of damaged and destroyed infrastructure.
- Recovery of losses sustained during the disaster event, combined with the development of increased resistance to future similar occurrences.

(Note: Disaster recovery initiatives present excellent opportunities to incorporate disaster risk reduction actions. Following a disaster event, there are usually high levels of awareness about the risk factors that increased its impact. These present opportunities to introduce disaster risk reduction efforts consultatively with the affected communities and key stakeholders in order to reduce the likelihood of future loss). (See KPA 4.)

Eight key planning points for disaster risk reduction projects or programmes

There are eight key planning points or requirements that must be applied and documented by all national and provincial organs of State and municipal entities when planning disaster risk reduction initiatives. These enhance the established principles and approaches detailed in existing guidelines for integrated development planning.

- **Planning point 1:** Use disaster risk assessment findings to focus planning efforts.
- **Planning point 2:** Establish an informed multidisciplinary team with capacity to address the disaster risk and identify a primary entity to facilitate the initiative.
- **Planning point 3:** Actively involve communities or groups at risk.
- **Planning point 4:** Address multiple vulnerabilities wherever possible.
- **Planning point 5:** Plan for changing risk conditions and uncertainty, including the effects of climate variability.
- **Planning point 6:** Apply the precautionary principle to avoid inadvertently increasing disaster risks.
- **Planning point 7:** Avoid unintended consequences that undermine risk-avoidance behaviour and ownership of disaster risks.
- **Planning point 8:** Establish clear goals and targets for disaster risk reduction initiatives, and link monitoring and evaluation criteria to initial disaster risk assessment findings

Research

Disaster risk reduction initiatives must be preceded by transparent research and careful planning and must provide evidence of the relevance or likely effectiveness of the planned intervention(s).

(See Enabler 2.)

Monitoring effectiveness and disseminating results

As part of the annual reporting requirements specified in the Act, municipal and provincial disaster management centres must include documented accounts of the disaster risk, reduction projects, programmes and initiatives planned and implemented, including those aimed at reducing vulnerability and loss for defined priority disaster risks.

Integration of disaster risk reduction with spatial development planning

Disaster risk is driven by both hazard and vulnerability factors reflected in spatial development frameworks.

Incorporation of disaster risk reduction planning into integrated development planning

As disaster risk reduction efforts are medium- to long-term multisectoral efforts focused on vulnerability reduction, they must be incorporated into ongoing IDP projects, processes, programmes and structures.

Risk - avoidance enforcement mechanisms

Critical components of effective disaster risk reduction are regulations, standards, by-laws and other legal enforcement instruments that discourage risk-promotive behaviour and minimise the potential for loss. National, provincial and municipal organs of State must assess the disaster risk management component of their existing policies, regulations, by-laws and other relevant legal instruments for their functional areas, and introduce measures to ensure alignment with the requirements specified in the Act.

Within provincial and municipal spheres, this may involve:

- Amendment of urban planning standards.
- Amendment of land-use regulations and zoning.
- Amendment of minimum standards for environmental impact assessments.
- Introduction of standards for 'risk-proofing' lifeline services and critical facilities from known priority disaster risks.
- Introduction of by-laws to implement extraordinary measures to prevent an escalation of a disaster or to minimise its effects.

Implementation and monitoring of disaster risk reduction programmes and initiatives

Effective implementation of disaster risk reduction programmes:

The eight planning points outlined above must also be applied when implementing disaster risk reduction programmes and initiatives. The monitoring processes and evaluations for disaster risk reduction initiatives specifically targeted communities at risk and must include both qualitative and quantitative vulnerability reduction outcomes.

In addition, projects should demonstrate close compliance with the goals, objectives, time frames and resource requirements identified in the planning process. Mechanisms must also be established to allow for project adaptation and adjustment for unforeseen conditions and opportunities.

Municipal and provincial disaster management centres must include in their annual reports documented accounts of the disaster risk reduction projects, programmes and initiatives planned and implemented. This include reports documenting the effectiveness of disaster risk reduction pilot projects and research initiatives, as well as initiatives that aim to reduce vulnerability and loss for defined priority disaster risks.

Measurable reductions in short-, medium - and large - scale disaster losses

The Act specifies that national, provincial and municipal disaster management centres must incorporate in their respective annual reports, as well as in a disaster management information system, a report on disaster risk reduction initiatives undertaken. They are also required to report on any disasters that occurred within their specific areas of jurisdiction. In this context, national, provincial and municipal disaster management centres must report on the frequency and severity of small-, medium- and large-scale disaster events, especially those in communities and areas identified as high risk through disaster risk assessment processes. Significant changes in frequency and severity, type or location of occurrences must also be reported, including systematic accounts of recorded losses.

(Note: Liaison with communities and in the context of agriculture, Organised agriculture (local Farmers Unions) to be observed.)

Reduced need for social relief in disaster-prone and economically vulnerable communities

While effective social relief is an important component of disaster response and recovery, the Act explicitly gives priority to vulnerability reduction in disaster -prone areas, communities and households. Annual reports generated by the national Department of Social Development and its provincial counterparts must include an account of the number of households receiving social relief assistance. This information must be further differentiated by location, date, disaster type and amount provided. An important benchmark for monitoring the effectiveness of disaster risk reduction initiatives in the most vulnerable communities will be changing demands for social relief assistance.

Generation and dissemination of case studies and best-practice guides in disaster risk reduction

The promotion of a 'culture of prevention' is practically enabled by access to examples of best practice in disaster risk reduction. In addition to the adoption of measures outlining training and capacity-building strategy, mechanisms for disseminating information on best practice in disaster risk reduction for South Africa. This includes the development of learning materials and support guides for different risk scenarios and contexts. (See Enabler 2)

7.5 Key Performance Area 4: Response and Recovery

7.5.1 Objective

To ensure effective and appropriate disaster response and recovery by:

- Implementing a uniform approach to the dissemination of early warnings.
- Averting or reducing the potential impact in respect of personal injury, health, loss of life, property, infrastructure, environments and government services.
- Implementing immediate integrated and appropriate response and relief measures when significant events or disasters occur or are threatening to occur.
- Implementing all rehabilitation and reconstruction strategies following a disaster in an integrated and developmental manner.

Early warnings

Early warnings are designed to alert areas, communities, households and individuals to an impending or imminent significant event or disaster so that they can take the necessary steps to avoid or reduce the risk and prepare for an effective response.

Assessment, classification, declaration and review of a disaster

When significant events or disasters occur or are threatening to occur, clear guidelines for the measures that have to be taken need to be established.

Organs of State are in terms of section 25 of the Disaster Management Act, 2002, tasked with primary responsibility for dealing with disasters as a result of a particular hazard or significant event. To ensure immediate and appropriate response and relief actions organs of State must prepare operational guidelines for initial assessments, the extent of the area affected and the damage to critical infrastructure, lifeline facilities, property and the environment.

Classification of a disaster and the declaration of a state of disaster

With the exception of a security-related event, the responsibility for strategic co-ordination in responding to a national disaster or significant event, which occurs or is threatening to occur, rests with the Head of the NDMC.

The Head of the NDMC must make recommendations to the appropriate organ of State or statutory functionary on whether a national state of disaster should be declared in terms of section 27 of the Act.

Disaster reviews and reports

Comprehensive reviews must be conducted routinely after all significant events and events classified as disasters. The findings will directly influence the review and updating of disaster risk management plans and will also serve as valuable training aids.

Integrated response and recovery

Co-ordination of response and recovery efforts

Responsibility for co -coordinating response to specific known rapid- and slow-onset significant events and disasters must be allocated to a specific organ of State. For example:

- Flood response and recovery efforts would involve the combined efforts of many stakeholders, but the primary responsibility must be allocated to a specific organ of State with the other stakeholders assuming supportive responsibilities. In the case of riverine floods, for example, the Department of Water Affairs and Forestry will bear primary responsibility. In the case of drought, the Department of Agriculture will be the primary agency, and in the case of extreme weather events, the NDMC could assume primary responsibility.

Resources

Mechanisms for the activation and mobilisation of additional resources for response and recovery measures must be clearly set out in operational plans.

Volunteers

Mechanisms for the deployment of volunteers must be outlined in operational plans.

National standard response management system

Each agency identified in the response management system must establish Standard Operating Protocols or procedures (SOPs) for co-coordinating response and recovery operations, and for ensuring government/business continuity. The SOPs must be consistent with the requirements of relevant legislation, regulations and standards.

The response management system must include common terminology for the identification of stakeholders responsible for direction, control and co-ordination of an event at the operational, tactical and strategic level, as well as for the title used for each level. For example, the tactical level (field operations), from where the event is being co-ordinated could be referred to as the Joint Operations Centre (JOC). Where strategic intervention is also required, for example in the case of a significant event, the head of the disaster management centre will be responsible for activating the Disaster Operations Centre (DOC) located in the centre of the relevant sphere.

(Note: Chapter 8 of this report has a bearing on this section. The involvement of Organised agriculture at all levels of the integrated institutional capacity for disaster risk management is of vital importance.)

The system must take into account conditions in South Africa where frequent significant events occurring on a daily basis require extraordinary measures, but do not necessarily justify the declaration of a local state of disaster.

The system must provide for a mechanism to track escalation of incidents and facilitate the reporting of 'trigger' indicators. 'Trigger' indicators must be clearly identified and must be reported to the disaster management centres in the various spheres. Examples include the routine reporting of all veld and forest fire incidents to the disaster management centre when fire danger rating indices are at certain levels, or the reporting of all incidents that require a predetermined level of response.

Emergency communication system

In view of the critical role of inter-agency communication in the management of incidents, significant events and disasters, the NDMC must give priority attention to the development of an emergency communication system for this purpose. (See Enabler 1)

Media relations

Responsibilities and protocols for media liaison, including press releases and media interviews, in the event of a national disaster occurring or threatening to occur, must be determined by the NDMC.

