

Chapter 5

ALTERNATIVE FINANCING MECHANISMS FOR DISASTER RISK MANAGEMENT IN SOUTH AFRICA

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5.1 Introduction

This report provides insight into current and ongoing research on alternative funding arrangements for disaster risk management in South Africa,

Natural disasters have a huge impact on social and economic welfare (Vakis, 2006). This impact is especially severe in low/middle-income countries, where governments often have insufficient funds after major disasters to repair critical infrastructure and provide assistance to the private sector (Linnerooth-Bayer and Mechler, 2007, p 57; Kotler *et al.*, 2006, p 236). The poor are particularly exposed to natural disasters and have limited access to risk management instruments. This leaves poor households less able to cope with the impact of disasters than more affluent citizens (Vakis, 2006, p 4). Such a state of affairs has two major consequences for the poor: (i) the severe effect of the shocks accentuates their poverty; and (ii) they become more risk averse and unwilling (or unable) to engage in risky, but higher return activities (Vakis, 2006, p 6). Therefore, to prevent sharp increases in poverty in a country following a disaster, mechanisms should be in place to mitigate the possible financial and societal impacts (Skoufias, 2003, p 1087).

According to the *Disaster Management Act No. 57 of 2002* (DMA), disasters are progressive or sudden, widespread or localised, natural or human-caused tragedies or hazards that threaten life, health, property or environment (South Africa, 2002). In developing countries disasters are common, in part because of climate change and inadequate risk management and associated funding. The literature suggests that disasters often put severe strain on public financing resources and overwhelm the public sector's ability to respond effectively especially for developing countries (Hofman and Brukof, 2006; Cardenas, 2009). In South Africa, each sphere of government plays a significant and unique role in managing and funding disasters and their risks. The role of local government specifically in disaster risk management is emphasised in both the DMA (2002) and the 1999 White Paper on Disaster Management.

Through stakeholder consultations, the FFC informed the National Disaster Management Centre (NDMC), which is the principal functional unit for disaster risk management in the national sphere, of the study from its inception. The department has since responded to the study, expressing general support of the study, its findings and recommendations. Further details of their response can be found on Annexure 5A.

5.1.1 Problem Statement

The current funding model for disaster risk reduction within government and the private sector does not provide optimally for the dynamic risk profile of South Africa and its diverse public financial management system. A number of challenges have emerged since 2005, when the Financial and Fiscal Commission (the Commission) revised the funding mechanisms for disaster management in South Africa. Firstly, the different spheres of government do not fully apply or adhere to current legislative, policy and institutional and funding mechanisms. Secondly, relief measures often take time to reach the victims or places affected by disasters because of the lengthy bureaucratic processes for disbursing disaster funds. Thirdly, experience has shown that funding for disasters does not always adequately address the effects of a particular hazardous event or the cost incurred by provinces or municipalities. The other challenge is that most municipalities do not understand the necessity of budgeting for disaster risk reduction (Visser & Van Niekerk, 2009). Similarly, provinces do not make provision for risk-reduction funding in their planning and budgeting processes. Finally, the lack of such measures have created some perverse incentives: when a disaster occurs, communities are discouraged from taking minimal mitigating or preventative measures by their expectation of some form of compensation from government.

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These challenges have resulted in many vulnerable members of the society suffering immensely from disaster events. This has also begged a number of questions, *inter alia*:

- What are the problems associated with current disaster risk-reduction funding mechanism? Is the funding mechanism adequate and effective?
- What are the feasible alternative funding mechanisms for disasters in South Africa? Is there a space for risk sharing and public-private partnerships?
- Are the institutional, policy and legislative frameworks for funding disasters adequate and effective in South Africa?

5.1.2 Objectives of the study

The objectives were to:

- Review and evaluate the legislative, policy and institutional frameworks for managing disaster risk reduction in South Africa.
- Give an overview of natural hazards and disaster risks that occur in South Africa.
- Give an overview of future scenarios and threats posed by climate change and variation in South Africa, and the sectors and locations likely to be affected.
- Review and assess the current funding arrangements and funding model for disaster risk management in South Africa.
- Evaluate the relevance of alternative disaster risk management financing mechanisms, for example in the form of the insurance options and public-private partnerships.
- Make policy proposals on best practices for financing disaster losses and disaster risk management, and alternative financing mechanisms, given the threats of climate change and variation.

5.1.3 Relationship to Research Strategy and Past Commission Work

In 2009, the Commission adopted a five-year research strategy to assist in attaining its vision of “enhancing the developmental impact of public resources through the financial and fiscal system in South Africa”. The four thematic areas, identified as fundamental principles and goals within the research strategy, are:

- I. Policy outcomes
- II. Accountable institutions
- III. Equitable growth and distribution of resources
- IV. Flexible response

This paper is well located within the Commission’s research strategy, especially “equitable growth and distribution of resources” (by making sure that resources are distributed equitably in disaster funding) and “accountable institutions” (policy-makers design disaster management policies that improve the planning and coordination of disasters and have clear accountable structures). These issues bode well for the Commission’s role of maintaining an effective, equitable and sustainable system of intergovernmental fiscal relations in South Africa.

The frequency (and severity) of natural disasters is increasing (Ghesquiere and Mahul, 2007, p 2). As a result, the fiscal and economic exposure of developing countries grows every year for reasons that range from the growing concentration of populations and assets in high-risk areas to increases in climate variability. Both Olokesusi (2005, p 17) and Ghesquiere and Mahul (2007, p 2) indicated that disasters have serious implications for long-term development if risk management is not actively applied. This poses an increasing threat to poverty reduction and sustainable development. South Africa, like any developing country, has suffered significantly from natural and man-made hazards.

General international viewpoints regarding disaster risk management provide a theoretical basis for the study. The international trend is to emphasise funding disaster risk reduction before an event occurs (*ex ante*) rather than the traditional approach of funding losses associated with a disaster after it has happened (*ex post*). This report will use these two focuses (*ex ante* and *ex post*).

Each of these focuses is unique and requires distinctive funding mechanisms, yet these two domains are inextricably linked. The aim of this report is to highlight the salient aspects that need to be considered when drafting a new national funding model and policy on disaster risk management funding. Aspects include funding for disasters and risks, disaster response and recovery strategies, financial tools that can be used, the role of government, access to alternative funding, and how other countries have financed disasters.

5.2 Disaster Risk Reduction vs. Disaster Response and Recovery

To understand the various components of disaster risk management within the South African context, and subsequently the funding needs, it is imperative to define the respective components. The National Disaster Management Framework (NDMF) and the DMA allude to the need for ‘pre-’ and ‘post-disaster’ funding. The first refers to what is commonly known as disaster reduction and the latter to disaster response and recovery.

Disaster risk reduction (also called ‘disaster reduction’) can be defined as the “practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events” (UNISDR, 2009). According to Freeman, Keen and Mani (2003, p 14–16), a variety of measures can possibly be used to reduce the physical destruction caused by natural disasters. These measures include: land-use planning, to reduce construction on seismic fault lines, in coastal regions subject to storm damage, and along river shorelines subject to frequent floods; building standards aimed at ensuring some level of robustness against earthquakes or cyclones; mitigating environmental degradations, such as soil erosion, that can worsen the impact of disasters; and engineering interventions, such as the creation of dams for flood control, dikes to reroute flood waters, fire breaks and seawalls to break storm surges.

The growing importance of disaster risk reduction is emphasised by a global review carried out by the United Nations Inter-agency Secretariat of the International Strategy for Disaster Reduction (UNISDR, 2004, p 345). Highlighting the mounting costs of disasters, the huge losses that have to be covered by insurance companies, the fiscal pressure on governments undertaking post-disaster recovery and reconstruction measures, the UNISDR has called for sustainable financing arrangements to address disaster risks.

The growing need for investment in disaster mitigation and preparedness at national and local levels means that financing disaster risk reduction has become a critically important issue. Recent developments have encouraged disaster risk reduction to become embedded in development projects; particularly as risk assessments are taken into account (as is the case of the Integrated Development Plans (IDPs) at municipal level in South Africa). These developments have been supported by the Organisation for Economic Cooperation and Development (OECD), the World Bank and the International Monetary Fund (IMF), as well as other development banks (UNISDR, 2004, p 345–350).

Furthermore, governments also require resources to deal with small and medium-size disasters. Therefore, they depend on domestic resources for financing disaster risk management schemes, which have been slow to develop because of institutional ignorance and weakness in addressing disaster risks. National budgets that usually make provision for disasters still focus mainly on relief and emergency response activities.

Prevention and mitigation have not yet become an integral part of public financing, nor have institutional channels been developed. Many countries have now set up special funds for the financing of disaster risk reduction, the so-called calamity funds, reconstruction, mitigation and vulnerability reduction funds, as well as social funds and public works programmes (UNISDR, 2004, p 350–356).

Structural measures may be necessary in sectors such as agriculture, water and construction. These structural developments will have significant fiscal consequences, as a result of explicit public policy commitments and the implicit responsibilities of the state in the context of such disasters. Government, therefore, has an important role to play in disaster risk reduction, not only to safeguard its own property, but also to take measures, such as coastal defences and early warning systems for detecting timeously any developing weather risks, and implement

appropriate regulatory controls, for example, on land use. Infrastructure planning also needs to be sensitive to the risks of extreme weather events.

However, the extent of risk-reduction measures in developed and developing countries is markedly different. In the USA, expenditure on preparedness and mitigation measures has increased significantly. In contrast, the financial resources, technical knowledge and political will to mitigate physical vulnerability are often absent in many developing countries. In developing countries, there is little incentive to mitigate damages with *ex-ante* measures because in many cases such damages are paid for by the national government (in the case of sub-national governments, such as municipalities) or foreign donors (in the case of the national government itself). This is sometimes referred to as the 'Samaritan's dilemma' (Freeman *et al.*, 2003, p 17).

The 'Samaritan's dilemma' is when governments or sub-national governments in developing countries believe that they can rely on disaster relief from the national government or foreign donors without taking any *ex-ante* measures to deal with disaster risks themselves. Mahul and Gurenko (2006, p 2) found that the availability of free or inexpensive post-disaster funding discourages developing countries from any proactive *ex-ante* risk management, such as looking into market-driven risk transfer solutions, including reinsurance. They maintain that *ex-post* financing is not the right approach. Instead, a formal country risk-financing framework would provide tangible incentives for proactive country risk management and promote market risk financing. This approach should include developing risk-funding solutions that would provide developing countries with strong economic incentives to engage in active risk management, and thereby reduce their growing vulnerability and levels of exposure significantly (Mahul and Gurenko, 2006, p 3). Nevertheless, historically most governments have not taken much interest in the *ex-ante* management of disasters because of a perception of low vulnerability levels and the fact that most severe hazards manifest themselves very infrequently (Kaplow, 1991; Kunreuther, 1996, p 7).

5.2.1 Disaster Response and Recovery

The UN defines disaster response as "the provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected" (UNISDR, 2009). Recovery is "the restoration and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors" (UNISDR, 2009). Although disaster risk reduction should emphasise risk mitigation, the focus is now on the government's capacity to react in the aftermath of a major disaster, specifically regarding finance relief and reconstruction costs (Ghesquiere and Mahul, 2007, p 2). This development is confirmed by the growth in literature pertaining to disaster response, recovery and relief.

The fiscal and economic risk exposure of developing countries has increased significantly, as a result of the concentration of the world's population in vulnerable urban areas, substandard construction practices and low insurance coverage. Over the period 1977–2001, the average damages from large disasters in developing countries represented 7.1% of GDP (Ghesquiere and Mahul, 2007, p 2).

Analysing recent catastrophes, Ghesquiere and Mahul (2007, p 3) found that funding for relief and reconstruction in developing countries generally comes from different sources than in developed countries. In developed countries, losses from natural disasters are typically funded through a combination of private risk financing and an efficient public revenue system that relies on wide and deep taxation systems. In middle and low-income countries, which have relatively low tax ratios and ongoing fiscal policy-funding sources, post-disaster reconstruction tends to be more varied, relying strongly on *ex-post* borrowing and assistance from international donors. Multilateral financial agencies play a particularly important role in middle-income countries, while support from bilateral donors is generally predominant in low-income countries.

Relief operations usually include emergency assistance provided to the affected population, to ensure that basic needs, such as shelters, food and medical attention are adequately met. These costs can be estimated based on a scenario analysis. However, although relief costs are limited, they should be financed in a matter of hours after a disaster event occurs. Therefore, governments' capacity to mobilise resources for relief operations at short notice should be a key component of their risk-financing strategies.

Several techniques can be used to estimate the likely cost of early recovery operations. Catastrophic risk models can simulate the impact of natural disasters, such as earthquakes, on the infrastructure and provide rough estimates of the lifeline infrastructural requirements (e.g. water, electricity and key transportation lines) that are likely to be

damaged in the event of a major disaster, as well as the removal of debris and the establishment of basic safety nets. Such models can also be used to assess the number of people likely to be left homeless and the number of buildings that will have to be rebuilt. One of the important purposes of the early recovery operations is to limit secondary losses and to ensure that reconstruction can start as soon as possible. The early recovery stage can also be used as an opportunity to appoint engineering firms, which can start designing infrastructure works that will have to take place during the reconstruction phase.

For reconstruction operations, catastrophe risk modelling techniques can be used to estimate the potential damage to infrastructure and to any public and private property. Risk assessments can be provided for each group of assets, such as the probable maximum losses during a given return period. This can help the authorities determine the budgetary needs of any such potentially catastrophic events.

Reconstruction operations generally centre on rehabilitating or replacing assets damaged by a disaster. These include public buildings and infrastructure, which are the direct responsibility of the state. However, national or municipal authorities generally have to face obligations that go beyond their own assets. In most cases, government will have to subsidise the reconstruction of private assets, and in particular the housing for low-income families who could not otherwise afford to rebuild their houses. The use of scenario analysis coupled with risk models can also help authorities to understand their potential needs better over time.

