

**AN INVESTIGATION OF THE FLOOD RESPONSE AND RECOVERY:
CASE STUDY OF THULAMELA LOCAL MUNICIPALITY**

A Mini Dissertation

by

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2. DEDICATION

To my best friends (wife, Boitumelo, and children, Ndivhuwo, Botshelo and Mpho).

To my study supervisor, Professor Dewald van Niekerk.

To Mr T Lalumbe, my mentor.

To all who dedicate their efforts and time in reducing disaster risks.

To those who died during the 1999/2000 floods in the Thulamela Local Municipality.

3. **DECLARATION**

I, Mudinda Chester Dau, hereby present for consideration by the Disaster Risk Management Training and Education Centre for Africa (DIMTEC), Faculty of Natural and Agricultural Science at the University of the Free State (UFS), my dissertation in partial fulfillment of the requirements for the Masters in Disaster Management.

I declare that this dissertation is the product of my own efforts. No other person has published a similar study from which I copied. At no stage should this work be published without my consent and that of DIMTEC.

Views, opinions and proposals expressed herein should be attributed to the author and not to DIMTEC.

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Mudinda Chester Dau

24 April 2010

EXECUTIVE SUMMARY

This study investigates the response and recovery measures implemented by the Thulamela Local Municipality, Limpopo, during the 1999/2000 floods in the area. Floods pose a disaster risk to inhabitants of Thulamela.

The researcher adopted a qualitative research method to investigate the municipality's response and recovery measures and assessed its effectiveness, weaknesses and failures. The study took the form of interviews and observations wherein respondents were questioned on the capacity of the municipality's response and recovery. All respondents agreed that the municipality was not capacitated in various ways to respond effectively to the flood disaster.

The researcher analysed the causal factors of the disaster with reference to the Pressure And Release (PAR) model. This was important to identify the community's vulnerabilities and capacities to cope with the floods with the aim of evaluating the response and recovery of the Thulamela Local Municipality.

The analysis revealed that the prevailing vulnerabilities during the floods were rooted in various factors, ranging from poverty, lack of infrastructure, lack of knowledge and other factors as depicted by the stages of the PAR model. These stages are the root causes, dynamic pressures and unsafe conditions. However, these causal factors resulted from individual, municipal and national government's mistakes.

The study led to recommendations that the municipality can consider implementing measures with a view to mitigating the effects of future floods. The recommendations propose an integrated approach, which focuses on disaster risk reduction.

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CHAPTER 1

GENERAL ORIENTATION

INTRODUCTION

Unforeseen crisis situations such as water, smoke and fire require emergency preparedness planning for any response and recovery operation. Experience has demonstrated that an organised and proactive response to emergency situations is necessary for the protection of the community and to prevent total destruction and loss of property in the area. Any organisation that takes its responsibilities seriously will have analysed the risks it faces and prepare a disaster management plan.

The researcher, who grew up in Thulamela, conducted the study out of concern for the community and the devastating impact the floods have on their lives, yet officialdom seems to not do anything to develop counter-measures to reduce the risk of repeated floods. This research was conducted to evaluate how the local municipality intervened during and after the floods. It was the objective of the researcher to identify and highlight the municipality's activities during and after the floods, which may have caused or increased the floods or minimised their impact.

One of the main reasons for conducting this study is that the Thulamela Municipality does not have the capacity in terms of personnel efficiency, knowledge of disaster management, budget, policy implementation, liaison and political intervention. With regard to human resources, the municipality does not have the staff with the relevant skills to deal with floods, or put differently, the municipality does not know what to do pre-, during and post-flood situation.

The consequences of floods, as with other natural disasters, are very traumatic and numerous respondents pleaded with the researcher to advise the local municipality on ways to reduce the pain and suffering of the village's inhabitants when disaster strikes.