Regulations and directives for response and recovery

Operations

The NDMC must ensure the development of regulations and directives to standardise and regulate the practice and management of response and recovery operations in all spheres of government.

Regulation of relief measures

Relief operations following significant events and/or events classified as disasters must be co-ordinated and relief assistance and donations equitably distributed.

Rehabilitation and reconstruction

In order to ensure a holistic approach to rehabilitation and reconstruction in the aftermath of a significant event or disaster, the organ of State tasked with primary responsibility for a known hazard, must facilitate the establishment of project teams for this purpose.

Checks and balances must be affected to ensure that projects and programmes maintain a developmental focus. Project teams established for this purpose must determine their own terms of reference and key performance indicators and must report on progress to the NDMC.

7.6 Enabler 1: Information Management and Communication

7.6.1 Objective

To guide the development of a comprehensive information management and communication system and establish integrated communication links with all disaster risk management role players.

It requires systems and processes that will:

- Provide an institutional resource database, including a reporting and performance measurement facility.
- Facilitate information exchange between primary interest groups.
- Facilitate risk analysis, disaster risk assessment, mapping, monitoring and tracking.
- Guide and inform focused risk management, development planning and decision-making.
- Facilitate timely dissemination of early warnings, public awareness and preparedness, especially for at-risk people, households, communities, areas and developments.
- Enable timely and appropriate decision making to ensure rapid and effective response and recovery operations.
- Facilitate integrated and co-ordinated multi-agency response management.

- Record and track real-time disaster response and recovery information.
- Facilitate education, training and research in disaster risk management.
- Facilitate funding and financial management for the purpose of disaster risk management.

7.7 Enabler 2: Education, training, public awareness and research

7.7.1 Objective

To support the education, training, public awareness and research enabler, the following functionalities are required:

- Education and training programmes pertaining to disaster risk management in all spheres of the education system need to be recorded and monitored.
- The content of education and training programmes as well as records of participants (professionals, volunteers, communities, learners), and the education and training programmes they attended must be recorded.
- A register and records need to be kept of all accredited service providers as well as accredited facilitators to ensure that minimum standards set by Sector Education and Training Authorities (SETA's) are met.
- Research programmes and projects need to be registered and monitored and the information disseminated to relevant stakeholders.
- Initiatives related to an integrated awareness programme by all spheres of government need to be recorded to minimise duplication and to ensure synergy among stakeholders.

7.8 Enabler 3: Funding arrangements for disaster risk management

7.8.1 Objective

To provide a database that contains data relating to all funding matters.

The funding mechanisms for different aspects of disaster risk management, budgets, applications for funding, approvals and spending, need to be recorded to ensure proper usage and management of available funding.

(Note: It is important to look at the activities provided for under this enabler where all spheres of Government must adhere to the funding arrangements for their own organs. The Department of Agriculture indicated that it will carry the following costs:

- *development of plans,*
- *the sensitisation of all concerned and the review of plans;*
- *dissemination, coordination and implementation of early warning systems and issuing of advisories;*
- *awareness campaigns and education; and*
- *research initiatives.*

Each provincial department of agriculture and municipality should provide for disaster in their annual budget or Medium Term Expenditure Framework projections. If the disaster is of such a magnitude that a provincial department of agriculture or municipality cannot handle it, assistance may be

requested from the National Department of Agriculture. The latter will then approach National Treasury for post-disaster recovery and rehabilitation. Funding will ultimately depend on the approval of assistance schemes).

The dimensions of hazards to agriculture

Although it is not possible to list each and every hazard separately, the following are truly global (Keith Smith):

- **Natural hazards:** There is mounting evidence that worldwide environmental changes, especially climate change, will exacerbate atmospheric hazards like storms and floods, as well as facilitate the spread of infectious diseases. This is a sign that large-area hazards, as opposed to site-specific threats, will become more prominent.
- **Technological hazards:** The dependence on electricity supplies and mass communications to support the key functions of large cities and modern economies means that power failures and computer viruses can quickly disable urban life. Recently identified toxins offer fresh threats to human health.
- **Economical hazards.**
- **New-concern threats:** The ongoing spread of technology and urbanisation, together with growing social diversity and political tension, create fresh opportunities for international violence and terrorism.

CHAPTER 8

THE RELATIONSHIP BETWEEN THE PROVISIONS OF THE DISASTER MANAGEMENT ACT, 2002, THE NATIONAL DISASTER RISK MANAGEMENT FRAMEWORK, THE DISASTER MANAGEMENT PLANS OF THE VARIOUS ORGANS OF STATE AND THE AGRICULTURAL SECTOR

8.1 Introduction

The Disaster Management Act prescribes the following on capacity building which influence public-private sector partnerships:

- National Disaster Management Advisory Forums.
- Provincial Disaster Management Advisory Forums.
- Municipal Disaster Management Advisory Forums
- Disaster management committees. (Local municipalities must establish their own disaster management committees and ensure the establishment of disaster management committees or forums in each municipal ward).

As set out in the sections below, it is clear that the structures of organised agriculture match with the integrated institutional capacity for disaster risk management, which set the scene for involvement and cooperation.

(Note: That a full description of the role and functions of the above Forums and Committees can be found under Key Performance Area 1.)

8.2 Government - National

Minister of Provincial and Local Government.
Department of Provincial and Local Government.
National Disaster Management Centre.
Minister of Agriculture and Land Affairs.
Department of Agriculture.
Directorate of Disaster and Risk Management

Government - Provincial

Premier.
MEC for Provincial and Local Government.
MEC for Agriculture.
Department of Provincial and Local Government.
Department of Agriculture.

Government - Local

Mayors of District Municipalities.
Managers of District Municipalities.

Mayors of Local Municipalities.
Municipal Managers of Local Municipalities.
Councillors at Wards (Including Traditional Leaders).

8.3 Organised agriculture

AGRI SA National

Agri SA is a federation of agricultural organisations. It has three legs namely the General Affairs Chamber consisting of nine Provincial Affiliations to which the respective Farmers Associations are members. The second leg is the National Commodity Chamber where twenty-nine National Commodity Organisations are affiliated. The third leg is the Agricultural Business Chamber, which is presently, affiliated to Agri SA like the respective Provincial Affiliations.

NAFU SA

The National African Farmers Union of South Africa (NAFU SA), has nine Provincial Farmers Unions and one Commodity Union, and draws its members from a very broad base, which includes farmers, agri-businesses, farmers' organisations, corporations and individuals who support NAFU SA's objectives and goals.

TAU SA

TAU SA, previously, the Transvaal Agricultural Union, provides membership to farmers countrywide. National Commodity Organisations are affiliated to TAU SA, who has seating in the General Affairs Chamber.

8.4 Alternative structures

In the event that a municipality elects not to establish the aforementioned arrangements, appropriate alternative existing structures must be identified for the purpose of ensuring that the principles of co-operative governance and community participation are applied within the context of the Act and in accordance with the National Disaster Risk Management Framework.

Whilst the Act makes provision for the establishment of disaster management centres in metropolitan and district municipalities, from a practical point of view, and in the case of municipalities where distance is a factor, consideration must also be given to the establishment of decentralised or satellite disaster management units, offices or centres. This is where organized agriculture with its decentralised structures can play an important role. In those areas where District Drought Committees were previously appointed to assist with drought relief schemes, the concept should be reinstated as a structure to serve in district municipalities.

CHAPTER 9

PRINCIPLES GOVERNING DISASTER RISK MANAGEMENT IN THE AGRICULTURAL SECTOR

9.1 Introduction

The Strategic Plan for South African Agriculture of November 2001, sets out the vision and strategic goals for the agricultural sector, also identifying constraints or impediments posing certain risks both climatic variation and other unknown factors i.e. natural disasters, unstable commodity prices, including high input costs combined with low productivity, poor business strategies and inefficiencies and unfair trade practices by our competitors, etc.

South Africa with its commercial and subsistence farming sub-sectors, national food security side by side with household food insecurity, sophisticated urban water security, needs a comprehensive policy to protect its agricultural sector, rural communities and economy, especially against the ravages of disasters of which drought is the most severe.

9.2 Key principles applied in disaster risk management

The principles applied in managing agricultural disasters are guided by the disaster risk management cycle model described in the National Disaster Risk Management Framework and must do the following:

- Address important human needs;
- Be driven at all tiers of government;
- Be transparent and inclusive;
- Ensure community involvement;
- Accommodate local conditions;
- Have legitimacy;
- Be flexible and adaptable;
- Be efficient and effective;
- Be affordable and sustainable;
- Be needs oriented and prioritised;
- Involve other actors;
- Have a multi-disciplinary and integrated approach;
- Focus on key issues;
- Be practical;

9.3 Basic Elements of Disaster Risk Management in the Agricultural Sector

The following are the basic elements that should be followed:

- Disaster assistance must encourage and provide incentives for agricultural producers, local authorities and other water-dependent sectors or groups to adopt appropriate and

efficient management practices that help to alleviate the effects of disasters especially drought.