All three phases – providing relief, carrying out recovery works and completing reconstruction operations – will also depend on the absorption capacity of the affected economy. The damaged assets cannot all be rebuilt at once, and the government will have to prioritise which key assets to rebuild or rehabilitate first, and which other assets may be restored at a later stage. These choices made by the authorities will influence the timing of financing required for any reconstruction operations.

However, economic theory suggests that countries should ignore uncertainty for public investment and behave as if they are indifferent to risk because they can then pool risks to a much greater extent than private investors. The importance of disaster risk reduction as an ‘insurance mechanism’ for development gains now comes into play.

5.3 Financial Tools

Disaster risk reduction can take many forms: reducing exposure to risks, (e.g. land-use planning); reducing vulnerability (e.g. retrofitting high-risk buildings); or creating institutions for better response (e.g. emergency planning). The residual risk can then be managed with insurance and other risk-financing strategies/tools for the purpose of preventing disasters from occurring or providing timely relief and assuring an effective recovery.

The literature suggests a number of financial tools that the South African government needs to consider when drafting an alternative financing model. No evidence was found of a developed or developing state that integrates all of the available tools into a coherent financial model. The research considered the following market-based financial tools: sovereign insurance, risk pooling, reinsurance, index-based insurance, weather derivatives, and micro-insurance and catastrophe bonds.

Linnerooth-Bayer, Mechler and Hochrainer-Stigler (2011) summarises their findings of the pre- and post-disaster risk financing arrangements in Table 5.1.

Beside the *ex-ante* elements in Table 5.1, other available innovative tools include insurance against crop losses droughts infrastructure and other perils, reinsurance, micro-insurance, safety nets and derivatives. Government policies and regulations also play a role as disaster risk-reduction financial instruments.

Before discussing these tools, certain base concepts relating to insurance needs are briefly defined hereafter.

Table 5.1. Examples of pre- and post-disaster risk financing arrangements

	Security for loss of assets (households/businesses)	Food security for crop/ livestock loss (farms)	Security for relief and reconstruction (governments)
Post-disaster (ex-post)			
	Emergency loans Money lenders Public assistance	Sale of productive assets Food aid Diversions	Loans from World Bank and other international financing institutions (IFIs)
Pre-disaster (ex-ante)			
Non-market	Kinship arrangements	Voluntary mutual arrangements	International aid
Inter-temporal	Micro-savings	Food storage	Catastrophe reserve funds Regional pools Contingency credit
Market-based risk transfer	Property and life insurance	Crop and livestock insurance (also index-based)	Insurance or catastrophe bonds (also index-based)

Source: Linnerooth-Bayer et al., 2011

A **basis risk** is when the person insured experiences a loss but does not receive a payment because the index threshold was not reached, or when a person receives a payment but the loss suffered was not as severe as the index indicates (Skees et al., 2007, p 4).

Systemic risks (such as widespread of floods that affect large number of farmers simultaneously) are one of the most prominent arguments in favour of government providing, administering and overseeing agricultural insurance programmes. The systemic component of agricultural risks can generate major losses in the portfolio of agricultural insurers. Public intervention is justified to insure against such losses because no private reinsurer or pool of reinsurers has the capacity to cover such a large liability when the risks, even though small, may be difficult to diversify (Mahul and Stutley, 2010, p 31).

Moral hazards in the insurance context relate to the insurance purchaser engaging in risk-filled behaviour or behaviour in which fewer precautionary measures are taken because they are insured (Linnerooth-Bayer and Mechler, 2007, p 58). To avoid this moral hazard, insurance contracts should be structured in such a manner as to achieve the optimal trade-off between the conflicting goals of furthering risk spreading and providing appropriate incentives for risk reduction on the part of the insurance purchaser (Pauly, 1974, p 46).

Adverse selection refers to insurance cases where the insurer cannot determine some of the characteristics of the insurer that are relevant to the determination of the probability of the future state of nature (Pauly, 1974, p 44). The lack of accurate information means that insurers cannot make an accurate risk assumption, which results in people being over- or un-insured.

5.3.1 Sovereign Insurance

Sovereign insurance typically seeks to maintain a well-diversified portfolio of risks, making it very attractive for financing disaster risk. However, this can be a very costly exercise (Linnerooth-Bayer et al., 2007; Linnerooth-Bayer et al., 2011; Mechler, Linnerooth-Bayer and Peppiatt, 2006; Cardenas et al., 2007). Therefore, in some instances a viable strategy could be to transfer risks to the commercial insurance markets, which are well established in developed countries. The degree of their capitalisation and the potential size of pay-outs will determine whether insurance companies are capable of absorbing large disasters. However, reinsurance is another type of insurance available that allows insurance companies to pass on risks that exceed their absorptive capacity (see Section 5.3.3).

While efforts to mitigate and prevent disasters are vital, measures (such as insurance options) that go beyond the current disaster-risk funding scenario are vital. A regional body, established by international donors, normally provides

sovereign insurance to a number of participating countries, which may require catastrophic or disaster risk insurance (Ghesquiere & Mahul, 2007, p 18). Risk financing through insurance and other hedging instruments spreads and pools risks, thus lessening the variability of (but not directly reducing) losses (Linnerooth-Bayer & Mechler 2008; Linnerooth-Bayer *et al.*, 2011).

Catastrophe insurance markets are alternatives that have been on the rise (Hofman and Brukoff, 2006). These markets offer opportunities for the transfer of such risks and can assist by introducing an element of predictability when dealing with post-disaster financing. In addition, risk is transferred to third parties who are better able to absorb it. This represents a *complementary strategy*, where the disaster risk is transferred through purchasing insurance, establishing a form of 'ex-ante risk financing'. It is argued that the use of insurance mechanisms will alleviate budget pressures arising from disasters, as funds would be secured in advance. Hofman and Brukoff, (2006), proposed four insurance-based modalities that can be used to shield public finance resources from disasters: risk pooling, commercial insurance, reinsurance and capital markets. Linnerooth-Bayer *et al.* (2011) provide a more detailed analysis of these components.

5.3.2 Risk Pooling

A risk pool is a form of risk management mostly practiced by insurance companies. Under this system, insurance companies come together to form a pool, which can protect insurance companies against catastrophic risks such as floods, earthquakes etc. The term is also used to describe the pooling of similar risks that underlies the concept of insurance. While risk pooling is necessary for insurance to work, not all risks can be effectively pooled. In particular, pooling dissimilar risks in a voluntary insurance market is difficult, unless a subsidy is available to encourage participation (American Academy of Actuaries, 2006).

Risk pooling thus suggests that demand variability is reduced if demand is aggregated across different locations, which will make it more likely that high demand from one customer will be offset by low demand from another. This reduction in variability allows a decrease in safety stock and thereby reduces average inventory.

According to Brenzel and Jones (2010, p 13) the four main types of risk pooling mechanisms are:

1. *National insurance systems*, where funding comes from general revenues, and insurance coverage is provided to the entire population for a fixed set of services (benefits package).
2. *Social insurance systems*, which are funded from mandatory earmarked payroll contributions from individuals and employers. Coverage is provided to contributors, usually in a phased manner. Services are provided based on a defined benefits package that can include certain services. Additional subsidies may come from external assistance or earmarked taxes.
3. *Mutuelles or community-based insurance schemes*, which are generally non-profit prepayment plans for services that are managed at the community level. Funding comes from prepayment into a pooled fund, supplemented by government or donor resources. Coverage is provided to community members, and services are provided by NGOs or public facilities. Benefits are based on community preferences and they may include preventative services.
4. *Private insurance*, where funding of insurance premiums comes from individuals who purchase coverage (out-of-pocket) on a voluntary basis. Coverage is limited to contributors and benefits are pre-defined. Service provision may be through a network of private providers. A study on behalf of the South African Insurance Association argued that private-public partnerships (PPPs) in agricultural insurance tend to improve the financial performance of government-sponsored agricultural insurance programmes: loss ratios (a simple measure of the financial performance of an insurance programme) seem to be lower when programmes are managed by the private sector, sometimes with support from the government through PPPs. This may be a consequence of better implementation of insurance principles, such as sound underwriting procedures and better pricing of risk; lower administrative costs; and greater financial discipline of private insurers.

Risk pooling is beneficial because the costs of insurance are sometimes unpredictable and generally high (Davies and Carrin, 2001). People cannot reliably forecast when a disaster will strike and need disaster recovery services, the cost of which can be significant. Risk-pooling increases the likelihood that those who need disaster recovery will be able to obtain it in an affordable and timely manner. It further allows resources to be transferred to those in need. From the

viewpoint of individuals and households, contributions during times when no disaster has struck can be used to meet costs of recovery in the event of a disaster. In many cases, pooling also contributes towards redistributive goals by making those with higher incomes contribute more in order to subsidise the poor.

However, risk-pooling has its downside. Clients who are insured, and therefore do not have to pay the full cost of services, may be inclined to over-use those services; providers may be happy to let them do so because they will be able to earn more (moral hazard). In addition, those who are more likely to require assistance have a stronger incentive to join a voluntary risk-pooling scheme (adverse selection). Such problems could be reduced in micro-insurance schemes, since their small scale and community focus might provide informal safeguards (Davies and Carrin, 2001). According to Brennan (1993) small groups are at a disadvantage in risk pooling because they lack a diversified pool of purchasers. This means that small groups are not big enough to reflect community-wide risk levels and so are susceptible to poor experience rating and resulting high premiums.

5.3.3 Reinsurance

In the period 1985–1999, developing countries experienced great economic losses due to natural disasters. Affected developing nations lost an estimated average of 13.4% of their GDP, whereas developed countries only lost 2.5% (Teh and Martina, 2008, pp 3-4). These types of losses not only devastate the economy but also significantly impede human development in developing countries (O'Brien *et al.*, 2006, p 64). Unfortunately, while many individuals in developed countries have private insurance to assist them to recover from disaster impacts, this luxury is not widespread in developing countries (Walker, 2003, p 3; Goes and Skees, 2003, p 1). Furthermore, developing countries do not spread their covariant risk – a risk, or combination of risks, that effects a large number of the insured items/people at the same, for example an earthquake, or a major flood – into international markets, although the international insurance market is ideally geared to handle large scale risk insurance (Teh and Martina, 2008, pp 3-4). The lack of comprehensive insurance cover for disasters in developing countries needs to be addressed with great urgency, as the changing climate is contributing to the increases in disaster losses (; Hoeppe and Gurenko, 2006, pp 609- 10).

Reinsurance provides an excellent tool that insures by spreading the risk among many insurance companies on the international market (Miranda & Vedenov, 2001, p 650; Walker, 2003, p 3; Croson and Kunreuther, 1999, p 3). Risk spreading is central to the understanding of reinsurance (, p 593; Walker, 2003, p 3; Croson and Kunreuther, 1999, p 4). Reinsurance operates by diversifying risks through the creation of global risk pools. No single company or government can provide insurance for a disaster impact, and so they (insurance companies or governments) limit their own risks by partitioning the risks into smaller units. They then buy reinsurance for the partitioned risk from different global reinsurance companies (e.g. Swiss Re, Munich Re, Merrill Lynch, Aon etc.), thereby spreading the risks globally across many companies (Walker, 2003, p 4, , 1996, p 593; Miranda and Vedenov, 2001, p 654).

As a possible tool to deal with disaster impacts, reinsurance has a couple of advantages. First, by spreading risk over time and at a global level, reinsurance is a disaster mitigation tool that reduces the unexpected and unplanned demands for large levels of funding when disasters strike (Walker, 2003:2). Second, the spreading of risk means that no one company or government runs the risk of becoming insolvent due to large disaster impacts. Instead, risk is spread making it more manageable to handle (, p 593; Walker, 2005, p 5). In cases where central government is the financial intermediary and receives benefits from the use of reinsurance tools, the government can use these benefits to assist directly those communities adversely affected by covariant risk (Teh and Martina, 2008, p 17-18). In countries with high-levels of reinsurance, reinsurance generates foreign income at a time when the national economy may be under strain from a significant disaster (Walker, 2005, p 7).

Reinsurance also has some negative aspects, such as the time it takes for reinsurance to pay out funds to affected communities. Reinsurance requires that claims settlement and audit process be completed before payments are done, resulting in a delay or absence of disaster assistance that only adds to the burden of communities adversely affected by a disaster impact (Teh and Martina, 2008, p 28; Croson and Kunreuther, 1999, p 6). Reinsurance can also be a more expensive option for developing countries compared to CAT bonds (Miranda and Vedenov, 2001, p 650). This is because the global reinsurance market is not very competitive, which leads to premium prices for reinsurance being higher than prices for CAT bonds (Teh and Martina, 2008, p 25; Miranda and Vedenov, 2001, p 650). Furthermore, by not being competitive enough may lessen the global reinsurance market's ability to absorb losses due to large-scale disasters. For developing countries, reinsurance may be a less favourable option because reinsurance contracts have to be renegotiated on an annual basis, which creates an additional element of risk and additional transactions costs (Teh and Martina, 2008, p 25). Finally, the reinsurer could become insolvent and thereby unable to meet all, if any, of its contractual obligations. The implication is that the insured are exposed to credit risk – or at best an extended delay in the payment of indemnity (Teh and Martina, 2008, p 26).

Agricultural reinsurance is usually critical for domestic agricultural insurers to secure enough risk capital in case a major disaster causes catastrophic insurance losses. Some countries (including Costa Rica, Iran, Japan, and Kazakhstan) rely only on public reinsurance. Premium subsidies are the most common form of public intervention, with almost two-thirds of the surveyed countries (at all levels of development) providing agricultural insurance premium subsidies, usually at 50% of the original gross premium. Some countries also offer variable premium subsidies, while a few countries, such as India, offer cap premiums. Premium subsidy programmes are offered mainly under multiple named-peril crop insurance (MPCI) or area-yield insurance; a major exception is South Africa, which offers non-subsidised MPCI to individual farmers. Most peril crop insurance products, such as hail insurance, have been offered for many years without any public subsidies. Government intervention in livestock insurance is much lower than for crop insurance: only 35% of the surveyed countries offer livestock insurance premium subsidies.