1.2 BACKGROUND OF THE AREA

The Thulamela Local Municipality is one of the municipalities under the jurisdiction of the Vhembe District Municipality. It is one of the eastern-most local municipalities in the district. The Kruger National Park forms the boundary in the east, while sharing the borders with Mutale Municipality in the north east and Makhado Municipality in the south and south west. The municipality covers an area of 754,727 square kilometres.

The Thulamela Municipality was established in 2000, in terms of the Local Government Municipality Structures Act (Act 177 of 1998). The name Thulamela is a Karanga word meaning “The Place of Giving Birth”. The ancient Thulamela settlement, which has now been declared a national heritage site, is situated north of the Kruger National Park, at the Punda Maria gate.

The present-day Thulamela is a municipal area covering vast tracts of land, mainly tribal, and Thoho-ya-Ndou is its political, administrative and commercial centre. In terms of population, it is the largest of four municipalities under Vhembe District Municipality. (Thulamela Municipality IDP Review, 2006/07: 6). The Thulamela Local Municipality consists of rural communities that are vulnerable to several hazards, such as floods, fires, thunderstorms, drought, diseases and many more natural hazards. Solutions to the many social, environmental and economic problems in Thulamela have been investigated with the aim to reduce the vulnerability to disasters that may occur as a result of such hazards. This research will focus on floods.

Thulamela is inhabited by Tshivenda-speaking and Shangaan (Tsonga) speakers. (See figure 1 for the map of Thulamela). Thulamela accommodates a large number of people who depend on subsistence farming and the developed economy. The majority of the population is rural and practice farming and cattle grazing. This is supported by the fact that the staple food in the area is maize, grown by the villagers. Numerous foreigners, Mozambicans and Zimbabweans, live and work in this municipality. Limpopo borders Zimbabwe and Mozambique and these are foreigners who fled from their countries due to

various reasons. There are also a few Asians (Indians and Pakistanis) who run shops in the area.

Thulamela Municipality is characterised by poverty, lack of infrastructure, limited access to land as well as poor means of communication. The above-mentioned factors make the municipality and its inhabitants vulnerable to a range of hazards as they do not have mitigation measures in place, due to either lack of infrastructure and/or communications. Poverty leads communities to depend on subsistence farming, thus leading them to settle in disaster-prone areas. Villagers stay along the river banks, at the foot of the mountains, at places that easily become waterlogged and on floodplains because they want to be close to the land they till.

The municipality is faced with the challenge of reducing the impact of disasters. Mitigation is the most important foundation for creating a disaster-resistant community. Mitigation can also be the first step to creating more sustainable communities. This can only be achieved by involving communities in the planning and development process. Planning and development is the main vehicle through which the Thulamela Municipality can achieve these objectives. The municipality is facing different kinds of hazards which need strategic planning to manage those hazards (Thulamela municipality IDP Review Disaster management plan 2006/07: 2).

some areas are flat land and some mountainous. Although villagers are aware of this, the majority of people are unaware of the implications, especially with regard to disasters. When Tshakhuma Village was flooded in the year 2000, six families were buried under soil washed down from the mountains. These families had settled at the foot of the mountain because they wanted to be close to the land they cultivated. (Interview with Mr T Lalumbe, Vhembe District Manager: Disaster Management). The researcher observed that Thulamela Local Municipality has the greatest risk in the form of floods due to rain catchments, lack of information, identification of settlement and geographical set up of the area. Another problem is that the roads have not been maintained.

1.4 RESEARCH OBJECTIVES

The objective of this study is to make recommendations to the Thulamela Local Municipality on the measures that have to be taken before and after floods. Specific objectives include to:

- Investigate the extent of the damage that took place in the year 2000;
- Develop risk mitigation, emergency response and disaster preparedness plans, and
- Recommend short- and long-term management goals to prevent floods.

1.5 RESEARCH QUESTIONS

A range of questions was posed in the pursuit of these objectives. Because the study involved interviewing the then municipal manager of Thulamela Local Municipality, traditional leaders, the direct and indirect victims of the year 2000 floods, research questions will be written separately. See Annexure 1 and 2.