- Disaster assistance must be provided in an equitable, consistent and predictable manner without regard to economic circumstances, industry or geographic region.
- Disaster assistance must be provided in the form of technical and relief measures, financially or otherwise.
- All drought-relief agencies should co-ordinate their efforts to establish an accessible pool of knowledge and experience on drought relief.
- Effective communication must be promoted amongst all parties concerned. It is of utmost importance that all parties involved are committed to co-operation and the promotion of confidence in each other.
- In cases of severe drought conditions, prompt relief must be readily available and should be implemented with utmost speed and efficiency.
- Those at risk must know what to expect from government during drought or other agricultural disasters in order to be better prepared to manage risk.
- The commitment towards the conservation and protection of the natural and agricultural resource base must be pursued with long-term and comprehensive conservation programmes.
- The creation of permanent structures (including infrastructure and human resources) capable of providing streamlined procedures and effective co-ordination, and to ensure continuity in the ongoing process of reducing vulnerability to recurrent drought-related crises.
- The strengthening of rural community capacity through an education-, extension- and research scheme, thereby reducing their vulnerability to disasters especially drought.
- Promotion of a general acceptance of a drought management strategy for the agricultural sector so as to minimise resource degradation and the vulnerability of the sector to drought.
- Drought management strategies should be co-coordinated amongst all countries in the sub-continent. As drought normally affects more than one country at a time, it is essential to co-ordinate individual actions, to be aware of each other's management strategies, and if possible strive towards a common drought management strategy.
- Appropriate water supply systems must be installed and maintained in the developing regions to reduce dependency on highly vulnerable water sources such as seasonal rainfall, springs and river flow

- The development backlog of water provision systems in most of the rural areas should be addressed with urgency as water provision has proved to be one of the first and most critical drought impacts on rural communities.
- Water provision must be co-coordinated effectively between all levels of Government
- The adequacy of water reserves is an early indicator of vulnerability to drought, and is a situation, which should be constantly monitored, and be available on a GIS-database. The primary responsibility for the design, implementation, application and maintenance of these systems should be that of the Department of Water Affairs and Forestry.
- The development and updating of procedures for the effective communication between all role-players, of information on the nature of available relief schemes and the procedures for the accessing thereof by all members of target communities.
- The establishment and updating of sustainable agricultural systems through optimal resource utilisation.
- Improving the relevant household security conditions, creating capacity for self-reliance and ensuring access to effective relief rendering services must reduce the vulnerability of developing communities.
- Integrated information systems must be established on all levels ranging from communities to regions and national structures. Effective management and co-ordination of information will ensure that probable drought impacts are identified prior to the actual relief needs and that follow-up relief actions are monitored for adequacy.
- All necessary resources and support systems that can be used for drought relief actions should be made available. The whereabouts and procedures of accessing these resources should be known to all the relevant relief organisations.
- Efficient communication and co-operation must be established between all the states in the sub-continent to address regional drought conditions. Relief actions in South Africa should be planned and co-coordinated in consultation with relief organisations in neighbouring states
- Improving the relevant household security conditions, creating capacity for self-reliance and ensuring access to effective relief rendering services must reduce the vulnerability of developing communities.
- Existing infrastructure must be extended and reconstructed where needed, to enable utilisation thereof for immediate relief actions. Procedures to access resources, activate operations and second personnel, must be specifically defined for drought relief actions with emphasis given to the speed of implementation.

9.4 Early warning and monitoring systems

The National Disaster Management Centre, while responsible for ensuring that systems essential to the reduction of vulnerability to disasters are maintained, has to depend on line function departments i.e. Department of Agriculture in respect of drought, with the necessary expertise to assemble data and develop and maintain systems. The primary responsibility for the design, implementation, application and maintenance of these systems should be that of the Department of Agriculture.

Early warning and monitoring systems related to agriculture are essential to assessing the vulnerability of the sector especially to drought, the extent of support, if any, required to maintain a viable production sector, and the measure in which national food security could be affected by drought.

Monitoring schemes providing in-time data on nutritional states of vulnerable groups, health status of groups and employment status of groups involved in drought-sensitive industries like agriculture, appear essential to ensure that such groups receive the necessary support. Monitoring systems looking at the nutritional status of the population and at the household food security of the poor should be designed to provide coverage of all areas of South Africa, and accurate assessments of the current status of parameters on a geographical basis

By meshing systems in an appropriate network and ensuring that systems are compatible, the Centre will be able to monitor the level of maintenance and adequacy of the different early warning and monitoring systems, and ensure continuity in their operation and application.

CHAPTER 10

INTEGRATION OF THE ELEMENTS OF DISASTER RISK MANAGEMENT OF ASSESSMENT, REDUCTION, MITIGATION, RESPONSE AND RECOVERY IN THE AGRICULTURAL SECTOR

10.1 Introduction

Integration can only happen within the parameters and concepts of disaster risk management.

10.2 Development and Implementation of an integration strategy

The above can only be achieved within a proper risk assessment study, which requires an integrated, multi-sectoral, multi-disciplinary process, with the above parameters in mind.

A separate strategy has been developed as a template and is contained in this document, where after each Commodity Chamber can apply it to its own circumstances.

10.3 Elements

10.3.1 Assessment of the risk of disasters.

10.3.2 Preventing or reducing the risk of disasters.

10.3.3 Mitigating the severity or consequences of disasters.

10.3.4 Preparedness -especially in emergencies.

10.3.5 Response to disasters in a rapid and effective manner.

10.3.6 Recovery and rehabilitation in the post-disaster phase.

CHAPTER 11

INVOLVEMENT OF THE AGRICULTURAL SECTOR IN STAKEHOLDER PARTICIPATION, TECHNICAL ADVICE, PLANNING AND FINANCIAL AID IN RESPECT OF DISASTER RISK MANAGEMENT

11.1 Introduction

In order to put the principles of the broad Disaster Risk Management Plan for agricultural in perspective, it is necessary to concentrate on the change in approach in disaster management from the past to the present, both internationally and especially locally. Internationally, the field of disaster management has moved from a reactive disaster management approach, to one that is more proactive. Thus while emergency response is still an essential part of disaster management, the need to adopt a longer-term, risk-reduction disaster management approach, should also emerge as central in disaster risk management; a link with disaster reduction particularly in longer-term development goals. Previously, droughts as well as other disasters were, for example, largely regarded as a physical hazard requiring a response after the disaster had occurred. The focus, moreover, was on impacts of the event and post-disaster relief and response. In South Africa a similar response to disaster management, including agricultural disasters such as drought, can be tracked. Although valuable information from Early Warning Systems has been available, together with several financial aid schemes to assist those in need in the times of agricultural disaster, these efforts were often in the past reactive in nature and in some instances, helped foster a 'dependency' on government intervention by those most at risk.

11.2 The Disaster Risk Management Plan

In general, this paragraph must be read in context of the four Key Performance Areas as laid down in the National Disaster Risk Management Framework (NDRMF).

The first Key Performance Area being the integrated institutional capacity for disaster risk management, with the objective to establish integrated institutional capacity to enable the effective implementation of disaster risk management (DRM) policy and legislation.

Arrangements must be established for:

- Policy development and adoption.
- Direction and implementation of policy.
- Stakeholder participation in planning and operations.
- Technical advice in planning and operations.
- Arrangements for co-operation for DRM.

11.3 Responsibilities

Although the National Department of Agriculture will have the principal responsibility of drought management, there are still a host of other agricultural hazards that could result in disasters, namely animal diseases, pests and plagues where the Department on the one hand, as

part of its line functions, have a responsibility to the agricultural sector, which will eventually form part of the overall agricultural disaster management plan. On the other hand Organised agriculture with its structures at national, provincial and local level has an enormous responsibility and task to get involved with stakeholder participation in planning and operations, especially at local municipal level where capacity and knowledge of local agricultural conditions is much needed.

The first enabler, namely information, management and communication as advocated in the NDRMF, is the first step in a mitigation strategy and is required by all levels of decision-making and implementation. The second enabler describes education, training, awareness and research. The information includes the availability of funds and human power, and how these are best allocated in times of an emergency. Political decision-makers, administrative officials, and most importantly, the individuals vulnerable to disasters: The decision-makers and administrators should be fully aware of the risks as well as the options available to them should a disaster occur. Those directly affected by a disaster should be fully informed of action that they should take and assistance that they can expect. It is equally important that they should be aware of the financial and other assistance that will not be available to them, so that they can make provision for this in their planning. Awareness programmes should identify geographical regions and communities within those regions that are at risk from the different forms of disaster (including droughts). Risk maps should be prepared and maintained. Awareness programmes developed during quiet periods will form a sound basis for the first step in the development of warning systems. Public awareness and education regarding the realities of our climate, our natural resources and our vulnerability to crises, need to be promoted as a specific mitigation strategy.

In order to effectively apply mitigating measures against disasters, the root causes need to be addressed. Risk management is too often restricted to treating the symptoms, often when it is too late and when only a relief function can be performed. Because of the variety of factors, which cause or exacerbate disastrous conditions, the government has to adopt a multi sectoral approach. Advocacy is required to ensure that all parties understand the impact of their policies on conditions of e.g. water scarcity and other vulnerabilities. It is therefore necessary to give attention to the policies of several government departments at both national and provincial level. Local Government plays a critical role in disaster relief, particularly in the mobilisation of local resources.

In national terms, the impact of disasters usually results in major setbacks, including the direct loss of existing national assets and the diversion of national resources and effort away from ongoing development, in order to achieve recovery, and stripping the assets of the poor. It may sometimes be necessary for special reasons to assist people with rehabilitation if by doing so this restores production capacity much more quickly than would otherwise be possible, but this is unlikely. If this occurred, measures would be enforced to ensure that only farmers who had taken appropriate measures to mitigate the disaster are assisted (reciprocity) and that dependency was not induced.

11.4 The Drought Management Plan (DMP)

The vision contained in the DMP is to develop an effective, integrated risk and disaster management system for plant and animal husbandry and price and income systems so as to minimise the impact of droughts. Reducing drought risk and managing drought entail -

- Setting up a system of information management, and monitoring and evaluating drought situations to detect biophysical and social vulnerabilities and suggest counter action;
- Compiling drought indicator maps so as to provide updated information on, for example, whether drought is emerging or subsiding;
- Compiling regular rangeland/vegetation indicator maps to enable those farming to make pro-active strategic decisions;
- Implementing and improving early warning systems; and
- Establishing and implementing priority programmes for risk reduction, including preparedness, mitigation, response, recovery and rehabilitation.