Governments also provide public reinsurance (32% of surveyed countries), subsidies on administrative and operational expenses (16%), and loss adjustment subsidies (6%). Public sector support to reinsurance is higher in high-income than middle-income economies. Support ranges from national reinsurance companies to agreements under which governments act as excess-of-loss reinsurers (in such cases, the government charges no reinsurance premium). Governments can also provide support through legislation (51% of crop programmes and 33% of livestock programmes reviewed) and research, development, and training (44% of crop programmes and 33% of livestock programmes reviewed).

Only 11% of the countries have developed special programmes for small and marginal farmers, usually in the form of additional premium subsidies. However, in some countries, such as Chile, rural banks and insurance companies have developed such programmes; in Mexico the public reinsurance company supports small farmers' self-insurance groups. The total public cost of agricultural insurance programmes is estimated at 68% of the 2007 global premium volume, of which upfront premium subsidies represent 44%. On the basis of the World Bank survey in 65 countries, the overall government cost of upfront premium subsidies is estimated at 44% of original gross premiums. When administrative and operating subsidies and claim subsidies are included, the total cost to governments of agricultural insurance provision may be as high as 68% of original gross premiums.

The public cost of agricultural insurance subsidies represents 50%–150% of the premiums paid by farmers in the majority of the countries surveyed. Public support to agricultural insurance in many high-income countries (including Italy, Spain, and the United States) represents more than twice the premium paid by farmers. In contrast, in most middle- and low-income countries surveyed, public support to agricultural insurance represents 50%–150% of the premium paid by farmers. However, subsidies are not always a precondition for high penetration. High levels of agricultural insurance uptake can be found not only for programmes that carry high premium subsidy levels (such as MPCI in Canada, India, and the United States), but also in countries with strong traditions in agricultural insurance through unsubsidised named-peril crop insurance and livestock insurance (such as Argentina, Australia, and Germany).

The survey results thus do not support the argument that premium subsidies are a precondition for farmers and herders to purchase agricultural insurance.

Nevertheless, agricultural insurance cannot replace sound financial practices. Although it can facilitate access to credit by reducing the default risk on loans caused by production shortfalls, agricultural insurance is not a substitute for sound financial discipline and financial risk management.

5.3.4 Index-based Insurance

Index-based insurance differs from normal insurance, as conventional insurance is calculated against losses in reality, whereas index-based insurance is calculated against specific physical or economic triggers. Conventional insurance is calculated on the loss itself, but index-based insurance is considered according to the event that causes losses (Linnerooth-Bayer *et al.*, 2011, p 7). Therefore, loss is not calculated based on the individual loss of each of the policyholders but is estimated according to an index (Skees, Murphy, Collier, McCord & Roth, 2007, p 2). The index is calculated by comparing the benefit with the actual value of the loss financially (Skees *et al.*, 2007, p 2). Indexes are calculated for a certain area: in America states and in India districts are used for index calculations and are usually for a certain time period, such as a season or a month. Any variations in variables will then depend on the type of index-based insurance that is needed, for example flooding, drought, storms etc.. As will be seen later, weather derivatives are an example of an index-based insurance tool.

Index-based insurance has a predetermined threshold and a limit that determines the range within which compensation payments may be made (Skees *et al.*, 2007, pp 2-3).

The threshold marks the point at which payments begin. Once the threshold is reached, the payment increases incrementally as the value of the index approaches the limit. For example, an index insurance contract designed to transfer the risk of drought would begin making indemnity payments if rainfall levels, as measured at an agreed weather station, fall below the threshold over a defined time period, such as a month or a season. Indemnity payments would increase proportionately for each millimeter (mm) of rainfall below the threshold until the agreed limit is reached. The maximum indemnity would be paid when rainfall is less than, or equal to, the limit.

Index-based insurance can be explained thus (Linnerooth-Bayer *et al.*, 2011, p7

[C]rop insurance may be based on measures of insufficient rainfall at key points in the growing season or a loss index determined by the correlation between historical weather events and crop yields in a region. The insurer will pay out if rainfall measured by a rain gauge falls below a specified level regardless of crop damage.”

Furthermore, policyholders take out what is called an index-insurance contract, and the payment rate is the same for each policyholder of the same contract. The payments are made regardless of the actual losses sustained by individuals, and the amount of the indemnity payment received depends on the value of the insurance purchased. (Skees *et al.*, 2007, pp 2-3).

Motivation for use of index-based insurance

Moral hazard, adverse selection and fraud are common in traditional crop insurance. For many small farms, such as those that dominate in most developing countries, farm-level loss adjustment is simply not practical. For example, the loss-adjustment costs for parcels that are less than one hectare can easily be larger than the premium for the risks (Skees *et al.*, 2007, p 1).

Advantages of index-based insurance

When using index-based insurance, the main advantage is that it is much cheaper than conventional insurance. This is due to reduced transactional and administrative costs because payments rely on a physical trigger and thus avoid expensive claims-settling process (Linnerooth-Bayer *et al.*, 2011, p 7; Skees *et al.*, 2007, p 2; Varangis, Skees and Barnett, 2002, pp 279-294). Index-based insurance avoids the moral hazard that is usually very common in conventional insurance, but farmers (for example) must still make sure that they reduce potential losses as much as possible (Linnerooth-Bayer *et al.*, 2011, pp 9-10; Varangis *et al.*, 2002, pp 279-294). Given that individual assessments are no longer done, index-based insurance is most suited for situations where a group of people or entire communities are affected by natural hazards or disasters, such as droughts, floods or earthquakes (Skees *et al.*, 2007, p 2). Index-based insurance allows payments to be made to many policyholders quickly to minimise the possible impact of the event. Furthermore, index insurance overcomes the problem of moral hazard because the policyholder’s behaviour cannot impact whatever the index is measuring, such as rainfall. (Skees *et al.*, 2007, pp 3-4)

Disadvantages of index insurance

One disadvantage of index-based insurance might be the disagreement between the index and individual losses, which is called basis risk. There are also different types of basis risk: spatial basis risk indicates the difference of physical space between where the incident occurs and where the index is measured: too much rain may flood a farmer’s land, but at the weather station it is not raining as much. Temporal basis risk considers the crop development stages: rain might affect crops more in an early stage than later on. Lastly, loss specific basis risk is when the index is inadequately related to the losses, and mistakes are then made in the process. (Skees *et al.*, 2007, p 4) Index-based insurance is also not very well suited for areas with “microclimates or highly idiosyncratic risk” (Linnerooth-Bayer *et al.*, 2011, p 17).

The case of drought insurance in Mexico

(Case study adapted from Skees *et al.*, 2007, p 29)

The Mexican government created a natural disaster fund, FONDEN, to rebuild infrastructure and assist low-income victims in case of any disastrous losses. A subsidiary of this fund – FAPRACC – was created to give immediate relief and assistance to farmers without access to insurance markets. FAPRACC offers conditional payment in the case of any of the following natural events: drought, hail, windstorms, floods and excessive rainfall. In 2002 a government-owned reinsurance company began selling weather-index insurance as a pilot study.

In Mexico, the state determines the losses. Payments made by FAPRACC are divided so that the state that declares the disaster is responsible for 30% and the federal government the other 70%. The Mexican government started to investigate other insurance options to improve disaster-relief funds, as the state and federal budgets had to absorb these costs, which was creating considerable constraints. The pilot project insured maize in the Guanajato state of Mexico against drought: the government-owned reinsurance company took 50% of the risk, and international reinsurers took the other 50%. Losses were determined using the index developed using statistics from the weather station rather than by the state. Therefore, drought was determined based on the rainfall index and no longer by government, which freed the decision from any political pressure.

After the success of the pilot project, the government-owned reinsurance company extended the programme, each year adding more states and other crops. By 2006, 26 regions of 32 states were being covered on 28% of non-irrigated cropland.

Key implementers and funders

Agroasemex (government-owned reinsurance company); FONDEN (government disaster-relief programme); FAPRACC (government disaster-relief programme, subsidiary of FONDEN), SwissRe (international reinsurer).

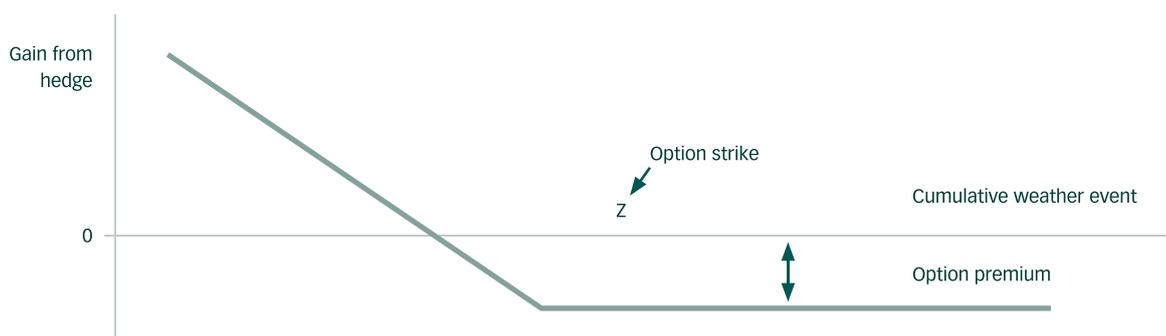
5.3.5 Weather Derivatives

Closely linked to index-based insurance are weather derivatives. According to the World Bank (2001), agriculture and agribusiness are the prime income-generating activities in developing countries, with agricultural activities generating an average total of 27% of the overall GDP. This over-reliance on agricultural production is especially exposed during events such as crop failure due to drought or flooding (Morduch, 1999). These events not only cause nationwide economic disruptions but also lead to the collapse of community-based coping mechanisms because the entire community is affected (Hess, Richter and Stoppa, 2002, p 2; Morduch, 1999). Agriculture is greatly affected by the vagaries of weather and possible collapse of informal coping mechanisms following severe disaster impacts, and so more formal tools are needed to protect the agricultural sector of developing nations (Turvey, 2001, p 334; Hess *et al.*, 2002, pp 1-2; Linnerooth-Bayer *et al.*, 2005, p 1045). In this regard, the emergence of weather derivatives provides a viable option for managing the financial impacts of disasters.

According to Stoppa and Hess (2003, pp 2-4), weather derivatives originally emerged with the deregulation of the US energy sector but were later applied to the agricultural sector, as weather events constitute a great economic risk to the sector (Alaton, Djechiche and Stillberger, 2002, p 3). Weather derivatives form part of the broader family of derivatives such as swaps, futures and forwards (Miller and Keipi, 2005, p 20). The specific aim of a weather derivative is to decrease the chance of financial losses due to severe weather by providing a hedge against production rather than price risk in agriculture (Turvey, 2001, pp 334-336; Stoppa and Hess, 2003, p 4; Miller and Keipi, 2005, p 20). In this regard, weather derivatives have been applied with great success in countries such as Ethiopia, Mexico and Morocco (Hess *et al.*, 2002, p 5; Hofman and Brukoff, 2006, p 18; Stoppa and Hess, 2003, pp 7-15).

The World Bank, in cooperation with Moroccan government, initiated a project to determine the viability of weather-based insurance as an alternative to traditional yield insurance (Stoppa and Hess, 2003, p 7). To achieve this, the weather derivative was designed according to the European option model (see Figure 5.1).

Figure 5.1. Pay-off structure for European put option on weather



Source: Turvey, 2001, p 341

The model comprised an option price, which was the cost of purchasing the rainfall insurance by the Moroccan wheat growers, and the strike (Z) was the rainfall threshold below which an indemnity was triggered (Hess *et al.*, 2002, p 9; Stoppa and Hess, 2003, p 8). Turvey (2001, p 341) explains that the strike value of the contract can be linked to the amount of rainfall (e.g. five inches) needed for crops to grow during a certain period (e.g. 1 May and 1 August). If rainfall were to dip below the strike value, pay-off would be made in incremental pay-offs worth e.g. 3,000 MAD (Moroccan dirhams) per inch (Turvey, 2001, p 341; Stoppa and Hess, 2003, pp 7-8). Thus, a farmer who received only four inches of rain during the contract period would receive MAD 3,000 and, if he only received three inches, would receive MAD 6,000 worth of reimbursement (Turvey, 2001, p 341; Stoppa and Hess, 2003, pp 7-8).

Weather derivatives have certain innate advantages (Miller and Keipi, 2005, p 20). First, they provide an excellent coping mechanism for farmers affected by high-probability, low-impact seasonal weather events and more intense disaster events such as drought (Linnerooth-Bayer *et al.*, 2005, p 1045). They can also be used to complement existing catastrophe bonds or disaster insurance (Miller and Keipi, 2005, p 20). Weather derivatives also provide a flexible option, as contracts can be structured to cover a specific variable (such as the amount of rain during the contract period) or to cover multiple events, if for example the insurer wants to insure that it rains at least once in any non-overlapping 14-day period. In both instances, a pre-determined lump-sum (e.g. R10,000) gets paid out, if expected conditions do not materialise (Turvey, 2001, pp 341-342). Crucially, weather derivatives also remove the possibility of the moral hazard associated with other types of insurance, as the pay-off is contingent on a specific event occurring and not on the actual crop yield or crop yield indemnities (Turvey, 2001, p 341; Alaton *et al.*, 2002, p 6; Stoppa and Hess, 2003, p 5).

A drawback of weather derivatives, especially for developing countries, is the availability and affordability of comprehensive and accurate weather data. Weather derivatives cannot be formulated without the availability of accurate and comprehensive weather data, and so historical data that has been confirmed to be accurate (comprising of daily information on key parameters for the past 30 years) needs to be accessible and reasonably priced. (Hess *et al.*, 2002, p 6; Stoppa and Hess, 2003, p 4).