1.6 RESEARCH METHODOLOGY

1.6.1 Research Design

Welman, Kruger & Mitchell (2007: 2) define methodology as that which considers and explains the logic behind research methods and techniques. A qualitative method was adopted in this study because of the nature of the topic. The researcher wanted to explore the opinions of the municipal manager and officials, municipal engineers, traditional leaders and the residents about their experience of the floods in the area in 2000.

1.6.2 Sampling Technique

Once the methodology was decided on, a purposive type of non-probability sampling was used to interview respondents because the researcher was interested in interviewing only the respondents who met the criteria of inclusion, namely direct and indirect victims of floods; the person who had been the manager of the area in 2000 and traditional leaders who were in that position during the time. In purposive sampling a particular case is chosen because it illustrates some feature or process that is of his own interest for a particular study, though this does not simply imply any case we happen to choose (De Vos, Strydom, Fouche & Delpont, 2005: 328).

1.6.3 Data Gathering Technique

After sampling was done, data was collected in the form of unstructured focus group interviews. Unstructured focus groups interviews were conducted whereby respondents were in groups of between six and 12 and they were asked questions and allowed to discuss their responses among themselves. The discussion was recorded on tape. The purpose of using the said technique, rather than a one-on-one technique, was that the incident happened a decade ago so it would be easier for them to remind each other in groups and bring forth relevant facts. The researcher also observed the interaction and

took notes during the process. Struwig & Stead (2004: 99) argue that focus groups are carefully-planned discussions designed to obtain perceptions on a defined area of interest in a permissive non-threatening environment. Focus group interviews, according to Welman & Kruger (2001: 63), in purposive sampling, researchers rely on their experience, ingenuity, and/or previous research findings to deliberately obtain units of analysis in such a manner that the sample they obtain may be representative of the relevant population. Rubin and Rubin (1995: 31) argue that their model of qualitative interviewing emphasises the relativism of culture, the active participation of the interviewer and the importance of giving the interviewee a voice.

1.6.4 Data Analysis

The data was analysed using the approach of Rubin and Rubin (1995: 226-227). These authors describe it as follows: “Data analysis begins while the interviews are still underway. This preliminary analysis tells you how to redesign your questions to focus on central themes as you continue interviewing. After the interviewing is complete, you begin a more detailed and fine grained analysis of what your conversational partners told you.

“In this formal analysis, you discover additional themes and concepts and build towards an overall explanation. To begin the final data analysis, put into one category all the material from all your interviews that speak to one theme or concept. Compare material within the categories to look for variations and nuances in meanings. Compare across the categories to discover connections between themes. The goal is to integrate the themes and concepts into a theory that offers an accurate, detailed, yet subtle interpretation of your research arena. The analysis is complete when you feel that you can share with others what your interpretation means for policymaking, for theory, and for understanding the social and political world.”

1.7 LIMITATION/DELIMITATION

This study was conducted in the Thulamela Municipality of Limpopo. The disaster manager, traditional leaders and direct and indirect victims of floods in the year 2000 were interviewed. The findings of this study can be applied only within the context of the Thulamela municipal area and thus will not be generalised to the other provinces because the nature of qualitative research is that they cannot be generalised.

9. TIMESHEET

Project Activities, Milestones and Cost Estimation

ACTIVITIES		Duration			Milestones	Total Cost
		Start Date	Finish date	Total Months		
1	Project Plan And Segmentation	Month	Month 2	2 Months	Research Plan	
1.1	Plan and Project Segmentation					
1.2	Literature Review					
2	Research Design	Month 2	Month 3	2 Months		
2.1	Field Study					
2.2.	Field Observation Plan (Recording System)					
2.3.	Interview Instrument Design					
2.4.3	Focus Group Design					
3.1	Instrument Design					
3.2.	Pilot Testing					
4	FIELDWORK (QUALITATIVE METHOD)	Month	Month 6	3 Months		
4.1	Observation					
4.2	Interviews					
4.34	Focus Groups					
5						
5.1	Data Collection					
5.2	Data Processing					