The first step in a drought mitigation plan is the development and dissemination of information required for decision-making and implementation by political decision-makers, administrative officials and, most importantly, individuals vulnerable to drought. The decision-makers and administrators should be fully aware of the risks as well as the options available during drought, including funds and manpower, and how these can be obtained. Those directly affected by a drought should be fully informed of actions they should take and assistance that they could expect. It is equally important that they should be aware of financial and other assistance that will not be available to them so that they can provide for this in their planning.

Most rural households depend on agriculture as their source of food and income. Agriculture thus plays a prominent role in the stability of rural communities. When drought strikes, these communities are often left without their livelihoods and their investment in agriculture. Until recently, responses to drought have been reactive and the procedures have followed inconsistent patterns.

11.5 Drought and other disaster aid schemes

In the past, various assistance schemes such as rebate on transport cost of stock feed and incentives for stock reduction were developed to assist farmers in the event of cold spells, veld fires, floods, droughts, snow etc. Some of these schemes are still in operation in limited form. These schemes are based on the extent of the type of hazard resulting in a disaster and damage in a particular province. Therefore each province has a unique scheme designed for that province.

Current assistance schemes are not designed to replace what farmers have lost, but to enable them to continue farming despite setbacks brought about by disasters. These assistance schemes do not cover insured or insurable assets such as infrastructure and crops.

It is clear that the present disaster aid for drought is not particularly suitable for the farming community both commercial and emerging. The draft Drought Management Plan (DMP) has been published for general comments, and road shows are taking place with the view to scrutinise the document. Hopefully from this exercise clarity on the State's involvement in drought and other hazards resulting in disasters, in view of the new approach set out in the Disaster Management Act, 2002, will come forward. Although Organised agriculture by way of written comments from Agri SA and TAU SA has stated concern on a range of issues, the importance of inputs from Organised agriculture in refining the DMP cannot be overemphasised.

CHAPTER 12

CROSS CUTTING FACTORS IMPACTING ON THE VULNERABILITY OF ALL PARTICIPANTS IN THE AGRICULTURAL SECTOR

(Note: The list below has been compiled of those cross cutting factors that must also needs to be considered within the wider content of risk management and not merely those related to "nature". It should be kept in mind when applying disaster risk assessment as set out in Key Performance Area - 2. The list is by no means exhaustive and will need further development. It is also not placed in any order of priority)

12.1 Introduction

In general, socio-economic problems combine with insecure physical environments, create a high degree of vulnerability in the LDCs (Keith Smith, 2004). This is also true in the agricultural sector, except that the sector has also had to deal with the forces of nature, environmental degradation and poor development decisions which contribute increasingly to disaster losses in poor countries (Kreimer and Munasinghe, 1991). Common weaknesses include the organisational structure (everything from poor roads to untrained civil servants) and the lack of welfare programmes (including inadequate housing and health provision combined with a low nutritional status). It is comparatively easy to see that the severity of disaster impact is often a function of human vulnerability, rather than the physical magnitude of the event. The figure below illustrates some of the factors that divide the world and lead to differences in risk levels.

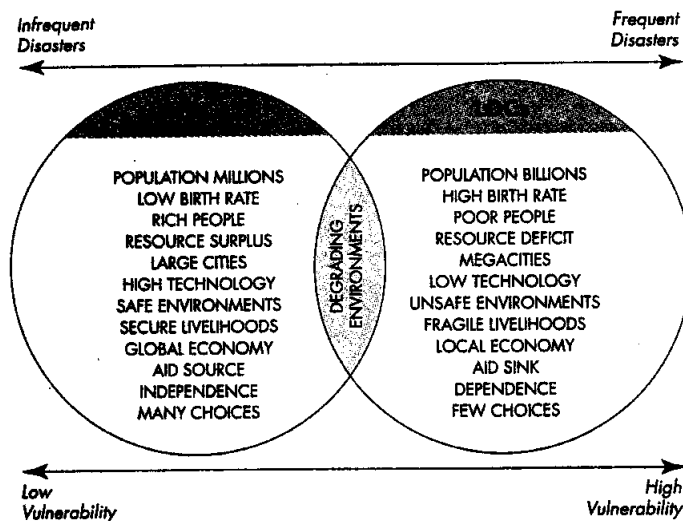


Figure 1.8 Some factors that divide the MDCs and the LDCs. Degrading environmental conditions are a feature of all levels of development but frequent disaster strikes and high vulnerability in the LDCs ensure the greatest disaster impacts.

Source: Adapted from Kates *et al.* (2001).

12.2 Droughts and floods

Apart from any other types of disasters discussed previously in this document, droughts and floods are the most common and devastating hazards resulting in disasters in South Africa.

12.3 Animal diseases

Diseases like foot and mouth, swine fever and the anticipated bird flu, impact on agriculture on a scale that goes beyond imagination.

12.4 Other diseases and pests

Under this category there are a variety of diseases and pests like locusts, red-billed finches and other confronting horticulture and field crops.

12.5 Factors of production

Factors of production namely, availability and quality of natural resources, level of input prices such as labour, diesel, pesticides, machinery, knowledge and infrastructure. These factors are necessary for the sector to be globally competitive and profitable. Recent studies have shown that factor conditions in South Africa constrain competitiveness in the agricultural and agro-processing sector. Most important in this regard are input prices, the productivity of the natural resource base, the cost and quality of unskilled labour, the cost of skilled labour, administration costs associated with hiring and managing labour, the quality of infrastructure, the cost of capital and the cost and availability of technology. In comparison with the major grain producers of the world such as the US, EU, Argentina and Brazil, South Africa has relatively low-potential soils, a dry and unstable climate, and a high-cost economy. These factors make it very difficult for South African agriculture to compete with these countries. Therefore, in order to be competitive, the option open to farmers in the absence of state support is to be more efficient and to reduce production costs mainly by using fewer inputs more effectively. Many farmers and agribusinesses have successfully implemented programmes of rationalisation, cost cutting, improved labour management and cost-effectiveness as part of a strategy to reduce production costs. Transport costs are influenced largely by inadequate and poorly managed transport infrastructure. These factors alone make production costs in agriculture on the African continent four times higher than in Asia, America and Europe.

12.6 Legislation

Reference needs to be made to the study done on behalf of the National Agricultural Directory 2004/5 and published by the Department of Agriculture. Chapter 1 of this study deals with 74 pieces of national legislation impacting on the agricultural sector. The sections mostly affected are the livestock where animal diseases like foot and mouth disease causes great discomfort and financial losses. Furthermore, legislation pertaining to marketing, land reform and subdivision of agricultural land, do have an impact on the broader sector. A special investigation needs to be conducted on the role and the manner in which this legislation are managed.

12.7 Broad Based Black Economic Empowerment for Agriculture (AgriBEE)

The Government has set in place a general framework called Broad Based Black Economic Empowerment (BBBEE), to guide a targeted national equity drive as part of a comprehensive social and economic transformation policy.

In the case of agriculture an Agricultural Black Economic Empowerment (AgriBEE) framework has been developed. The Minister of Agriculture and Land Affairs launched this framework in July 2004, with the purpose of stimulating stakeholder consultations towards the establishment of an agricultural sector charter. A protracted consultation process has taken place since the launch and it is expected to finalise the agricultural charter by the end of 2005.

The immediate focus of AgriBEE implementation is to support skills development in the sector, which is still largely characterised by illiteracy and inadequate skills levels. This limits black people to take full advantage of any economic opportunity in the agricultural sector. Empowerment initiatives will largely be geared towards specific designated interested groups such as women, youth and disabled persons, and promoting investment in the nodal land areas in South Africa. AgriBEE implementation mechanisms will be one of a range of government mechanisms (together with CASP, LRAD, MAFISA, etc.) forming part of a comprehensive support towards the economic integration of Black people in the agro-food sector.

12.8 Population growth and Urbanisation

The overall number of people exposed to hazard is increasing, largely because some 90% of the population growth is taking place in the LDCs. In these countries, human vulnerability is already high through dense concentrations of population in unsafe physical settings. Continued population growth outstrips the ability of governments to invest.

Based on the 2001 Census, 79% of South African citizens identified themselves as African; 9.6% as White; 8.9% as Coloured; and 2.5% as Indian/Asian. To cater for South Africa's diverse peoples, the Constitution recognises 11 official languages.

The country is very unevenly populated. An average population density is 36.7 inhabitants per km², but it reaches 519.5 inhabitants per km² in Gauteng (a small region with two large cities, Johannesburg and Pretoria), and whilst there are only 2.3 persons per km² in the Northern Cape. The latter is the largest province with 30% of total land area and just 1.8% of total population. Some 21% of the population is located in KwaZulu-Natal on 7% of the total land area.

South Africa is becoming progressively more urbanised. The share of urban population currently reaches 58%, which is well above the Sub-Saharan Africa average of 34%. Six cities, Johannesburg, Tshwane (Pretoria), Cape Town, Ethekewini (Durban), Ekurhuleni (Greater East Rand) and Nelson Mandela (Port Elizabeth) each count for over 1 million inhabitants. The rapid urbanisation is quite consistent with the trends in the developing world and is an increasingly important factor to consider in policymaking.

12.9 Land pressure

Rural land pressure adds to the problem. Poverty forces the adoption of unsustainable land use practices and countries with a legacy of deforestation, soil erosion and over-cultivation, find their environment more vulnerable to environmental hazards like floods and droughts.

12.10 Land reform

The main objectives of land reform are:

- Redress past injustices.
- Foster reconciliation and stability.
- Support economic growth.
- Improve household welfare and alleviate poverty.