Weather derivatives also have certain disadvantages, in particular that of basis risk (Hofman and Brukoff, 2006, p 7; Ciumas, 2009, p 23; Ghiulnara and Viegas, 2010, p 17; Yang, 2010, p 104). This is because with weather derivatives there is no relation (at least *ex post*) between the predetermined pay-out and the actual damage (Hofman and Brukoff, 2006, p 7). This basis risk implies that the insurance claim may either exceed or undershoot the actual loss (Hofman and Brukoff, 2006, p 7; Ciumas, 2009, p 23; Ghiulnara and Viegas, 2010, p 17). This basis risk also tends to increase in highly spatially heterogeneous production areas (Yang, 2010, p 104). Formulating accurate weather derivatives is notoriously tricky, as the temperature varies continuously from region to region, whereas precipitation risk is discrete, often occurring in some fields, but leaving others only yards away dry (Richards *et al.*, 2002, p 2). If, as expected, weather is specific to very small geographic areas, then collecting useable data and defining a relevant index are both vitally important and potentially difficult (Richards *et al.*, 2002, p 2; Yang, 2010, p 104). Ghiulnara and Viegas (2010, p 17) also found that derivatives may generate systemic risks for the whole economy, when a market participant becomes very large relative to particular derivatives markets.

5.3.6 Micro-insurance

Micro-insurance is the protection of low-income people against specific perils in exchange for regular premium payments proportionate to the likelihood and cost of the risk involved (Churchill, 2006b, p 12). Micro-insurance is also aimed at the developing world's low-income workers, especially those in the informal economy who tend to be underserved by mainstream commercial and social insurance schemes (ILO, 2010). In other words, micro-insurance is the use of insurance as an economic instrument aimed at the "micro" (i.e. smaller than national) level of society (Dror and Jacquier, 1999, pp 77-78).

Four main delivery models are used for providing micro-insurance (Cohen and McCord, 2003; Churchill, 2006a; Mechler *et al.*, 2006, p 9):

- *Full-service model*: commercial or public insurers provide the full range of insurance services, from the initial development of the product, through distribution, to absorbing the risk.
- *Partner-agent model*: commercial or public insurers, together with micro-finance institutions or non-governmental and other organisations, collaboratively develop the product. The insurer absorbs the risk, and the agent markets the product through its established distribution network, which lowers the cost of distribution and thus promotes affordability.
- *Community-based model*: local communities, micro-finance institutions, NGOs, and/or cooperatives develop and distribute the product, manage the risk pool, and absorb the risk. As with insurance mutuals, commercial insurers are not involved.
- *Provider model*: banks and other micro-finance providers can directly offer or require insurance contracts. These are usually coupled with credit, for example, to insure against the risk of default.

The Micro-insurance Network breaks down micro-insurance into five basic models, which link up with the aforementioned four models. (Micro Insurance Network, s.a.):

- *The partner-agent model* is based on the collaboration between a partner agency (usually a formal insurance company) and a dealing agent that provides services to low-income clients. The company (the partner) feeds the financial resources, sets the premiums, monitors the insurance claims and ensures that legal obligations are observed. The agent ensures that the risks, resources and knowledge are transferred and shared rationally between the formal and informal sectors.
- *The mutualised insurance and other community-based organisations model*, in which credit and savings cooperatives often offer borrower's insurance contracts that cover the balance of a loan to be paid back. Moreover, they offer savings in the form of life insurance, to stimulate saving habits. Some also sell housing, funeral, invalidity and disease insurance, and even (rarely) accident policies. These products are in addition to mainstream credit and savings services.
- *The 'all-in-one insurance' model*, whereby different organisations (micro-finance institutions, insurance companies, etc.) can also sell their policies directly to the poor through agents who are paid a salary or sales commission, or both.
- *The 'franchise' model* is when professional insurers franchise their license, assigning part of their capital to the licensee through a reinsurance treaty. The licensee (generally a micro-finance institution) is in charge of designing the product, setting the prices and handling the losses and gains.
- *The 'supplier' model* applies specifically to health insurance and implies that the insurers provide all or part of the services. Their interest is that they remain in control of the offer, which is a crucial element for client faithfulness.

Micro-insurance brings a number of benefits (Maleika and Kuriakose, 2008, p 2), as it:

- helps protect the poor and their assets from negative external shocks,
- helps compensate the effects of covariate shocks (e.g. natural disasters),

- addresses gender specific vulnerabilities,
- frees up household capital for investment in small enterprise,
- helps households avoid poverty traps,
- helps to expand informal insurance schemes and social protection.

Furthermore, micro-insurance has low transaction costs, (Pierro, 2007, p 4), is more transparent because pay-outs are fixed in advance, and people other than farmers (such as fishermen) affected by the weather can buy micro-insurance. Micro-insurance also can break the cycle of poverty by providing low-income households with access to post-disaster liquidity, thus securing their livelihoods and providing for reconstruction. Furthermore, an insurance contract is a more dignified means of coping with disaster than relying on the ad hoc generosity of donors after a disaster strikes (Mechler *et al.*, 2006, p 6).

Nevertheless, micro-insurance has certain limitations. The main hindrance to micro-insurance worldwide is the gap between the formal and informal sectors, specifically in terms of insurance (Bancel, 2005). The legal environment is often not helpful towards making micro-insurance accessible to the people who need it most. Lastly professional skills and the spreading of product information relating to micro-insurance are lacking. Roth, McCord and Liberf (2007, p 7) argue that the greatest hindrance to micro-insurance is consumer ignorance. The inability to write micro-insurance on a profitable basis, poor people who cannot afford micro-insurance, the lack of demand from poor people, and the lack to access reinsurance, are hindrances to successful micro-insurance (Roth *et al.*, 2007, p 45). The high cost of insuring covariant disaster risk means that individuals can pay substantially more than their expected losses over the long term when donors do not give support (Mechler *et al.*, 2006, pp 6-7)

5.3.7 Catastrophe Bonds

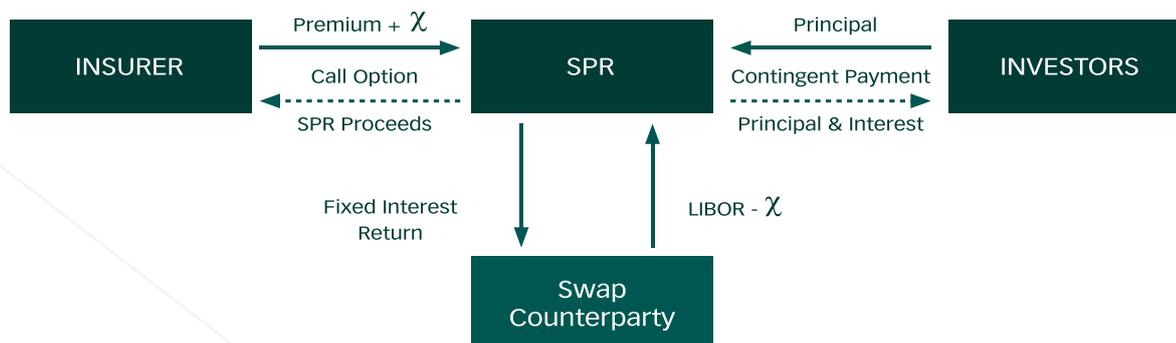
Catastrophe (CAT) bonds can be defined as a financial tool that transfers the financial risks of disasters such as cyclones and earthquakes from insurance companies to the broader capital markets (Fukuyama, 2008). The rise in CAT bonds has been fuelled by uncertainties within the global economy, which has led investment managers to consider CAT bonds as a means of diversifying away from traditional assets invested in markets (Fukuyama, 2008).

CAT bonds are financial instruments that transfer the risk of natural disasters to investors. These investors then receive a yield, in return for agreeing to cover damages they consider unlikely, and lock in funds for disaster relief before disasters strike (Perry, 2011). CAT bonds provide a way to take what is a fairly high risk away from the government to an insurer and reinsurer or capital market investor (Perry, 2011).

CAT bonds were modelled on asset-backed-security transactions, which have been executed for a wide variety of financial assets including mortgage loans, automobile loans, aircraft leases, and student loans (Cummins, 2006). The first successful CAT bond was an \$85 million issue by Hannover Re in 1994). The first CAT bond issued by a non-financial firm was in 1999 and covered earthquake losses in the Tokyo region for Oriental Land Company, the owner of Tokyo Disneyland.

Figure 5.2 provides a basic overview of how catastrophe bonds function.

Figure 5.2. CAT bond with a single purpose reinsurer



Source: Cummins, 2006

The transaction begins with the formation of a single purpose reinsurer (SPR), which issues bonds to investors and invests the proceeds in safe securities such as treasury bonds. Embedded in the bonds is a call option that is triggered by a defined catastrophic event. When the event occurs, proceeds are released from the special purpose vehicle (SPV) to help the insurer pay claims arising from the event (Cummins, 2006).

CAT bonds are an innovative financing solution for transferring disaster risks. However, the concept is actually not a new one and is similar to the practice of bottomry, which dates at least to classical Greek and Roman times. In a bottomry contract, the lender extended a loan to finance a voyage. If the ship returned to port, the loan was repaid with interest, but if the ship sank, the loan was forgiven.

Although approximately 120 bonds have been issued to date in the USA (Cummins, 2006), the amount of risk capital raised remains small relative to the global reinsurance market (Bond Market Association, 2006). It is of interest to explore the possible reasons for the limited amount of risk capital raised to date because of the as-yet unrealised potential of the CAT bond market. One possible explanation is that the bonds appear expensive relative to conventional reinsurance. Structuring a CAT bond deal requires significant expenditures on professional expertise from investment bankers, accountants, actuaries, and lawyers. In addition, the spreads on the bonds have tended to be high – often several times the expected losses on the bonds (Cummins, 2006).

The lack of investor interest is another reason for the limited size of the CAT bond market (Cummins, 2006). Yet, although possibly true at one time, recent data suggests a broad market interest in CAT bonds among institutional investors (likely fuelled by Hurricane Katrina and the 2010/1 Japan disasters).

This spreading of risk, as explained by Lewis (2007), is further emphasised by Fukuyama (2008) who explains that growth in the CAT bond market has been swift. In the two years after Hurricane Katrina devastated New Orleans, the market for CAT bonds roughly tripled to more than \$13 billion. Goldman Sachs estimates the market will exceed \$23 billion by the end of 2011, and John Seo, a hedge fund manager at Fermat Capital Management, expects it to grow to at least \$150 billion in the next 10 to 15 years. So far, insurance companies and investors consider CAT bonds as a win-win investment. After Hurricane Katrina, insurance companies realised their funds were not enough to cover another major catastrophe. With CAT bonds, they are increasingly able to offload some of their risk, especially along vulnerable coastlines.

Catastrophe bonds are predicted to grow, as they bring certain advantages. First, CAT bonds are not closely linked to the stock market or economic conditions and offer significant attractions to investors. For example, for the same level of risk, investors can usually obtain a higher yield with CAT bonds relative to alternative investments. Second, the insurance risk securitisation of CAT bonds shows no correlation with equities or corporate bonds, meaning they would provide a good diversification of risks.

5.3.8 Limitations to Insurance Tools

Nevertheless, there are a number of general limitations to using insurance for post-disaster recovery purposes, especially in the developing world. First, the small size of some states prevents them from efficiently pooling natural disasters, and the passage of a hurricane, for example, is a systemic risk that affects the entire economy of the country. Second, the high level of indebtedness of some countries' governments does not allow them to access capital markets in the aftermath of a disaster, thus preventing them from transferring some of the risk to future generations (also referred to as inter-temporal diversification). Third, post-disaster risk financing instruments may not provide quick liquidity after a disaster, creating in most cases a 'liquidity crunch' or bottleneck (also referred to as dynamic liquidity).

Dynamic liquidity can be defined as the potential lack of funds for financing public expenditure at different periods (short, medium and long term) after a natural disaster occurs. This framework make provision for financing the liquidity gaps by using a combination of *ex-ante* risk financing instruments, including reserves, budget reallocations, contingent debt and insurance, and *ex-post* financing instruments, such as borrowing, donor assistance and tax increases. To address the resource and liquidity gap, attention should be given to the budgetary impact of such natural disasters. Natural disasters generally put enormous strain on the budget of an affected country. The budgetary implications are based on the financing needs faced by a government during the three main phases in the post-disaster period: during the relief operations, early recovery operations and reconstruction operations.

An *ex-ante* estimate of the cost of relief operations can be difficult, since it depends on the specific characteristics of the catastrophic event (location, intensity, period of the year [winter or summer], time of the day [day or night]), but is

relatively small compared to the cost of subsequent recovery and reconstruction operations (Ghesquiere and Mahul, 2007, pp 9-10). Under these circumstances, the most cost-effective risk financing strategy that can be developed by a government is to **secure funds ex-ante through reserve funds, insurance or contingent debt** (unless the level of debt is already very high). If the government uses *ex-ante* risk financing instruments, such as sovereign insurance, it should mainly cover the immediate needs, since it is usually more expensive than post-disaster financing. In this case, long-term expenditure should be financed through post-disaster financing, including ex-post borrowing and tax increases. In other words, sovereign insurance should not finance the long-term resource gap, but only the short-term liquidity gap. The liquidity gap can be defined as the potential lack of funds for the financing of government deficit losses at different periods after the occurrence of a natural disaster.

Sovereign insurance presents a matrix of fiscal vulnerability that should help the South African government to analyse potential liquidity gaps and devise optimal insurance strategies. This concept differs from the standard concept of a resource gap; this is usually defined as the long-term gap between financial needs and post-disaster financing instruments.

Nevertheless, the South African insurance market is well developed and in most instances equipped to provide a number of the above-mentioned insurance products.