5.3	Data Analysis					
5.4	Data Interpretation					
6.	Report Write-Up	Month 9	Month 12	4 Months		
6.1	Draft 1					
6.2	Draft 2					
7						
7.1	Project End					

Gantt Chart: Major Project Activities

MAJOR RESEARCH PROJECT ACTIVITIES		MONTHS											
		01	02	03	04	05	06	07	08	09	10	11	12
01	Project Plan and Segmentation												
02	Research Design												
03	Fieldwork (Qualitative Methods)												
04	Data Analysis												
05	Report Write Up												
06	Report Submission												

10. RESOURCE SHEET

Resource Category	Resource Type	Availability and access	Source	Ethical Issues	Stage in research	Costs
Human Resources	None	None	None	None	None	None
Funding	Yes	To be identified	NGOs	To consider	All stages	R24.400
Computing	Yes	Have own	Have own	None	All stages	R4 500
Infrastructure	None	None	None	None	None	None
Equipment	Video camera	Own	Own	To consider	Data collection	R6 000

Adapted from Mouton, 2001: 234.

CHAPTER 2

PRESSURE AND RELEASE MODEL: A THEORETICAL ORIENTATION

2.1 INTRODUCTION

It is on the basis of a theoretical framework of the Pressure And Release model that the researcher has placed the theme of the study as a reference to clarify the context within which it originated. Basically, this chapter presents the conceptual framework relevant to this case study of the Thulamela Local Municipality with regard to its response and recovery to the 2000 floods.

To form part of the conceptual framework relevant for the case study, the chapter focuses on the Pressure And Release model (PAR), which is at the core of disaster management literature. The Pressure and Release model, together with the Progression of Safety model, were used to determine the flood vulnerability conditions against the response and recovery and the resilience level of the inhabitants of the Thulamela Local Municipality.

The researcher then focused on the response and recovery, shedding light on how the Thulamela Local Municipality responded to the 2000 floods and implemented a recovery strategy. The analysis of the response and recovery led to the identification of the challenges faced by the municipality and recommendations on what need to be done in future.

2.2.1 BACKGROUND TO THE 1999/2000 FLOODS IN THULAMELA LOCAL MUNICIPALITY

The rain fell non-stop, day and night, for 110 days. It started on 23 December 1999 and rained for 24 hours. On 24 December it stopped until 14:45. It then resumed raining till 14 January 2000. The downpour stopped on 27 March 2000.

On 26 December 1999, local municipal resources, including provincial, could not cope with the effects of the downpour. The district mayor was advised to request the Limpopo Premier to ask national government to assist. The Premier asked for Thulamela to be declared a disaster area, which was immediately done. The national government's assistance came on 3 January 2000 and it was found that it also could not cope. International assistance was then requested. (Lalumbe T).

The failure of all resources mobilised prompted the assistance of US Aid which came in handy. Churches helped to a certain extent. The Red Cross and the Muslim society in Thoho-ya-Ndou also rendered assistance. The Asian community in Thoho-ya-Ndou assisted in distributing food parcels.

2.2.2 RECORDED LOSSES

Among other things, the following events were recorded. Seventy two deaths were recorded and 112 big bridges and 209 small bridges were swept away. Ninety seven villages were cut off from the rest of the community (Lalumbe T). In Dzingahe and Maelula petrol stations, a total of 13 and 23 cars were swept away respectively.

The impact of the floods was more severe because the unplanned settlement of people, such as along river banks and at the foot of mountains, placed them in harms way. People also lacked information on what to do. They expected the government to do everything for them, which was not possible.

Following the background to the flood and its impact, it is now necessary to examine how the Thulamela Local Municipality's response and effectiveness of its recovery strategy.