The Land Reform Programmes forms part of the structural adjustment programmes of the government and is implemented through three main programmes:

- Land restitution: Restoring land to people dispossessed in the past by racially discriminatory legislation. The Land Claims Commission and Land Claims Court deal with such cases;
- Land redistribution: Providing the poor and previously disadvantaged population with land to improve their livelihoods, use the land for settlement purposes or to establish farming enterprises;
- Land tenure reform: Ensuring security of tenure for different forms of land occupation, which enables individuals or groups to earn the benefit of their property and enjoy recognition and protection, without fear of arbitrary action by the State or landowners.

The land restitution programme is aimed at the restitution of land rights to those forcibly removed from their land since 1913. The Land Claims Commission deals with land claims and compensation of the present owners and restitution to the claimants. Within the process of restitution the dispossessed person or community is either given back their original property (or similar property), or receive an equivalent financial compensation. The legislation governing this programme is the Restitution Land Rights Act 22 of 1994. The restitution targets people who were dispossessed of their land as from 19 June 1913.

Land redistribution is aimed at providing people with access to land for either settlement or agricultural purposes. The aim is inter alia to settle small and emerging farmer on viable farming operations in the commercial farming areas. The LRAD aims to transfer 30% of all white-owned agricultural land in 15 years to previously disadvantaged individuals.

Land tenure reform is aimed at ensuring security of tenure for different forms of land occupation, which enables individuals or groups to earn the benefit of their property and enjoy recognition and protection, without fear of arbitrary action by the State or landowners.

12.11 Inequality

Disaster vulnerability is closely associated with the economic gap between rich and poor.

12.12 Climate change

Global warming will bring significant changes in the world's climate. Potential changes in climate may have significant effects on various sectors of South African society and the economy. In order to assess the possible effects of the changing climate, a study was undertaken through the South African Country Studies Programme. This study had the following objectives:

- To identify sectors and areas of highest vulnerability to climate change;
- To propose suitable adaptation measures to offset adverse consequences; and
- To synthesise the results of the vulnerability and adaptation studies across sectors for analysis by policy or mitigation initiatives.

Regional climate change scenarios were used in these investigations, which were developed using the Global Climate Model (GCM) simulation. The potential effects of a changed climate within 50 years and possible adaptation strategies were identified for the following sectors: human health; maize production; plant biodiversity; water resources; rangelands; and animal tax.

The following changes to the South African climate within the next 50 years were predicted:

- A continental warming of between 1°C and 3°C, with the maximum focused on regions of aridity, and the minimum along the coastal regions.
- Broad reductions of approximately 5% to 10% of current rainfall.
- Increased summer rainfall in the northeast and the southwest, but a reduction of the duration of the summer rains in the northeast.
- Nominal increases in rainfall in the northeast during the winter season.
- Increased daily maximum temperatures in summer and autumn in the western half of the country.
- An extension of the summer season characteristics.

Some areas of the country may experience higher levels of change seasonally than others, with increased incidents of flood and drought. Air pollution will become a greater problem, due to enhanced temperature inversions (Hewitson, 1999).

12.13 Political change

The richest countries are reducing their commitments to internal welfare and to the international community. For example, in many Western countries, health spending per person has declined since 1980, and the role of the welfare state has been deliberately reduced.

The South African agriculture saw major policy changes in the past ten years. The centralised control of agricultural markets has been removed, trade has largely been liberalised and equitable access to services and resources for all groups of the population have been actively promoted.

Reforms have pursued multiple objectives, in particular, the broadening of access to agriculture; reducing poverty; improving food security and increasing productivity and profitability in the sector.

12.14 Economic growth

Economic growth, especially in the wealthy countries, has increased the exposure to catastrophic property damage. Along with the growing complexity and cost of the physical plant responsible for the world's industrial output, capital development has ensured that each hazard will threaten an increasing amount of property unless steps are taken to reduce the risks within cities and on industrial sites. Partly in response to the growing shortage of building land, some of the growth has occurred in areas subjected to natural hazards, whilst human-made hazards such as toxic chemicals and the use of nuclear power have added to the loss potential.

12.15 Technical innovation

New technology is sometimes seen as mitigating disaster through better forecasting systems and safer construction techniques. However, the more a society becomes dependent on advanced technology, the greater is the potential for disaster if the technology fails. New high-rise buildings, large dams, building construction on human-made islands in coastal areas, the proliferation of nuclear reactors, the reliance on mobile homes or low-cost housing, more extensive transportation (especially air travel) are all examples of such trends.

12.16 Social expectations

Hazard vulnerability may be increased because of rising social expectations. People have become much more mobile in recent years and expect to be transported around the world in the minimum amount of time, irrespective of adverse environmental conditions, such as severe weather.

12.17 Global interdependence

The functioning of the world economy works against the LDCs. Most of the Third World's export earnings come from its primary commodities for which market prices have either fallen over several decades, or remain highly unstable. The LDCs have little opportunity to process and market what they produce and are dependent on manufactured goods from the industrialised nations that are often highly priced or tied to aid packages. The progressive impoverishment of the small-scale farmer, combined with a foreign debt burden that may be many times the normal annual export earnings, takes resources away from long-term development in a process that has been described as a transfusion of blood from the sick to the healthy.

12.18 Economic importance of Agriculture

South African agriculture is of a dualistic nature, with a well-developed commercial sector comprising about 45 000 commercial farms (mostly owner-operated and using hired labour), occupying 86% of agricultural land. This commercial sector is capital-intensive, using hired labour, and is strongly linked to global markets. However, in terms of revenue most of these farms are relatively small and the owners are often relying on off-farm incomes. Subsistence and sub-subsistence (communal) farms (operated by family labour) occupy the remaining 14% of

farmland. Past government policies, which restricted Blacks to certain regions (homelands), and therefore excluded them from entering mainstream agriculture, was a major factor in promoting the dualistic nature of agriculture in South Africa that exists today.

Following the OECD Review of Agricultural Policies in South Africa, 2006, the commercial sector is similar to most OECD countries in that the top 20% produces about 80% of the total value of production. The fact that 23 000 commercial farms (or 51%) earn less than R 300 000 per annum is an indication that most of South Africa's commercial farms are in fact rather small units.

Agriculture is of declining importance in terms of its contribution to GDP but remains significant in terms of employment. Commercial agricultural production in South Africa was valued at R 68 billion in 2003, while the sector's contribution to the total gross domestic product was R 35.6 billion or 3.1% of GDP. The importance of agriculture in the overall economy has declined from around 6% in the 1980s to 3.6% in 2001-02. However, it remains an important sector in terms of employment: accounting for around 10% of the country's jobs as far as official employment is concerned.

According to the Agricultural Census 2002, formal agriculture provides employment for about 481 000 full-time farm workers (with total annual incomes of R 5.2 billion) and 459 000 seasonal and casual workers (total incomes R 1 billion). The smallholder sector provides mostly part-time employment for at least an additional 1.3 million households. In total, it is estimated that about 6 million people rely on agriculture for a livelihood. With such a large labour force, average labour productivity in South African agriculture is relatively low compared with other countries. However, the dual character of commercial farms and many subsistence farmers (of which there is a lack of data) implies that sector-wide averages should be interpreted with caution.

12.19 The development of small-scale farmers as a matter of priority

Smallholder farming, still located mostly in the former homelands, is an impoverished sector dominated by low-input, labour-intensive forms of production. Up to 2.5 million households subsist in this sector, having been relegated to farming on 13% of available agricultural land. Low productivity is a major challenge in the small-scale subsistence sector, attributable to past discriminatory policies coupled with such problems as tenure insecurity, very small land holdings and ineffective support services (e.g. extension, finance and marketing). The government policy guidelines now dictate that 80% of the efforts of the Department of Agriculture directed at agriculture should be allocated to assist the small farm sector. Such general directives, however, are extremely difficult to interpret, implement and monitor.

The communal areas, which form the bulk of the former 'homelands', are still using the traditional system of communal land tenure under which local leaders (chiefs) allocate communal land to the members of the commune for cultivation and pasture of their animals (mostly sheep and goats). Efforts to reform this system have met with strong political resistance from local leaders who have vested interests in the status quo. However, as seen in Latin America, converting insecure tenure systems into a modern property rights system, with a transparent and accessible land market is fundamental to good resource management, the provision of credit and increased productivity (Hernando de Soto, 1996). The Black population in rural areas is the target of the land reform policies (see Part 2), and is expected to benefit from the

development of the small-scale, market oriented farm sector. However, it is clear that adequate supporting infrastructure must also be in place if these new entrepreneurs are to survive.

It is essential for the development of small-scale farmers and for the less developed regions of South Africa, to have a financial system able to mobilise savings, allocate capital and monitor farmers, business firms and micro-enterprises. The overall supply of credit to smallholder agriculture is not known with any degree of accuracy due to diversions of loan funds and the cyclical nature of many small-scale farming activities. Coetzee (2003) estimates that less than 2% of the Land Bank's loans portfolio in 2003 was for small-scale agriculture. He also notes the minor role of private sector and State lending and that the number of provincial parastatal credit institutions has declined, as they were not financially sustainable. The problem is mostly that of high transaction costs and risk of default, which render formal financial institutions unwilling to provide services to those who are not engaged in the formal economy. The property right deficiencies in communal farming are another serious impediment to financing agriculture in the communes.

Specific agricultural related infrastructure includes government spending on on-farm and communal land infrastructure such as dipping tanks, replacement and upgrading of existing structures, and fencing. This expenditure is financed from provincial department budgets under farmer support programmes, and at the national level through conditional grant transfers to provinces under the terms of the Comprehensive Agricultural Support Programme (CASP).

In the State of the Nation address on 21 May 2004, the President announced the re-establishment of the Agricultural Credit Scheme (ACS) in the Department of Agriculture to provide capital for this sector, leaving the Land Bank to deal with the commercial sector for which R1 billion is immediately available to the ACS, and to increase the Department's support to agricultural activities in communal land areas as well as other small-scale agriculture.