5.3.9 Other Disaster Risk Financing Mechanisms

Although a viable option in some instances, insurance will not be adequate for the South African government in all cases. The proposed model should also consider other options to finance disaster risk. Some of these options are safety nets, government policies and regulations, and accessing alternative funds.

Safety nets

According to the World Bank, safety nets are “formal and informal mechanisms that protect people against the adverse outcomes of poverty”. Furthermore, the social policy aspect of safety nets is concerned primarily with formal programmes meant to provide or substitute for income (Rogers and Coates, 2002, p 1). Importantly safety nets should be viewed as a means of providing livelihood support (an important disaster risk-reduction mechanism), rather than just a set of transfers of food or cash to affected communities, often after a disaster has occurred (Gentilini, 2005, p 18; Vakis, 2006, p 7).

Safety nets are ideally suited to disaster risk management because they can be deployed as a disaster risk-reduction and resilience-building measure and also during transient periods of poverty following disasters, serving as a permanent, planned means of assisting the chronic or transitory poor population that exists in any country (Rogers and Coates, 2002, p 3). Thus, safety nets provide mechanisms by which governments, households, and businesses can reduce the risk of a disaster impact or recover from disaster impacts in a timely manner. (Linnerooth-Bayer and Mechler, 2007, p 54; Gentilini, 2005, p 18).

Safety nets can be divided into two main categories (Besley, Burgess and Rasul, 2003, p 3): cash or income transfers, such as pensions, child allowances, unemployment benefits, or micro-finance (Gentilini, 2005:17), and transfers of commodities, such as food subsidies, housing subsidies, or energy subsidies (Besley *et al.*, 2003, p 6; Skoufias, 2003, p 1093; Gentilini, 2005, p 17). They may also provide income indirectly by offering vulnerable groups employment in public works programmes or, more broadly, by providing services such as health and education (Besley *et al.*, 2003, p 6; Kotler *et al.*, 2006, p 236). Of these types of safety nets, developing countries rely heavily on food-based intervention as key components in their safety net toolkit (Rogers and Coates, 2002, p 3).

Food-based safety nets

Food-based safety net programmes aim to increase the household’s real income in the form of food or cash-equivalents associated with food (Rogers and Coates, 2002, pp 1-7). The advantages of food based safety nets are two-fold: the food received can augment existing food supplies, and the food can be sold to increase the real income of a household (Rogers and Coates, 2002, p 2). Both applications of this type of safety net will decrease the vulnerability of a household to disaster risk. A few food based safety nets can be identified.

Food-for Work (FFW) schemes are, in essence, not orientated towards income transfer, but to providing employment opportunities, with remuneration in the form of food. The provision of employment and household food security protects households against the decline in purchasing power that often accompanies seasonal unemployment, climate-induced

famine, or other periodic disruptions (Rogers and Coates, 2002:6). FFW programmes are especially advantageous because they do not only ensure household food security but also contribute to community-based regional development, through creating or improving infrastructure using FFW labour (Rogers and Coates, 2002, p 6).

Food stamps, vouchers and coupons can be used to transfer income to a targeted population (Rogers and Coates, 2002, p 6; Besley *et al.*, 2003, p 6). Specifically, this food-based intervention allows for great flexibility, allowing communities to access only a few specific foods (those with high nutritional value) or to purchase any food in the market (Besley *et al.*, 2003, p 6; Rogers and Coates, 2002, p 6). These mechanisms have ensured greater food consumption within affected communities in Jamaica, Honduras, Sri Lanka, Mexico, Colombia, and the US. The only disadvantage of food stamps, vouchers and coupons is that, to be implemented effectively requires a well-developed commercial retail sector, a solid banking system and reliable government, which are often missing in low-income countries (Rogers and Coates, 2002, p 6), but not in South Africa.

Consumer food price subsidies are used to augment real household income by lowering the amount of money a household spends on food on a monthly basis. This is achieved by purposefully lowering the prices of staple foodstuff consumed by poor households. The advantage of subsidising staple food stuff for poor households is that money can be freed up which can be devoted to purchasing a greater quantity and/or variety of food or other goods (Rogers and Coates, 2002, p 7; Woden and Zaman, 2008, p 12). However, consumer food price subsidies are often expensive interventions. For example, in 1979 subsidies to food accounted for a full 5% of Sri Lanka's GDP (Rogers and Coates, 2002, p 7).

Emergency feeding programmes form an integral part of the strategy of international donor organisations and governments to address chronic food shortages within developing nations, such as Ethiopia, India and Zambia (Del Ninno, Dorosh and Kalanidhi, 2007, pp 414-415). Emergency food programmes aim to fortify community lives and livelihoods when existing food entitlements have been adversely affected by a disrupting event such a disaster (Del Ninno *et al.*, 2007, p 429; Rogers and Coates, 2002, p 7).

Cash-based safety nets are interventions based on cash transfers aimed at providing direct assistance to affected communities on either a conditional or unconditional basis (Vakis, 2006, p 9). By providing direct cash support, governments and/or donor organisations hope to address both short-term structural poverty and longer term intergenerational poverty following a disaster impact (Vakis, 2006, p 9; Andersson, Mekonnen and Stage, 2009, p 4; Besley *et al.*, 2003, p 6). Importantly, cash transfers provide a flexible intervention tool following a disaster, as the affected community/household can decide on which priority intervention area (housing, food, medicine) to divert the received funds (Vakis, 2009, p 9). The key attributes of cash-based safety net – i.e. their low cost, inherent flexibility and ability to scale up during emergencies – make them ideal disaster risk management tools (Vakis, 2009, p 9; Slater *et al.*, 2006, p 1).

Cash transfers can be either *conditional* or *unconditional*. Unconditional cash transfers impose no restrictions on communities in order to qualify for aid, whereas conditional cash transfers require communities to plough received money back into the communities (such as sending children to school) in order to receive continued financial support (Vakis, 2009, p 9). The Productive Safety Net Programme (PSNP) in Ethiopia is an example of an intervention with an unconditional cash transfer component. The PSNP is a flagship programme by the Ethiopian government to address the chronic food insecurities facing the country. The project takes a proactive approach to improving the efficiency and productivity of transfers to food insecure households, thereby reducing household vulnerability, improving resilience and promoting sustainable community development (Slater *et al.*, 2006, p 1; Andersson *et al.*, 2009, pp 2-3). To achieve this, the project employs two mechanisms: one is a conditional public works who works for cash component, the other is an unconditional component indented to support those within a community (such as the elderly and disabled) who cannot participate in the public works component (Andersson *et al.*, 2009, p 4).

Communities whose livelihoods are destroyed by disasters, such as droughts, floods, hurricanes, plagues, and earthquakes, often engage in coping strategies such as removing their children from school (Skoufias, 2003, p 1088). This provides a short term solution to the problem but in the longer term exacerbates poverty. To prevent this from happening, cash based safety nets often have conditions attached to them. For example, the *Red de Protección Social* system set up in Nicaragua to deal with the impact of droughts came with conditions that households ensure both their children's school attendance and family health through regular visits health service providers (Vakis, 2006, p 10).

Public works, such as the PSNP in Ethiopia, provide income for communities. The rationale for public work is two-fold: it provides direct income for a community/household through short-term employment, which helps them to meet consumption shortfalls and other immediate needs; and can contribute to reconstructing damaged infrastructure and creating social development infrastructure and projects (Vakis, 2006, p 10). Importantly, public works interventions

also allow for community involvement and buy-in into development projects. Examples of such schemes include the public employment schemes in Argentina (the Trabajar Program), Bolivia (Emergency Social Fund), Chile, China, and India (Besley *et al.*, 2003, p 6).

Social funds provide opportunities for a wide range of actors such as local governments, NGOs, line ministries, community groups and local project committees to cooperate in empowering local communities and, in doing so reduce, their disaster risk (Vaskis, 2006, p 11). Specifically, social funds are built up by establishing small community-run projects (with the help of the above mentioned role-players) that focus on community-specific development problems such as training and micro-enterprise development. These projects are meant to generate a community-wide social fund that can be used to recover from disaster events (Vaskis, 2006, p 11) or as a savings scheme with multiple disaster risk-reduction applications. An example is the Community Development Project (FID IV) in Madagascar where a component of the project was dedicated social protection in urban communities (Vaskis, 2006, pp 11-12). This project was an effective risk mitigation tool during the cyclones that affected Madagascar during 2004 (Vaskis, 2006, p 12).

Micro-finance schemes can serve as effective cash-based safety nets (Pitt, 2000), especially in countries and regions, such as Ethiopia (Africa) and Bangladesh (Asia) whose economies are primarily based on agriculture (Slater *et al.*, 2006, p 1; Andersson *et al.*, 2009, pp 2-3, Vaskis, 2006, p 12). Specifically, micro-finance schemes should provide funds to farmers that would allow them to diversify their incoming earning activities. According to Vaskis (2006, p 12) the efficacy of micro-finance interventions has already been proved in Bangladesh where the 1988 and 1998 floods had a minimal impact on farmers, since their economic activities were diversified, and no longer season specific (Vaskis, 2006, p 12).

5.3.10 Government Policies and Regulations

Local budget appropriations and executive regulations need to be considered when analysing budgetary requirements (Ghesquiere and Mahul, 2007, p 11). Some countries have developed emergency legislation that allows for emergency procurement before a financing source has been identified, but most countries have maintained more conservative legislation. For example, in some countries, tenders for emergency works cannot start until Parliament has approved full budget appropriations.

An optimal risk-financing strategy will need to ensure that funds are available at the appropriate time both pre- and post-disaster. It should also aim to amend out-dated legislation that may prove to be a burden in the aftermath of a major catastrophic event. As will be seen later, an argument is made for the amendment of the *Fund-Raising Act 107 of 1978* (FRA) and the DMA.

5.3.11 Accessing Alternative Funds: The National Lottery

According to the National Lottery Distribution Trust Fund (NLDTF), any NGO can apply for lotto funding in case of a national or local disaster (Sehlola, 2011). Yet disaster response funding does not fall into any of the NLDTF's three categories, which are sports and recreation, arts and culture, and charities. Thus, a miscellaneous application may be submitted to the NLDTF for the release of emergency funds at any time throughout the year (without waiting for the annual call for applications). Emergency funds can be applied for at national level or local level – for example, a river floods and prohibits children from going to school, or a large-scale disaster hits the entire country. However, despite applying for emergency funds, the NGO will have to undergo the regular application process, which is strict and time consuming. What is clear is that the distribution of miscellaneous funds is scarce.

5.3.12 International Comparative Study: Alternative Funding Arrangements

A proposed alternative financing model for disaster risk reduction for South Africa will be incomplete if it does not consider the lessons learnt and best practices from around the world. To this end a comparative study was undertaken of a number of countries, including Nigeria, India, Australia and New Zealand, with attention being given to NGO initiatives.

Olokesusi (2005, p 17) suggests that a number of funding alternatives for disaster risk management should be explored in **Nigeria**, including the following:

- Public-private partnerships
- A disaster risk insurance pool for households

- A Disaster Risk Mitigation Fund managed by the State through a formal institutional structure
- A Disaster Mitigation Trust Fund managed by the private sector
- Lotteries and fund-raising events
- Bilateral and multilateral assistance at international level
- Special taxes and levies
- Accessing the Global Environmental Facility (fund of the World Bank).

In **India**, the government maintains the National Disaster Fund for the purpose of providing instant relief when instructed to by the National Commission. The current Calamity Relief Fund is seen as the National Disaster Fund and is maintained by the government. In addition to the National Disaster Fund, a National Disaster Contingency Fund meets urgent expenses for disaster risk management. Furthermore, the National Commission decides how funds are spent from the National Disaster Contingency Fund. Each state government must maintain their own State Disaster Fund, and the State Commission decides how the funds are spent. Every District Administration must maintain a District Disaster Fund, which is managed by the District Councils (Government of India, 2005; 2008).

Australia does not have any legislation that focuses specifically on disaster risk management (Commonwealth of Australia, 2000, p 41) because government policy has been to deal with emergency management administratively. Thus, different ministers within the government assume different administrative responsibilities for disaster risk management. For instance, as the minister administering the Appropriations legislation including payments arrangements between the Commonwealth and the States, the minister for finance and administration is responsible for the Natural Disaster Relief Arrangements (NDRA). In general, each level of government should contribute one-third of the cost of disaster risk assessment and mitigation measures. The Natural Disaster Resilience Program is one of the main funding mechanisms for disaster mitigation and preparedness in Australia. The Commonwealth Attorney-General's Department provides this programme to support State and Territory initiatives to reduce the impact of natural disasters, enhance community resilience and support emergency volunteer

National emergency management legislation in New Zealand emphasises that every department, civil defence emergency management group, local authority, emergency service, and lifeline utility and any other person required by this Act to undertake civil defence emergency management or to perform any functions or duties, must take all necessary steps to undertake civil defence emergency management or to perform those functions and duties (New Zealand, 2002). This logically includes implementing funding arrangements to respond effectively to and recover from disasters. Although all the role-players legally have a role to play in funding disaster risk management, New Zealand's central government provides most of the funding.

In South Africa, Section 164(1)(a)(i) of the *Local Government: Municipal Finance Management Act No 56 of 2003* (MFMA) states that: "No municipality ... may conduct any commercial activities otherwise than in the exercise of the powers and functions assigned to it in terms of the constitution or national or provincial legislation". (South Africa, 2003) Performing a function without the requisite constitutional mandate has serious consequences for a municipality, as any associated act would be unlawful and unconstitutional, and expenses incurred in managing disaster risk would be in violation of the MFMA. Schedules 4B and 5B in the Constitution do not give local government the mandate for disaster management functions, but the *Disaster Management Act*, as national legislations does make this allocation. So the constitutionality of the DMA can rightfully be questioned, which has some significant impact on how funding is allocated and used for disaster risk management purposes.

5.4 South Africa's Current Funding Arrangements

A number of legislative frameworks govern the funding for disaster risk management in South Africa, including:

- *Public Finance Management Act No. 1 of 1999* (PFMA), which governs the release of funds for disaster events. Sections 16 and 25 allow the minister of finance or MEC to appropriate funds from their revenue funds for use of emergency situations (which in this case can mean disasters). However, the limitation is that the fund may not exceed a certain percentage of the total amount appropriated in the annual budget.

- *Municipal Finance Management Act No. 56 of 2003, (MFMA)*. Section 29 allows the mayor of a municipality to authorise unforeseeable and unavoidable expenditure in emergency situations (which in this instance can mean disasters). Such expenditure must be appropriated in the adjustment budget within 60 days, otherwise the spending becomes unauthorised. Again, the amount of funds available to respond to emergencies is restricted to a prescribed percentage of the budget.
- *Amended Municipal Systems Act, 2000*. Section 10 states that the Cabinet member, MEC or other organ of the state initiating an assignment of a function or power to a municipality in terms of Sections 9 and 10 must take appropriate steps to ensure that sufficient funding and capacity-building initiatives are available for the performance of such assigned function. For disaster risk management, the assignment for the function or power imposes a duty on municipality, and that duty falls outside the functional areas as listed and discussed above for Schedule 4B and 5B of the Constitution. According to this Act, disaster risk management imposes new constitutional obligations on local government. In the sense that disaster risk management encompasses a wide range of activities requiring funding (risk reduction, preparedness and response and recovery), appropriate measures or steps need to be taken to ensure that adequate finance and capacity are met.

In the DMA, only Sections 56 and 57 refer to funding mechanisms, and only for post-disaster recovery and rehabilitation after certain conditions have been met as described in the Act. Other than that, no guidelines are provided to cover funding of disaster risk management or alternative funding mechanisms.

The NDMF sets out the design and structure of funding mechanisms for disaster risk management and the role of each sphere, based on five categories or activities:

- **Start-up activities/costs.** The fund is through a conditional grant and is a once-off payment, so that the respective spheres are able to establish the centres as required by the Act. The use of conditional grants will result in some uniformity in response times and lessen cross-boundary effects. However, the NDMF acknowledges that creating a grant to fund this once-off cost may be inefficient. The question that arises is whether all the minimum requirements for setting up the centres can be met through this funding.
- **Ongoing activities/costs.** This category is funded through the department's operational budget rather than (ideally) through disaster-management funding, or as a standalone programme within the disaster management programme. To judge whether respective spheres would meet (or not) the objectives would require dedicated monitoring mechanisms to be in place, to establish if the category has been funded adequately.
- **Disaster risk reduction.** Funding for this category is mainly for disaster risk assessment and risk reduction, which the spheres need to include in their budgets and their strategic plans, as emphasised by the NDMF. Therefore, the spheres of government must make this as part of their routine processes and need to be monitored.
- **Response, recovery and rehabilitation strategies.** The response and recovery fund includes activities such as early warning, disaster response and recovery operations, relief measures etc. The NDMF is aware that no dedicated funding mechanisms are in place for this category, which delays the release of resources. Applying the PFMA, which is used as a mechanism to release funds, has some challenges, including the bureaucratic process to be followed, which increases the lead time between the declaration of the disasters and access to the funds. While the NDMF indicates that funds for this category need to come from own budgets (so funds can flow quickly to support response and recovery efforts), the sphere can only request assistance from national government when funds are exhausted. Financial assistance is considered after taking into account disaster risk-reduction principles prior to the event.

What is crucial is the separation of the contingency reserve from policy reserve so that funds can be quickly accessed, as recommended by the Commission in the 2003/2004 annual submission.

Lastly, according to the NDMF, costs associated with education, training and capacity-building programmes need to be recovered from SETAs, and costs for research into disaster risk management should be funded through the budgets of the disaster centres, the private sector and NGOs. The NDMF acknowledges that the provinces and national spheres have budget for this, but accreditation is lacking.

These funding arrangements build on the disaster-management funding recommendations made by the Commission in its 2003/2004 annual submission and its 2002/2003 assessment of the financial implications of the Disaster Management Bill (FFC, 2002a). Yet while having these strategies in place is vital, it alone is not adequate. Other alternative mechanisms

are needed to add or complement existing mechanisms, to increase the available public finance resources, as suggested by international literature.

The NDMF has acknowledged another challenge to the effectiveness of disaster risk management: the lack of information about the costs associated with past disasters. Without having data on past disasters that can be used to project potential costs, quantifying and budgeting for disaster risk management is difficult. Until minimum guidelines are prescribed and costed, designing a specific mechanism detailing how much funds should flow among and within the spheres of government will be difficult.

Besides the legislative and policy background to disaster risk management funding in South Africa, a number of declared disasters exposed the weaknesses in the current funding mechanisms. The roles of the National Treasury and of the Commission become important when considering the development of an alternative financing mechanism.

5.4.1 Role of National Treasury

Prior to introducing conditional grants for disasters in the latest 2011 Medium Term Expenditure Framework (MTEF), government was not putting specific allocations aside to deal with disasters (Makinta, 2011). Instead, all expenditure was deferred from the adjustments of estimates. The source of such funding is usually the Contingency Reserve, which is budgeted for nationally. The funding of natural disasters would always flow through a short-term in year grant(s). The amount would be allocated during the adjustment period in October for immediate expenditure (or rolled over in the case of infrastructure-related repairs).

In the new MTEF cycle in 2011, the government implemented a policy driven by conditional grants with full frameworks of expenditure, under which these funds are immediately accessible from their budgets, although with conditions (Makinta, 2011). The Treasury has always been wary of a possible exploitation of this window of funding. However, since 2009 and the xenophobic attacks in South Africa, National Treasury has been under much pressure to ensure adequate funding is available for emergencies.

Clearly the current mechanisms and *status quo* are not completely adequate. Since 2002/2003, the Commission has been directly involved in seeking a revised model which would address all of the deficiencies in the current system.

5.4.2 Financial and Fiscal Commission

The Commission's submission in 2002/2003 assessed the financial implications of the then Disaster Management Bill and identified some of the funding gaps. The Commission found that no dedicated funding mechanisms were in place for disaster risk management. In some instances, they were severely limited and, where they did exist, were in the form of relief funds and/or contingency reserves. The initial research was later followed by the 2003/2004 annual submission on disaster risk management funding.

Government did not respond to the Commission's recommendation on start-up costs, ongoing institutional costs and prevention and mitigation projects. However, it noted that the current framework does not set predetermined proportions to be contributed by each sphere in the event of a disaster. It also did not indicate whether the Commission's proposal on the thresholds has been accepted. The Commission recommended that a more defined legal basis be provided for the central contingency reserve, which would be allocated for two emergency purposes: macroeconomic stability and response to natural and manmade disasters. Such an arrangement would allow funds to be accessed quickly when needed. Government agreed with the core of the Commission's proposals but did not see the need to divide the current contingency into a policy reserve and contingency reserve.

5.5 Methodology

- A qualitative research design was used, and a literature study looked at international literature on the topic, including:
- International disaster risk-reduction strategies, plan and policies
- International scientific research on the funding of disaster risk reduction

- International case studies on the decentralised funding of disaster risk reduction which will included the countries of Nigeria, Australia, India and New Zealand
- Reports from international, multi-national and inter-governmental organisations.
- Some elements of historical research were used in analysing the planning documents – the IDP and Service Delivery and Budget Implementation Plan – and the approved annual and medium term budget documents.
- Using purposive sampling, semi-structured interviews were conducted with selected knowledgeable individuals (n=24) in the disaster risk management and public financial management domains at all levels of government and across different government sectors.

5.6 Findings and Discussions

The data from the semi-structured interviews was analysed, and two prominent themes were identified: funding for disaster risk management and funding for disaster recovery. It became clear that the current funding model of government has gravitated towards this unwritten distinction, which also correlates completely with the literature review, international best practices and acceptable funding mechanisms at all levels of government.

However, first the known limitations in the current system, as highlighted by the respondents, should be considered, as they provide fertile ground for the development of an alternative model. One of the key drivers of funding risk management remains the post-disaster funding focus (i.e. a disaster has occurred and therefore funding is needed, as opposed to integrating funding into development initiatives to reduce the risk of disasters from happening), mostly because of a lack of understanding or ignorance of what this entails. The research identified the following gaps and bottlenecks within the current process, especially within disaster recovery and response.

5.6.1 Disaster Relief and Recovery Funding

The state provides social security during times of crises, and these relief measures are known as social relief. Within the South African legislative environment, two broad categories address social relief: social relief for individuals and social relief for community (Myburgh, 2005, p 179). The nature of disasters – as events that exceed communities' ability to cope with the adverse consequences of their impacts – makes it important to focus on those pieces of legislation that address community social relief funding.

According to Myburgh (2005, p 180), government provides community relief during community-wide disaster situations (such as flooding and fires) that have caused excessive damage to both personal property and livelihood (e.g. destruction of crops). The funding for community social relief has two main sources:

- General government funds collected through taxation; and
- Fund-raising activities in terms of the *Fund-Raising Act 107 of 1978 (FRA)*.

Of these two funding sources, the FRA is crucially important because the general funds collected through taxation are often inadequate, or some cases non-existent, in most national, provincial and local government departments. The perceived impracticality of budgeting for events that might or might not happen mean that funds collected through taxation are often used for other budgets items. To serve as additional sources of funding, the following funds have been set-up in terms of Section 16 of the FRA (Myburgh, 2005, p 181):

- The Disaster Relief Fund
- The South African Defence Force Fund
- The Refugee Relief Fund
- The State President's Fund
- The Social Relief Fund.

The **Disaster Relief Fund** renders assistance to any person who has suffered damages or loss caused by disaster. Importantly, a Board appointed by the Minister is responsible for managing the fund and for ensuring that assistance is rendered where deemed necessary (Myburgh, 2005, p 181). The Department of Social Development (DSD) manages the Disaster Relief Fund. Although a Board is in place to manage the fund, its current functioning is problematic. According to respondents from the DSD, the Disaster Relief Board Members are not all instantly available when a disaster occurs. As a consequence, officials have to wait for an undefined period of time for the Board to meet and approve funding relief efforts.

Although the FRA is a crucial source of funding for disaster-relief efforts, agencies that need to respond timeously to the impacts of disasters often find it difficult to access the funds (Van Zyl, 2011a, p 40). One of the major problems inhibiting the release of funds relates to the declaration of a state of disaster. According to the FRA, the process to release disaster-relief funds can only be initiated once the president has declared a disaster (Van Zyl, 2011a, p 40). This situation is not ideal because long reporting lines to the Office of the Presidency and bureaucratic red tape from local level (where a disaster happens) severely hamper the flow of information and consequently the release of funds for relief and recovery efforts. The above is also in conflict with the DMA.

According to respondents from the DSD, more synergy is needed between the DMA and FRA when a state of disaster is declared. As the discussion below shows, the research suggests significant changes to the legislation governing disaster-relief funds.

5.6.2 General Problems Hampering the Release of Disaster Relief Funds

Currently DSD faces several challenges that hamper its ability to distribute funds to affected communities once monies have been released from the Disaster Relief Fund. Firstly, relevant structures are not in place to streamline the distribution of funds. According to the DSD, one major structural problem is that the department currently has no internal disaster risk management unit, as required by the DMA. As a consequence, no dedicated team drives the DSD's disaster-relief component. Secondly, unlike most other line departments within government, the DSD does not have decentralised offices at a local government level (where relief is needed following a disaster). This means that funding takes a long time to reach affected communities. To overcome this problem, DSD officials suggest that the distribution of social relief following a disaster is cascaded down to become a provincial government level responsibility. Officials also felt that the South African Social Security Agency (SASSA) should no longer be involved in the distribution of disaster-relief funds, as the SASSA is geared towards broader social relief rather than disaster-relief issues.

The location of disaster risk management centres (DRMCs) is also a stumbling block to the distribution of funds following disasters. In many instances the location of DRMCs differs from province to province, and from municipality to municipality, which often hampers the DSD's ability to contact their counterparts at provincial and/or local level. As a result, the DSD has in the past struggled to coordinate effectively the distribution of funds to affected communities.

Human resource issues add to the problem of distributing funds to affected communities, as the DSD is currently severely understaffed. This means that national government level employees become involved in the operational activities at local level whenever a disaster strikes. No-one is playing an oversight role, which is the actual mandate of the DSD, and so nobody monitors whether funds are reaching affected communities in the shortest time possible.

A final problem relates to the current lack of adequate disbursement systems that can provide access to relevant statistics and reports on persons affected by disasters. Without an adequate statistics system in place, it is difficult to determine how many people need disaster relief and how much relief they need, which slows down the distribution of relief funds. To speed up the distribution of relief funds, the DSD should be linked to the information and database systems of both the NDMC and the Department of Cooperative Governance.

5.6.3 Declaration of States of Disasters

The DMA (Sections 23, 26, 27, 41 and 55) and the NDMF (Key Performance Area 4 – Section 4.2) provide for the classification and declaration of states of disaster at municipal, provincial and national level. Both the DMA and NDMF call for uniform standards to be developed for the assessment of a proposed disaster. Yet, although all of the "key performance indicators" linked to Section 4.2 of the NDMF refer to "guidelines and uniform methods", these standards still have to be developed (with the exception of the priority guidelines mentioned earlier). In light of this, the classification and declaration of a state of disaster at all levels will continue to be ambiguous, with an obvious impact on the allocation of funding.

The first time a state of disaster was declared in South Africa under the DMA was in June 2008, when xenophobic attacks occurred in the Western Cape and Gauteng provinces (South Africa, 2008a; 2008b). Since then, a number of states of disasters have been declared, the most significant being the 2010/2011 floods in most parts of South Africa. The declaration of these events tested the functionality and measures of the government's response. The process and procedures for declaring states of disasters were found to be unclear and cumbersome. In almost all instances, the difference between the classification and declaration was unclear (despite the explanations provided in the NDMF). Similarly, the roles of the district municipalities, provinces and the NDMC were muddled. This should not be surprising considering the lack of clear guidance on this issue and varying opinion even at national level.