The main thrust of this objective is to provide and facilitate access to credit related products and services to land and agrarian reform beneficiaries in communal areas, small farms and Agri-businesses in the country.

To establish Micro-Agricultural Finance Schemes of South Africa (MAFISA) as the 1st state-owned scheme to provide micro and retail agricultural financial services on a large, accessible, cost effective and sustainable basis in the rural areas.

The established Micro-Agricultural Finance Schemes of South Africa (MAFISA) provides credit and other financial packages such as savings, insurance and payment facilities to working poor and entrepreneurs in rural and peri-urban areas. This would broaden and stimulate greater access and participation along the total agricultural value chain by rural working poor and entrepreneurs in the financial markets.

MAFISA will therefore focus on the provision of short and medium term loans as phase one, long-term loans as second phase, along the total agriculture value chain, to allow potential sustainable agri-business entrepreneurs to graduate into mainstream commercial ventures.

12.20 Research

At the World Summit on Sustainable Development in Johannesburg in 2002, the Johannesburg Plan of Action was adopted and funds committed to deal with environmental degradation and disasters. South Africa as a partner will have to increase its research capacity especially as far as climate change is concerned.

12.21 Role of the Department of Agriculture

The Department of Agriculture needs to increase the level of commitment to prevention and mitigation actions that will reduce the probability and severity of disaster events through stepping up awareness campaigns to communities at risk. These actions should be incorporated into existing and future policies, plans and projects of national, provincial and local government, as well as policies and practices of the private sector. Strengthening of the capacity of the Directorate Agricultural Disaster Risk Management and reviewing its position in the organisational structure of the Department to be a position where direct reporting to the Director-General would be advisable. The motivation lies in the importance of risk management and as an overarching function it can only at that level.

12.22 Income tax provision as mitigation

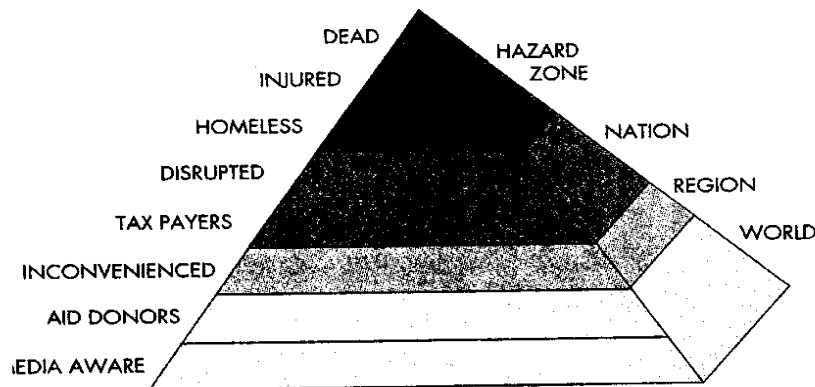
Section 13.5 of the Income Tax 1962 (No. 58 of 1962) refers to a scheme whereby farmers can on or after 21 June 1993, any amount received from selling of livestock as result of drought conditions, deposit such amount or part thereof with the Land bank. The objective of this scheme is to allow farmers to sell stock during a period of drought and put them in a position to restock when the climatic situation improves. Such amounts deposited with the Land bank will not be form part of the gross income of the farmer. Deposits must take place within a period of 3 months after the sale of the livestock. Funds can only be withdrawn after a period of 6 months. Withdrawals can take place with a days notice. These funds will accrue interest at market related rates and paid out on a half yearly basis and kept for a period of 6 years where after it will form part of a farmer's gross income. Offices of Land bank or SARS can be contacted for further information. This scheme is not accessible to other subsectors in agriculture.

CHAPTER 13

THE IDENTIFICATION OF HAZARDS LIKELY TO RESULT IN DISASTERS - WHAT IS THE PROBABILITY OF EACH EVENT?

13.1 Introduction

Viewing agriculture as a sector, some hazards resulting disasters will undoubtedly have an impact on the sector as a whole and can be called general or overarching, while others will impact on portions or areas. Identifying the nature of hazard and associated risk for each sub-sector would be necessary, by involving and evaluating the significance of a risk either quantitatively or qualitatively.



The figure above from Keith Smith (2004) shows the disaster impact pyramid. Awareness of disaster spreads from the small number of people most directly affected in the hazard zone, to the global population via the mass media.

13.2 Climate change

Firstly the question of climate change will have a detrimental effect on the agricultural sector as a whole. The South African Country study, based on one of the Hadley Centre in the UK (HADCM2) scenarios, predicts a decrease in SA rainfall over most of the country - summer region by 15% and winter rainfall by 25% - by 2050. Temperature will increase between 2.5 and 3°C. Runoff into main rivers is likely to be reduced e.g. Orange River -12-16% decrease in outflow. There will be a possible increase in fire frequency, saltation problems will occur and increased demand for irrigation will be experienced. The arid interior and moister north-eastern regions of South Africa are likely to be subjected to elevated evapo-transpiration rates, increased stress, and more frequent flood events, whereas the south-western regions of the country are likely to experience increased early winter frontal and less rainfall. The areas currently classified as water-stressed are likely to increase. Famines might become more frequent and widespread.

Significant decrease in river flow in the southern and western catchments is predicted, leading to shrinkage of areas amenable to the country's biomes to about half of their current extent, with huge losses in biodiversity.

13.3 Droughts

Drought is a major feature of the climate of Southern Africa and often it has a devastating impact. The root causes of vulnerability to drought disasters in South Africa remain low average rainfall, poverty and inequitable development. Rapid population growth and urbanisation, inequitable patterns of land ownership, lack of education and subsistence agriculture on marginal land lead to deforestation and environmental degradation, malnutrition and unemployment, all of which heighten vulnerability. A notable part of South Africa has been declared a drought disaster area for up to 70% of a 30-year period, whereas some eastern parts of the country have never been declared a drought disaster area. The above scenario calls for a comprehensive approach to drought management. To be effective, such an approach needs to appropriately balance prevention, mitigation, preparedness, response, recovery and disaster-related development. The occurrence of other disasters, the so-called unpredictable disasters like floods, pests and animal diseases also, need to be taken in consideration.

13.4 The probability of disasters

Keith Smith refers to disaster patterns that must be taken in account. Given sampling periods of sufficient length, independently compiled databases tend to show a similar frequency of occurrence of natural disaster types (Fig. 2.4). Floods are the most common cause of natural disaster, accounting for about one-third of all recorded events. Conversely, droughts and earthquakes were the deadliest disasters over this period, resulting in nearly half of all deaths, despite making up little more than 10% of events. Some relatively high-profile events, such as wildfires and volcanic eruptions, have both a low frequency of occurrence and a low death toll.

13.5 Probability studies

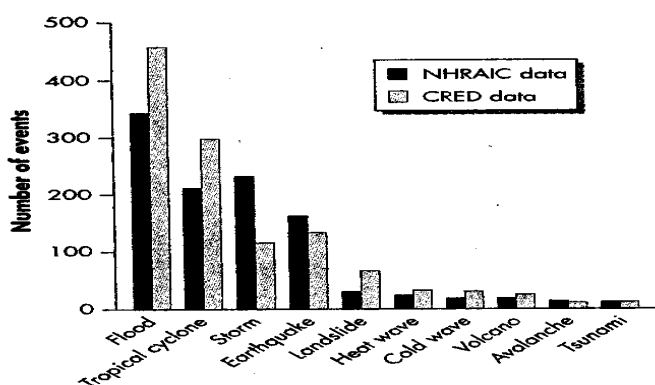


Figure 2.4 Similarity in the ranked numbers of natural disasters, according to type, recorded in two databases over contrasting, but overlapping, 35-year periods. The NHRAIC database relates to 1947–81; the CRED database relates to 1964–98.

Note: NHRAIC refers to the Natural Hazards Research and Applications Information Center.

Source: Adapted from Thompson (1982) and CRED database.

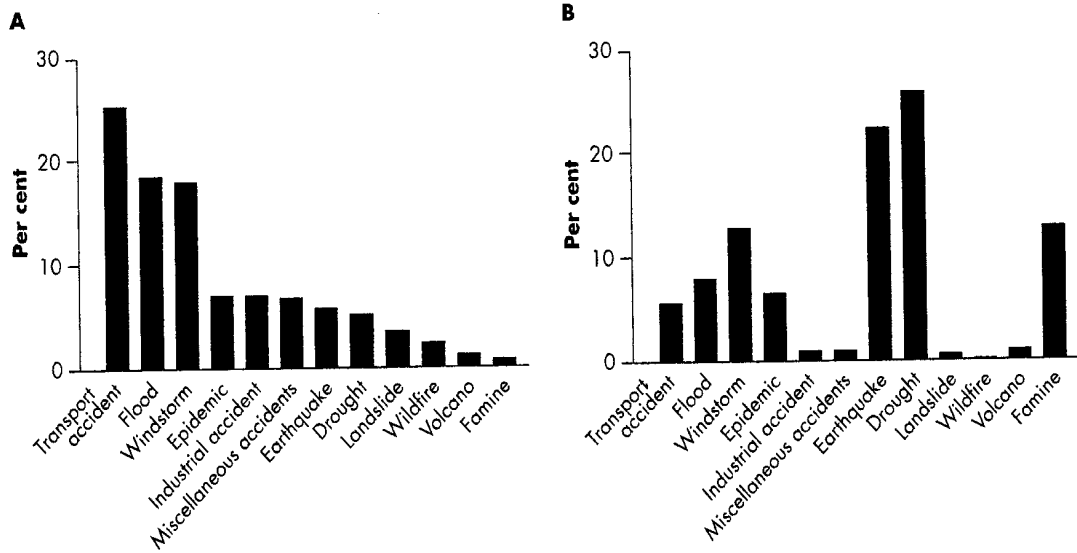


Figure 2.5 Percentage incidence of global disasters and disaster deaths according to disaster type 1975–2001. (A) incidence of main disaster types; (B) associated incidence of disaster deaths. Transport accidents, floods and storms are the most frequent disasters; droughts and earthquakes take the most lives. Source: Adapted from CRED database.