The NDMC's role in classifying and declaring a state of disaster is also questionable, as one of the founding aims of the DMA was the decentralisation of disaster risk management. Yet, the classification and declaration of a state of disaster remains the NDMC's role. An event remains a local disaster until the NDMC classifies it otherwise, which basically prevents municipalities from declaring a state of disaster. This situation leads to a lack of taking responsibility and the perception that the NDMC will in any event intervene.

Furthermore, how a disaster is scaled up to a 'new' classification by the NDMC is not clear. For example, if after assessment the NDMC classifies a local disaster as a provincial disaster, the provincial premier still has to declare a provincial state of disaster. Neither the DMA nor the NDMF provides for this reclassification process. Another, related issue is the NDMC's internal capacities. As one respondent remarked, the NDMC can hardly do its most basic functions (with its current human resource capacities) yet is expected (with its already limited human resources) to become involved in operational issues.

The last criticism is the duplicate declaration that occurs once other legislation is invoked. The FRA is the only other Act to make provision for the declaration of a disaster and requires the president to declare a disaster (as opposed to the DMA declaring a state of disaster). The FRA's aim is to relieve social distress emanating from a disaster event. In assessing the two Acts, contradictions and duplications clearly exist. On the one hand, the DMA aims to decentralise the declaration of a state of disaster and makes provision for such declarations before a hazardous event has turned into a disaster (hence the 'state' of disaster). On the other, the FRA can only be used to declare a disaster (an event that already exceeds the ability and resources of the affected community to deal with its consequences), and only the president can make this declaration (whereas provincial premiers and municipal councils can declare local and provincial states of disaster).

An assessment of the declared (states of) disasters since 2002 confirms these hypotheses. In all instances, the FRA was used to declare the disaster. Only since 2008 has the DMA been used, but the FRA was also invoked, thus effecting a dual classification. The DMA and the FRA need to be aligned, and very clear guidelines for the assessment, classification and declaration of states of disasters must be developed and disseminated to all spheres of government.

5.6.4 Timely Release of Funds

The time between when a disaster occurs and when funds are released often takes up to two years to reach affected communities. The current budgetary process, structures, systems and documentation greatly slows all spheres of government's ability to provide an environment conducive to the quick release of funds for disaster response, relief and recovery (Van Zyl, 2011b, p 7).

Firstly, following a disaster, the rapid assessment process impedes the timely release of funding for relief and recovery efforts. Legislation requires that all spheres of government (i.e. the local municipality) conduct a rapid assessment of the damage and, if it exceeds their capacity, to request the involvement of the relevant provincial government; the provincial government then conducts a verification assessment, and the process is repeated at national level (Van Zyl, 2011b, p 7). Although this process is needed to assess the total impact of a disaster, the duplication of assessments at all levels of government significantly delays the release of urgently needed funding for recovery and response. (Van Zyl 2011, p 8). One solution might be to put in place Response and Recovery Steering Committees (RSCs) in order to eliminate the assessment process at all spheres of government, thereby reducing the time delay in releasing the needed funds (Van Zyl, 2011b, p 9).

Secondly, funds budgeted for disaster relief and response often cannot be spent in one particular financial year, as is the case with the repair of infrastructure. When funds cannot be spent in a short space of time, inevitably the surplus funds have to be rolled over to the next financial year, creating instability (due to funds being reassigned to other projects) and delays in the flow of funding (Van Zyl, 2011b, pp 9-10). One way of overcoming these problems is for line departments,

national, provincial and local authorities not to budget for the post-disaster recovery, rehabilitation and response, as prescribed by the Act; instead the NDMC in collaboration with the Treasury should hold the funds for these functions (Van Zyl, 2011b, p 11). Respondents from provincial and local government level echoed this sentiment. Furthermore, the transfer of funds to provincial departments and local authorities should be based only on claims or internal transfers (Van Zyl, 2011b, p 11).

5.6.5 Constraints in Current System/Legislation

The funding regulation provided under chapter 6 of the DMA is also subject to Sections 16 and 25 of the *Public Finance Management (PFMA) No 1 of 1999* (South Africa, 1999), which provide for the use of funds in emergency situations (Myburgh, 2005, p 183). Section 16 of the PFMA is especially problematic for the rapid release of funds, specifically the release of emergency funds from the National Revenue Fund, which requires ministerial approval to release funds (Visser and Van Niekerk, 2009, pp 38-39). The need for this approval delays the rate at which funds can be made available for response and recovery operations.

Section 25 of the PFMA also creates problems for the release of disaster response and recovery funds at a provincial government level. Subsection 25(2) of the legislation states that, in the case of an unforeseen emergency, a maximum amount equalling about 2% of the annual provincial budget can be released from the Provincial Revenue Fund. This limitation is problematic, as response and recovery operations can be extremely costly, and the 2% of funds released is often insufficient for sustained response and recovery activities. Another aspect relates to Subsection 25(3b), which states that the release of funds should be subject to a vote of the provincial legislature. This further delays the release of funds.

According to DSD officials, the PFMA also creates a clash of accountability with regards to the Disaster Relief Fund. On the one hand, the PFMA says that DSD officials are accountable to the departmental director-general (DG) at all times; thus officials must inform the DG before proceeding with any task. On the other hand, in disaster or emergency situations DSD officials are also accountable to the Disaster Relief Fund Board. The confused reporting lines and additional bureaucratic procedures that need to be followed greatly hamper the quick release of funds.

Whereas the PFMA governs the release of disaster response and recovery funds to national and provincial tiers of government, the MFMA (South Africa, 2003, Section 29) governs the release of fund at municipal level (Visser and Van Niekerk, 2009, p 27). This Act creates similar problems at local level as the PFMA does at national and provincial level for the efficient release of funds for disaster response and relief (Visser and Van Niekerk, 2009, p 27). Specifically, although a municipality is allowed to authorise unforeseeable and unavoidable expenditure arising from an emergency situation, this expenditure is limited to a set minimum percentage of the budget, which is insufficient for prolonged response and relief efforts (Visser and Van Niekerk, 2009, p 27). The municipal council also needs to ratify the emergency expenditure before the funds can be released, and so release of funds will be delayed if all the councillors are not available.

Disaster recovery and rehabilitation funds are made available through the present budgetary process, which starts long before any disaster is reported (the exception might be a prolonged drought). Funds can also be made available for unforeseen expenditure such as disasters in the Medium Term Budget Policy Statement (MTBPS), which is normally made in October/November each year. Financing of these disasters happens from in-year allocations gazetted during these months, and so any disasters occurring between that time and March (end of the financial year) are not considered. Where the magnitude and severity of a disaster calls for a full rehabilitation of infrastructure or is the result of a persistent drought, funds are normally rolled over, provided that such funding was requested and approved before the November adjustment period.

Lack of capacity

Municipalities and provincial and national organs of state face a lack of capacity. Municipalities or provincial structures do not employ enough qualified engineers and other professionals with the necessary skills to deal with disasters.

As a result, assessment verification often lack professional inputs, which delays the completion of many rehabilitation projects; projects can on average take almost twice as long to complete as originally envisaged. These delays occur for various reasons:

- Lack of capacity to implement such projects,

- Delays in the procurement of funding for projects,
- Misunderstandings about procedures for releasing funds.

In order to address the above, various multi-disciplinary disaster assessment teams need to be established, and national guidelines for assessing and verifying disaster events should be developed and implemented.

Municipal Infrastructure Grant (MIG)

Once funding for a disaster is approved in line with the stipulated statutes, the requested funds are made available through the MIG structure. A municipality must comply with the following conditions:

- Submit financial statements to the Auditor-General on time.
- Demonstrate its capacity to manage the infrastructure investment programme.
- Prepare and submit all monthly reports on how the grant was used in a prescribed format by a specified time.
- Allocate MIG funds in the municipal budget.
- Prepare a project business plan for each project (which conforms with the requirements of the MIG programme).
- Register projects on the national MIG database.

The current system of channelling funds is a source of frustration for municipalities and the relevant government departments: a business plan has to be compiled and approved at a provincial and national level before being registered as a Provincial MIG. A large number of bottlenecks are found in the management of the projects registered under MIG structure.

Financing of disasters through conditional grants

Schedule 9 of the *Division of Revenue Act* (No. 6 of 2011) provides for funds to be released immediately to provinces and municipalities in response to disasters (*provincial and municipal disaster grants*). This process does not have an adjustment period before funds can be dispersed to provinces and municipalities. The Commission welcomes and is in support of this approach, which will help reduce the lead-time between the natural disasters occurring and the release of funds. The Commission also notes the conditions attached to the grant, in particular the need “for municipalities to fund the portion of the costs of the disaster based on the revenue raising capacity of the respective municipalities”. Strict adherence to this condition will encourage municipalities and provinces to take preventive and risk-reduction measures when a disaster strikes.

However, this process does not resolve the challenges engulfing the financing and management of disasters in the intergovernmental relations system. The process and institutions for declaring a disaster area need to be clarified. All spheres have a responsibility, but municipalities (especially districts municipalities) have difficulty implementing the provisions of the DMA and the guidelines provided in the National Disaster Management Framework (NDMF) of 2005. This is because of inadequate funding for planning and prevention, as provincial and municipal budgets do not have the fiscal space for this purpose – conditional grants for natural disasters are *ex post* allocations. As natural disasters increase, public finance is unlikely to be able to cope with the reconstruction demands. Therefore, in the long-term, alternative measures must be considered to reduce the physical destruction caused by natural disasters. These measures include land-use planning, building standards that ensure a level of robustness, developing and regulating domestic insurance markets, including introducing innovative market-based financing of disaster relief and recovery, such as risk pooling, reinsurance, derivatives, micro-insurance and catastrophe bonds.

Principles in the use of conditional grants

In its submission to the Select Committee on Finance, the Commission proposed that conditional grants should be used either when there are strong reasons to suggest the existence of spill-over benefits or to deal with programmes of national priority (FFC, 2002b). In the latter, conditional grants should be used for sub-national governments to institutionalise the programmes so that they can gradually be phased into the equitable share.

The Commission reiterates its previous recommendations from the 2007/2008 annual submission on the principles for instituting conditional grants in the intergovernmental fiscal relations (FFC, 2006):

- Conditional grants to provinces and municipalities should only be used to address problems of spill-over benefits and to deal with the funding of programmes identified as matters of national priority. Such conditional grants should be phased into the equitable share once provinces and municipalities have institutionalised the programmes.
- National government departments should clearly define minimum norms and standards for delivery in areas of concurrent responsibility and monitor the performance and compliance of provinces.

5.6.6 Monitoring and Evaluation

The quality of rehabilitation work and the more general maintenance of facilities are problematic. In some cases, the expected life of facilities and their capacity to withstand further disasters are seriously reduced. Moreover, many rehabilitation projects do not include monitoring and evaluation as part of the plan, which may result in the misappropriation of funds.

Mechanisms need to be developed for reducing delays in processing and administering requests – the length of time between a disaster occurring and funds being requested and approved is too long and frustrating. Such delays lead to problems in damage assessment, in providing of information on the scale of damage and related requirements, and in timely issue of emergency relief acts. Project review and monitoring arrangements are needed to ensure rapid and smooth implementation of rehabilitation. For example, to ensure improved maintenance, various measures could be introduced, including more funds, increased monitoring and greater public participation. Mechanisms or strategies for each type of disaster differ, although the basic principles or approach to disaster management are the same. Each disaster needs a different assessment, response and recovery approach.

5.6.7 Disaster Risk Reduction

Disaster risk-reduction funding is mostly perceived as funding linked to the everyday disaster-risk management activities of the various government spheres. However, the majority of the respondents indicated that funding for disaster risk reduction remains one of the most problematic areas, especially within sector departments. The various DRMCs seem to have more success budgeting for disaster risk reduction and being allocated funds through the equitable share. This can mainly be ascribed to the fact that the disaster risk management function is known through the implementation of the DMA.

Many officials and politicians still see disaster risk management as part of a DRMC's activities, with very little link to the multi-sectoral approach. Similarly, the general perception is that very few sector departments fully understand their responsibilities related to disaster risk reduction, which obviously leads to lack of budgeting. Sector departments also do not integrate disaster risk reduction into their normal day-to-day functioning. Although disaster risk reduction should be integrated into normal sectoral activities, additional funding will still be needed. The problem appears to be twofold: on the one hand officials do not budget for disaster risk reduction, and on the other the accounting officers do not demand it. Sector departments clearly need capacity development for disaster risk reduction.

5.6.8 Current Financial Management Systems

Most of the stakeholders consulted are content with the current public financial management system used for normal day-to-day operational funding. Funds are allocated to projects and aligned with the annual performance management system of the respective sphere of government. In general, most DRMCs have access to operational budgets, although some constraints remain in mobilising funds for capital projects. These types of disaster risk-reduction projects normally run into millions of rands and are the least likely to be funded adequately.

The general perception is that funding allocation is inadequate. In all instances, the MTEF was found to enable all disaster risk management functionaries to budget for disaster risk reduction. However, one of the greatest problems identified is provincial and municipal financial managers' lack of understanding and comprehension of disaster risk reduction. Creating greater understanding among these officials would mean a much more favourable budget allocation for disaster risk reduction. Although the MTEF allows for a fair accounting system, better reporting practices are needed, especially in disaster recovery.

5.6.9 Budgeting By Sector Departments of Disaster Reduction

The research shows that sector departments do not budget for the implementation of disaster risk-reduction activities. Most of the funding is masked as developmental projects (which it rightfully should be). However, the lack of knowledge and understanding of disaster risk reduction means that this integration happens almost by accident. Therefore, it could be argued that a crucial link to a new funding model is to develop and enhance the capacity of sector department officials to deal with disaster risk-reduction matters.