CHAPTER 14

SUMMARY OF THE IMPACT OF DISASTER RISK MANAGEMENT ON THE AGRICULTURAL SECTOR

14.1 Introduction

The Disaster Management Act, 2002, provides for an integrated and coordinated disaster risk management strategy, through partnerships between different stakeholders and through cooperative relations within all spheres of government as well as the private sector. This leaves the Agricultural sector with legislation that conforms to the principles on disaster risk management portrayed in the Strategic Plan for South African Agriculture, 2001.

Section 25 of the said Act provides for an obligation on all organs of state to prepare disaster management plans according to guidelines in the National Disaster Risk Management Framework. Subsequently the National Department of Agriculture in response to the Act and the framework prepared a draft Disaster Management Plan in with the scope, objectives, management issues and other elements embedded in the Act and will include the four Key Performance Areas and three Enablers laid down in the Framework. This it will grant the agricultural sector the opportunity to engage in a constructive manner when hazards resulting in disasters do occur. It will also allow the sector to provide much needed capacity and knowledge based information, especially at local level.

A Consequence from the abovementioned documents was the Drought Management Plan (DMP) as discussed in Chapter 11. This plan provides the platform on which future disaster risk and response management relating to drought will be dealt with. The participation of Organised agriculture and especially the role and importance of the previous District Drought Committees should not be overlooked and should be incorporated in the new dispensation of the structures of Local Authorities working on disaster risk management.

14.2 Future role of the Agricultural sector in disaster risk management

The agricultural sector should -

- act in a proactive manner by approaching the relative Departments namely Department of Provincial and Local Government, Provincial and Local Authorities were applicable, to have representation in the Advisory Forums.
- to become involved in the preparation of the strategies, policies and plans of state organs.
- support the initiatives of national, provincial and local governments in the development of co-ordinated procedures for relief in the form of specialist skills in emergency logistics, health, water, telecommunications and humanitarian assistance.

CHAPTER 15

PRO FORMA OR TEMPLATE TO BE USED IN DEVELOPING OF RISK MANAGEMENT STRATEGIES FOR NATIONAL COMMODITY ORGANIZATIONS

15.1 Introduction

To complete the study it was deemed necessary to include a pro forma or template, which the relevant National Commodity Organisations (NCO) can modify to develop its own disaster risk management strategies. Admittedly there is no hard and fast rule what such a strategy should look like and what the exact contents should be.

The pro forma as proposed is thus merely indicative and inputs from inter alia commodity groupings will thus be invited with a view to updating it as a final product. Further research on this topic will be done in conjunction with NCO's as well as Academics in the field of disaster risk management.

(Note: A proposal that might be useful is after reading the report, observe the concepts commonly used in disaster risk management, the elements of risk assessment, reduction, prevention, preparedness, response and recovery, specifically chapter 7 where the Key Performance Areas and Enablers are described, the cross cutting factors listed under chapter 12 for the specific commodities. The conceptual framework discussed under paragraph 1.2 of this report would be a very helpful instrument).

15.2 Objectives

The following objectives in broad terms, as prescribed in the National Disaster Risk Management Framework (NDRMF), are applicable in this pro forma:

- 15.2.1 To address holistically and comprehensively the various concerns and gaps in the different phases of the disaster management cycle by considering the underlying causes of disasters (i.e. the conditions of disaster risks) and the broader set of issues and contexts associated with disaster risk and its management.
- 15.2.2 To prevent, mitigate, prepare for, and respond effectively to the occurrence of disasters through the enhancement of local capacity and capability, especially in disaster risk management (i.e. recognizing, managing and reducing disaster risks, and ensuring good decision-making in disaster reduction and response based on reliable disaster risk information);
- 15.2.3 To promote multilevel, multidimensional and multidisciplinary coordination and collaboration among stakeholders in disaster reduction and response as they ensure the participation of the community, the integration of stakeholders' action, and the best use of limited resources.
- 15.3.4 Insuring that appropriate enabling mechanisms are in place, including policy, structure, capacity building, and resources.

15.4 Enabling mechanisms:

15.4.1 Policy:

The Disaster Management Act, 2002 in conjunction with the National Disaster Management Framework provides firstly the platform for disaster risk management, secondly, the Key Performance Areas and Enablers provides the guidelines to the activities to be followed in the disaster risk management cycle.

15.4.2 Structures:

The well-organised structures and systems of the agricultural sector can facilitate and ensure coordination of stakeholders' action and contributions to be in place. This involves the establishment and strengthening of focal points and coordination bodies for disaster reduction and response activities

15.4.3 Capacity:

The enhancement of national and local capacity to establish and implement disaster reduction and response measures, especially for vulnerable sectors and communities, is a constant undertaking.

15.4.4 Resources:

The identification and provision of resource requirements, including funds and trained human resources, are important. This includes means to access and use authorized fund appropriations for disaster reduction and response.

15.5 Proposed template

FRAMEWORK FOR IMPLEMENTATION OF STRATEGIES		
NDRMF OBJECTIVES	DESCRIPTION OF NDRMF OBJECTIVES	ACTIVITIES TO ACCOMPLISH OBJECTIVES BY NCO's
<p>Institutional capacity for disaster risk management (Key performance area 1)</p>	<ul style="list-style-type: none"> • Establishment of intuitional arrangements for implementing disaster risk management within the national, provincial and municipal spheres of government. • The application of the principle of co-operative governance for the purpose of disaster risk management. • The involvement of all stakeholders in strengthening the capabilities of national, provincial and municipal organs of state to reduce the likelihood and severity of disasters. • Describes processes and mechanisms for establishing co-operative arrangements with international role players and countries within southern Africa. 	<p>Capacity building and liaison with stakeholders</p> <ul style="list-style-type: none"> • all levels of Government • all levels of Organized Agriculture • farming communities <p>Establishment of a focal point within NCO's to communicate with other stakeholder e.g. DWAF/DMC's at different levels</p>

NDRMF OBJECTIVES	DESCRIPTION OF NDRMF OBJECTIVES	ACTIVITIES TO ACCOMPLISH OBJECTIVES BY NCO's
Disaster Risk Assessment (Key Performance Area 2)	To establish a uniform approach to assess and monitor disaster risks that will inform disaster risk management planning and disaster risk reduction undertaken by organs of State and other role players.	Risk Assessment <ul style="list-style-type: none"> • Collect relevant information • Establish the risk context. • Identify the risks. • Analyse the risks. • Assess and prioritise the disaster risks. • Identification of risks and hazards likely to result in disasters • Estimation of the risk of such events • Evaluation of social and economic consequences of derived risk • Treat the disaster risks • Monitor, review and communicate <p><i>(Note: Assessments should be on scientific grounds in line with national guidelines provided by the NDMC. Risk profiles should be compiled in such a manner that it can be integrated into those of other NCO's)</i></p>

NDRMF OBJECTIVES	DESCRIPTION OF NDRMF OBJECTIVES	ACTIVITIES TO ACCOMPLISH OBJECTIVES BY NCO's
<p>Disaster Risk Reduction</p> <p>(Key Performance Area 3)</p>	<p>To ensure all disaster risk management stakeholders develop and implement integrated disaster risk management plans and risk reduction programmes in accordance with approved frameworks.</p>	<p>Risk reduction</p> <ul style="list-style-type: none"> • Protect or reduce the risk and the intensity of a hazard not becoming a disaster • Influencing the cause of the risk • Modifying the risk • Develop plans and training to reduce the risk • Dissemination of information e.g. early warning, flood warnings • Measures to, respond and manage a hazard • Measures to hazard alert to minimize severity or consequences of disasters and vulnerability of communities or areas • Compiling of a Inventory of the NCO's capacity to deal with vulnerability and risks <p><i>(Note: It is important for NCO's to identify their vulnerability and possible solutions (also impediments listed in Chapter 12.)</i></p>

NDRMF OBJECTIVES	DESCRIPTION OF NDRMF OBJECTIVES	ACTIVITIES TO ACCOMPLISH OBJECTIVES BY NCO's
<p>Response and Recovery (Key Performance Area 4)</p>	<p>To ensure effective and appropriate disaster response and recovery by:</p> <ul style="list-style-type: none"> • Implementing a uniform approach to the dissemination of early warnings. • Averting or reducing the potential impact in respect of personal injury, health, loss of life, property, infrastructure, environments and government services. • Implementing immediate integrated and appropriate response and relief measures when significant events or disasters occur or are threatening to occur. • Implementing all rehabilitation and reconstruction strategies following a disaster in an integrated and developmental manner. 	<p>Recovery/rehabilitation - post disasters Develop and implement appropriate contingency plans</p> <ul style="list-style-type: none"> • Participate in processes to fully restore disaster affected communities or areas to pre disaster level functioning to become even more disaster resistant • Participate in recovery and development programmes post disaster • Coordinate with relevant organisations in the advisory forums • Apply appropriate measures to restore capacity <p><i>(Note: It is important that NCO's develop their specific hazard tracking mechanisms e.g. early warning in collaboration with other role players e. g. D o A, SAWS, NDMC, PDMS's, MDMC's.)</i></p>

NDRMF OBJECTIVES	DESCRIPTION OF NDRMF OBJECTIVES	ACTIVITIES TO ACCOMPLISH OBJECTIVES BY NCO's
<p>Information management and communication (Enabler I)</p>	<p>To guide the development of a comprehensive information management and communication system and establish integrated communication links with all disaster risk management role players.</p>	<p>Information management and communication</p> <ul style="list-style-type: none"> • Participation in information management and communication system of Organs of State - at all levels

NDRMF OBJECTIVES	DESCRIPTION OF NDRMF OBJECTIVES	ACTIVITIES TO ACCOMPLISH OBJECTIVES BY NCO's
<p>Education, training, public awareness and research</p> <p>(Enabler 2)</p>	<p>To support the education, training, public awareness and research enabler, the following functionalities are required:</p> <ul style="list-style-type: none"> • Education and training programmes pertaining to disaster risk management in all spheres of the education system need to be recorded and monitored. • The content of education and training programmes as well as records of participants (professionals, volunteers, communities, learners), and the education and training programmes they attended must be recorded. • A register and records need to be kept of all accredited service providers as well as accredited facilitators to ensure that minimum standards set by Sector Education and Training Authorities (SETA's) are met. • Research programmes and projects need to be registered and monitored and the information disseminated to relevant stakeholders. • Initiatives related to an integrated awareness programmes by all spheres of government need to be recorded to minimise duplication and to ensure synergy among stakeholders 	<p><i>Education, training and information programmes</i></p> <ul style="list-style-type: none"> • Participation in programmes of organs of State at all levels • Disseminate education, training and information programmes to farming communities <p>Create Awareness on-</p> <ul style="list-style-type: none"> • Prevention • Preparedness • Response

NDRMF OBJECTIVES	DESCRIPTION OF NDRMF OBJECTIVES	ACTIVITIES TO ACCOMPLISH OBJECTIVES BY NCO's
Funding arrangements for disaster risk management in South Africa (Enabler 3)	<p>To provide a database that contains data relating to all funding matters.</p> <p>The funding mechanisms for different aspects of disaster risk management, budgets, applications for funding, approvals and spending, need to be recorded to ensure proper usage and management of available funding.</p>	<p>Inputs on funding requirements -</p> <ul style="list-style-type: none"> • All levels of Government • All levels of Organized Agriculture • Farming communities
Align and update of objectives and activities	Review and update	<ul style="list-style-type: none"> • Align and review activities • Align strategies

CHAPTER 16

RECOMMENDATIONS

It is recommended that:

One. That a national indaba or summit be arranged with the role players in the agricultural sector, relevant Government officials, academics and other interested parties, to discuss disaster risk management in the agricultural sector on the basis of this document and to agree on a common approach and implementation strategy.

Two. To utilize the proposed pro forma or template contained in the study for the development of disaster risk management strategies for the respective groupings i.e. horticulture, agronomy and animal husbandry. Further adjustment of the template for adoption by Commodity Groupings with the view to their peculiar disaster strategy development might be necessary. The involvement of all structures of Organised agriculture, especially at local municipality level, within the National Disaster Risk Management Framework needs to be developed and implemented. A condensed disaster management strategy for purposes of an input to Government could be considered

Three. To consider a further study on the impact of the identified cross cutting factors on the risk profile and vulnerability of agriculture. A general evaluation of the impact of agricultural legislation as it relates to risks should be considered and possibly a more immediate focus on the Fertilizer, Farm feeds, Agricultural Remedies and Stock Remedies Act, 1947(Act no 36 of 1947) and the Animal Health Act, 2002(Act no.7 of 2002), with the view of putting proposals forward for the revision or amendment thereof. The study also needs to be considered in the manner agricultural legislation is generally managed.

CHAPTER 17

CONCLUSIONS

The assignment and this study was not meant to address every aspect of disaster risk management nor to render solutions to the complexity of the subject, but provide a basis or framework which can be used for application and further studies and strategies.

A lot of effort went into the understanding of the meaning of disaster risk management, the Disaster Management Act, 2002 and the National Disaster Management Framework, 2005 and its ramifications as it impacts on all citizens.

It is, however, heartening that our country is in the forefront in getting to grips with disaster risk management. The challenge for Organised agriculture lies in the preparation and implementation of its own strategies, policies and plans, as well as the participation in the NDRMF.

**Researched and drafted by -
Koos van Zyl
Assigned by Agri SA, NAFU SA and TAU SA
Funded by Total SA
Pretoria
August 2006**

CHAPTER 18

REFERENCES

(Many of the sources below have been drawn from the Input Paper on Agricultural Management Issues Related to Disasters, 1997. the Drafter of the Disaster Management Plan and the Drought Management Plan of the Department of Agriculture, South Africa.)

Agricultural Policy on Drought and other Agricultural Disasters, 1996.

Anon, 1990. National Drought Policy. Drought Policy Review Task Team, Final Report, Vol. 1. Australian Government Publishing Service, Canberra.

Anon, 1995. Report from the meeting of experts on climate information and prediction services (CLIPS), Melbourne, Australia. WCASP 32, WMO/td- No. 680, World Meteorological Organisation.

Anon, 1997. Rural adjustment: Managing change. Mid-term review of the Rural Adjustment Scheme, May 1997, Department of Primary Industries and Energy, Canberra, Australia.

A proposal for a National Drought Management Strategy, 1992.

Backeberg, Gerhard R, Drought Management Strategies in South Africa: Policy Requirements and Research Support for Irrigated Agriculture.

Brown, H.D., 1987. Locusts - A new threat. Research highlights 1987: Plant Production. Department of Agriculture and Water Supply, R.S.A.

Bruwer, J.J., 1990. Drought policy in the Republic of South Africa. In: Proceedings of the SARCCUS workshop on drought in June 1989. Edited by A.L. du Pisani.

Buckland, R.W., 1994. Implications of climatic variability for food security in the Southern African Development Community. In: Usable science: Food security, early warning and EI Nino. Proceedings of the workshop on ENSO/FEWS, Budapest, Hungary, 25-28 October 1993. Boulder, Colorado: NCAR.

Buys, L. J. 2004., A Strategic Vision for Disaster Management in Southern Africa

Climate Change and the Agriculture Sector in South Africa. A Discussion Document. December 2005.

Convention on Climate Change. Initial National Communication under the United Nations Framework. October 2000.

De Jager, J.M., Howard, M.D. & Fouché, H.J., 1997. Computing drought severity and forecasting its future impact on grazing in a GIS. In: Hazards and Disaster: A series of definitive works. Volume on

Drought. Edited by Donald Wilhite of the International Drought Mitigation Centre, University of Nebraska, Lincoln (1997), Routledge Publishers.

Disaster Management Bill, 2001. *Government Gazette.* South Africa.

Disaster Management Act, 2002. *Government Gazette* South Africa.

Erasmus, J.F., 1991. Methodologies for drought monitoring using meteorological data. Unpublished Ph.D. thesis, University of the Orange Free State.

Fouché, H.J., De Jager, J.M. & Opperman, D.P. 1985. A mathematical model for assessing the influence of stocking rate on the incidence of drought and for estimating the optimal stocking rates. *J. Grass. Soc. S. Afr.*, 2(3).

Glantz, M.H., 1992. Global warming and environmental change in sub-Saharan Africa. *Global Environmental Change*, Sept.

Glantz, M., Betsill, M. & Crandall, K., 1997. Food security in southern Africa: Assessing the use and value of ENSO information. National Centre for Atmospheric Research, National Oceanic and Atmospheric Administration Proposal No. GC95-017.

Hewitson, Bruce, University of Cape Town, 2006. *Climate Change past and Future.*

Keating, B.A., Meinke, H. & Dimes, J.P., 1996. Prospects for using a cropping systems simulator to assess exceptional droughts. Consultancy report to the Bureau of Resource Sciences, Department of Primary Industries and Energy, Canberra, Australia.

LIU, Y., WANG, H. 1998: Risk Management and Poverty Alleviation in Pastoral Areas of Qinghai Province China, FAO/CIAD field study report.

LIU, Y., BAAS, S., et al. 2000. Strengthening Pastoral Institutions in North-West China Pastoral Area to access - World Bank.

Maritz, P., Bosman, H., Armer, D. & Fuchs, L., 1996. Report of the working group on restructuring the water quota subsidy scheme.

Minutes of the Drought Working Group, 2001. (Unpublished).

National Drought Management Centre, 1995. A proposal for a National Drought Management Strategy. Pretoria, South Africa.

OECD Review of Agricultural Policies in South Africa, 2006.

O'Connor, T.G., 1995. Transformation of savanna grassland by drought and grazing. *Afr. J. Range For. Sci.*, 12(2).

Policy Guidelines for the Evaluation of Social, Economic and Political Impacts of Drought and Aridity, August 2005. AJ Pelsler, N Redelinghuys, MF Viljoen and MY Teweldemehin University of the Free State.

Roodeplaat Grassland Institute, undated. Stocking rate and grazing/carrying capacity of veld. On request from the Co-ordinated Extension Action Organisation.

Roux, André, Institute for Future Development, University of Stellenbosch, 2006, Trends, Challenges and Risks in the 21st Century: Aglobal Continental and South African Perspective.

Schulze, R.E., 1984. Hydrological simulation as a tool for agricultural drought assessment. *Water SA*, 10(1).

Schulze, R.E., Kiker, G.A. & Kunz, R.P., 1993. Global climate change and agricultural productivity in southern Africa. *Global Environment Change*, December.

Smith Keith, 2004. Environmental Hazards

South Africa, October 2000. Initial National Communication under the United Nations Framework - Convention on Climate Change.

SWIFT, J. & BAAS, ST. 1999. Pastoral institutions and approaches to risk management and poverty alleviation in Central Asian countries in transition.

Van Niekerk, Dewald, 2006. A Comprehensive Framework to Guide and Monitor Multi-sphere Disaster Risk Reduction in South Africa.

Time Magazine - 3 April 2006.

Weaver, A & Chapman A. Climate Change: A Heated Debate.

World Bank, 2003. The Millennium Development Goals. (Web: http://www.developmentgoals.org/Sub-Saharan_Africa.htm).

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