Once the multi-sectoral and multi-disciplinary nature of disaster risk reduction is understood, evidence of disaster risk reduction activities can be expected to appear in the various budgets, which will be financed by the *Division of Revenue Act* on an annual basis. One of the recommendations made is the implementation of a specific line item for disaster risk reduction for all organs of state. This will serve to highlight the need to think about disaster risk reduction in daily

operations. Such a line item must be governed by specific guidelines to ensure that it is used for disaster risk reduction. A major constraint to the current funding of disaster risk reduction is that local and provincial political heads do not understand the crucial role of disaster risk management within their municipalities (in DRMCs and sector/line departments). Municipal and provincial officials tend not to want to fund something that “might not happen”, which makes getting funds for pro-active disaster risk-reduction projects difficult. In general, disaster risk management officials have difficulty accessing funding because of protracted deliberation processes with municipal and provincial decision makers. This eventually leads to decision makers removing disaster relief, preparedness and mitigation funding from their list of priorities.

Politics also limits the release of disaster risk management funds. Politicians often do not want to provide pro-active funding because of the innate lack of publicity associated with disaster risk reduction. In the past, local government politics have also delayed access to disaster risk management funds – one political party may want to portray another party in a bad light over their management of a disaster situation.

Furthermore, as funds are only released once a state of disaster is declared, politicians may not want to declare a state of disaster for fear of economic disinvestment and losing the support of voters. Local government officials proposed that the declaration of a state of disaster should be totally removed from politicians and be handled by DRMCs.

The study found that one of the bigger systemic problems facing disaster risk management funding is that the disaster risk management function “is not owned by any one department”, and so no department budgets for the disaster risk management activities.

5.6.10 Private Sector Involvement

In most instances, the private sector is not involved in disaster management activities within their municipal areas. However, some exceptions were noted. For instance, in one district municipality, private sector companies are already involved in risk-assessment processes (although the specific DRMC is not given access to the data collected by these private sector companies). Stakeholders agreed that the private sector has a role to play in managing disaster risk. In particular, since companies often create a risk situation within a specific area, they should contribute to the mitigation of the risk by putting risk-reduction measures in place. Furthermore, private sector companies should be encouraged to participate in disaster risk-reduction projects, as part of their overall Corporate Social Responsibility (CSR). These CSR projects can be joint ventures between the private and public sector (represented by the DRMC of the district).

Most stakeholders agreed that the insurance industry is not yet sufficiently involved. The insurance industry has a role to play in disaster risk management activities, and more information is required on the services that they can provide.

5.6.11 Community Funding for Disaster Risk Reduction

Community-based funding mechanisms are still very limited, and the dependency on government recovery interventions is great. For the most part, communities depend on their extended family to help them recover from disaster impacts. It is important to note that the funds provided by family members are not used to assist with disaster risk-reduction activities. Furthermore, communities also use *stokvels* and private loans, but these coping mechanisms only provide relief to those in the community who can afford it. These interventions are generally expensive because of the exorbitant

interest rates charged by either the *stokvel* members or microlenders. Communities, especially the most marginalised and poor, also have difficulty accessing funding from institutions such as banks to assist them with the recovery process.

5.7 Conclusion

The study revealed some weaknesses in the legislative, policy and institutional frameworks for disaster risk management. Although institutional frameworks contain guidelines, these are clear only about who must declare and classify the disaster (NDMC). Other than that, the functions and processes, from the centres down to the municipalities, are confusing and duplicated. In addition, although local municipalities are the first point of call when a disaster occurs, the DMA says nothing about their role, discussing only the roles of the metropolitan and district municipalities.

Although progress has been made in disaster-management financing in South Africa, some flaws remain. The dedicated funding mechanisms focus on funding the disaster through own budgets and grants, and no other alternative financing mechanisms are in place. This puts a severe strain on public finance resources and results, among other things, in slow response and recovery when an emergency strikes because of the processes that have to be followed to access and receive funding. In addition, while the enabling legislation and policies emphasise the need for risk-reduction methods, these are limited and not fully exercised. No punitive measures are in place for those who do not take into account of the mitigation strategies, or incentive structures for those who comply. The role of private sector, community and NGOs is critical in disaster risk management and can contribute greatly to mitigating the associated risks and avoiding the ‘Samaritan’s dilemma’ that communities face.

The literature review found that, for disaster management to work efficiently and effectively, a combination of legislation, clear roles and responsibilities, the allocation of funding and other funding mechanism in the form of insurance measures are critical – optimal risk financing strategy is the key for both the pre- and post-disasters. Case studies reviewed, indicate that some roles, function and funding are best centralised, while others need to be decentralised.

5.8 Recommendations

With respect to alternative financing mechanisms for disaster management, it is recommended that:

- The Minister for Cooperative Governance and Traditional Affairs should streamline guidelines and gazette uniform standards governing and guiding the classification, declaration, assessment and response to disaster events in terms of the *Disaster Management Act* (DMA) and *National Disaster Management Framework* (NDMF). The absence of a standardised and coordinated approach to damage assessment and relief provision to people affected by disasters results in unnecessary duplication of effort and funding across government and delays in response and rehabilitation efforts.
- The Department of Cooperative Governance (DCoG) should, through the DMA, require municipalities, starting with the most vulnerable, to incorporate in their Integrated Development Plans (IDPs) disaster risk-reduction evaluations, strategies and measures, including:
 - o The development and enforcement of *land-use planning* and management measures so as to reduce infrastructure being built on seismic fault lines, in coastal regions subject to storm drainage and river shorelines subject to frequent floods;
 - o The development and enforcement of *buildings standards* (or retrofitting requirements) to ensure adequate robustness against earthquakes or cyclones.
 - o Engineering interventions to mitigate the degradation of environmental assets (such as soil erosion) through the creation of *dams* for flood control, *fire breaks*, and *sea walls* to break storm surges; and
 - o Financing strategies for these measures.

- Government should develop a policy framework for municipal disaster risk financing that:
 - o Differentiates between municipalities based on their vulnerabilities and fiscal capacities;
 - o Leverages private resources to fund long-term disaster risk management by combining private risk financing, intergovernmental grant financing (including the Green Fund) and municipal own revenues;
 - o Encourages and incentivises, where appropriate, the use of innovative market-based financing of disaster relief and recovery. Instruments that can be considered include sovereign insurance, risk pooling, reinsurance, index-based insurance, weather derivatives, micro-insurance, and catastrophe bonds.

- The National Treasury should require that environmental management and vulnerability objectives are explicitly incorporated into the design of existing key municipal grant programmes. These objectives should promote disaster risk-reduction methods (*ex ante* approach) and enhance municipal resilience to climate change through mitigation and adaptation methods. They should:
 - o Include the Integrated Housing and Human Settlement Development Grant, the Urban Settlements Development Grant, the Municipal Infrastructure Grant, the National Electrification Grant, the Public Transport Infrastructure and Systems Grant and the Regional Bulk Infrastructure Grant;
 - o Incorporate a statement of environmental and climate resilience objectives in each grant programme, together with measurable indicators;
 - o Prioritise the most vulnerable municipalities when determining the horizontal division of available resources in each programme;
 - o Provide for beneficiary municipalities to conduct appropriate climate-resilience evaluations on existing infrastructure over the medium term, subject to disaster risk-reduction methods being incorporated in respective IDPs;
 - o Be accompanied by capacity support to and engagement with the most vulnerable municipalities to ensure that they are able to identify and address disaster risks comprehensively.

Annexure 5A. The NDMC's Response to the FFC Recommendations

The National Disaster Management Centre (NDMC), as the principal functional unit for disaster risk management in the national sphere, appreciates the work that has been undertaken by the Financial and Fiscal Commission and generally supports the findings of the report.

The NDMC has embarked on a process to review the *Disaster Management Act (2002)* to identify areas where legislation may promote tangible results at the community level. Through the process of reviewing the *Disaster Management Act*, the NDMC also intends to ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.

Some of the key issues that the NDMC hopes to address through the review process are also challenges identified in the report and include matters on funding, classification and declaration processes, roles and responsibilities of sector departments and optimising the relationship between district and local municipalities in respect of disaster risk management issues.

One of the mechanisms to deal with the challenges in the implementation of the Disaster Management Act is the development of regulations and guidelines. The FFC report can greatly enhance and support the process of developing the required regulatory framework for implementation.

Comments on the specific recommendations of the report:

- a) ***“The placement of the various Disaster Risk Management Centres*** needs urgent attention with clear roles between district and local municipalities. The incorrect placement of these centres has a significant impact on the perceived importance of disaster risk management and thus also an influence on adequate funding for disaster risk management.”

NDMC comment:

The NDMC recognises the importance of the level and placement of the disaster risk management function within the various spheres of government. However, even more critical is the reporting and accountability for DRM in municipalities and provinces to the highest executive level and the priority given to instil the principles of disaster risk reduction in the IDP and budgeting processes.

- b) ***“Norms and standards must be introduced*** minimum guidelines on the funding mechanism in place need to be prescribed and costed as acknowledged by the National Disaster Management Policy Framework.”

NDMC comment:

The recommendation is not clear. However, the NDMC will also be developing regulations on funding for disaster risk management in terms of the Disaster Management Act.

- c) ***“Significant emphasis must be given to capacity development and awareness creation of disaster risk reduction*** with politicians, top management in the public sector, private sector partners and all sectoral and line departments in Government.”

NDMC comment:

The NDMC supports the principle to provide significant emphasis on disaster risk reduction and that it should be mainstreamed across sectors. The principles as outlined in the NDMF should be implemented more effectively and supported across the spheres of government. It is also recommended that reporting to the National Disaster Management Centre as custodian for disaster risk management in the country, be strengthened.

- d) ***“Clear guidelines for the assessment, classification and declaration of a state of disaster*** need to be developed so as to avoid confusion and duplication processes currently in place. More so, to the Rehabilitation and Response category funding.”

NDMC Comment:

The NDMC supports the recommendation and also recommends that Regulations be developed to spell out the process regarding the classification and declaration of a disaster. Furthermore provision should be made for a standardised approach to damage and needs assessments.

- e) ***“Incentive and punitive measures to be effective and strengthened.*** In the former, encourage those spheres that have assisted others through some form of surety/reimbursement. For the latter, punitive measures to be exercised for spheres not abiding/ not complying (e.g. 2% of budget to deal with disasters).”

NDMC Comment:

The NDMC supports the recommendation in principle. Further investigation on the implications is required prior to implementation.

- f) ***“A combination of private risk financing arrangements and pool of funding*** from the Government (hybrid pool of resources to fund disaster risk management). Varied approach to disaster management is needed so as to cater for differentiated fiscal capacity of municipalities.”

NDMC Comment:

The recommendation is supported.

- g) **“Catastrophic risk models as part of disaster risk assessments** are needed to assess the number of people that are likely to be homeless and the number of buildings that will have to be rebuilt. In the case of reconstruction operations, disaster risk modelling techniques can be used to estimate the potential damage to the infrastructure, as well as to any public and private property. This can assist the authorities determine the budgetary needs caused by any such potentially catastrophic events.”

NDMC Comment:

The principle is supported. All organs of state across sectors and spheres of government are required to conduct proper risk assessments, including costing of potential disasters.

- h) **“Development and regulation of domestic insurance markets** including the introduction of innovative market based financing of disaster relief and recovery such as sovereign insurance, risk pooling, reinsurance, index-based insurance, weather derivatives, micro-insurance, and catastrophe bonds, should be investigated.”

NDMC Comment:

The principle is supported and should be investigated.

- i) **“Specific reserve funds** based on either strategic investment or risk-based insurance is necessary. This recommendation is in line with the FFC’s previous recommendation of two reserves: one for macroeconomic stability and one for the response to disasters.”

NDMC comment:

The establishment of a specific reserve fund for disasters, which is not linked to the normal budgeting cycle, is supported. It is recommended that criteria be developed to determine the circumstances when the reserve fund can be utilised which should include certain large scale risk-reduction projects such as for example the relocation of a community at risk.

- j) **“Ex ante strategies such as investing in disaster risk-reduction** methods through proper and integrated development planning, land use planning, and buildings standards for sustainable financing is necessary. Coordinating that with legislative requirements of cooperation, coordination, the intergovernmental process and municipal systems act as required.”

NDMC Comment:

The recommendation is supported and furthermore a percentage of municipal and provincial budgets should provide for specific disaster risk-reduction activities on an annual basis.

The example of investing in disaster risk-reduction (*ex ante*) measures such as land use planning so as to reduce and prevent development in low-lying areas, coastal regions subject to tidal waves and on seismic fault lines and in dolomite areas cannot be over-emphasized. These measures need to be integrated into IDPs.

- k) **“Disaster management need to be part of comprehensive strategy for** climate change mitigation and adaptation strategies with funding thereof.”

NDMC Comment:

The NDMC supports the principle of having more robust conditions on disaster risk reduction (and climate change adaptation), also as part of conditional grant funding. Investing in disaster risk-reduction measures is critical.

- l) “The South African Government must consider **public-private partnerships for both disaster risk reduction** (e.g. disaster risk management fund) and disaster relief and recovery (disaster relief and recovery trust fund). Such arrangements can include restructuring debt payment to banks by individuals and families affected by disaster or disaster risks.”

NDMC Comment:

The NDMC supports the principle, although the implications of each such PPP should be analysed and carefully considered.

m) "Top-up of disaster risk-reduction funding through other funds such as the National Lottery must be considered."

NDMC Comments:

The NDMC supports the principle, although the implications should be analysed within the legal framework for the allocation of lottery funds before such a decision is taken.

n) "Disaster management **to be linked broader funding for municipalities** (including basic services)."

NDMC Comments:

The NDMC supports the principle and recommends that provision be made to utilise MIG funds (ring-fenced for this purpose), especially to provide for start up costs of providing disaster management and fire services which can be regarded as "basic services" to communities.

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