2.3 The Basis of the Pressure And Release Model

The Pressure and Release model (PAR) is introduced as a simple tool for showing how disasters occur when natural hazards affect vulnerable people. Their vulnerability is rooted in a social process and underlying causes which may ultimately be quite remote from the disaster event itself (Wisner et al. 2004: 50). According to Wisner et al (2004: 50), the basis for the PAR idea is that a disaster is the intersection of two opposing forces: those processes generating vulnerability on one side, and the natural hazard event (or sometimes a slowly unfolding natural process) on the other.

Disasters are a result of the intersection of vulnerability and hazards. There cannot be a disaster if there are hazards but vulnerability is (theoretically) nil, or if there is a vulnerable population but no hazardous event (Wisner et al. 2004: 49). It is important to understand that disasters do not only occur as a result of natural events like floods, hurricanes and volcanoes, but that these also occur as a result of socio-economic and political situations. This is because socio-economic and political factors determine the extent to which different people can adopt measures to mitigate their exposure to risk.

For example, the lives of people of Thulamela vary as reflected by the statistics of those employed and not employed. It is a fact that employment shapes the lives of individuals and groups as it also shapes the way of living due to financial strength or weakness.

According to Anderskov (2004 s.l) and Wisner et al. (2004:50), the cause of disasters is more on the basis of a social realm than that of a natural realm. A comparative stance is taken as Wisner et al (2004:50) propose that it is possible to view an event as having a spectrum of causative factors.

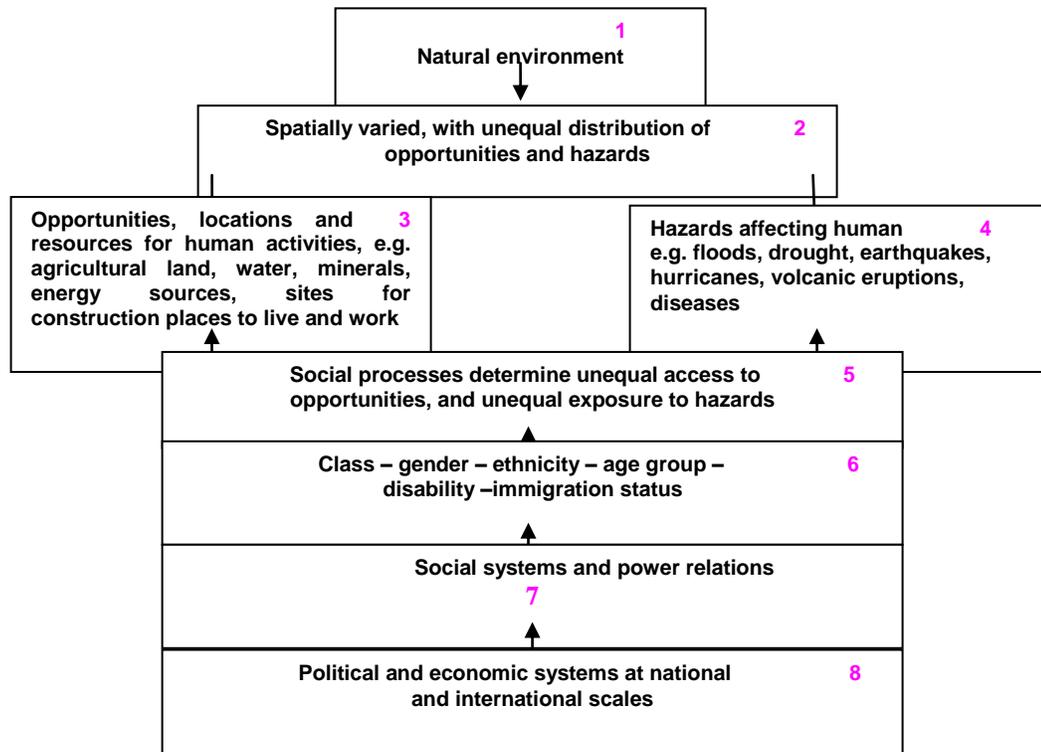


Figure 2.1
The Social Causation of Disasters (Wisner et al. 2004: 8)

Figure 2.1 clearly shows why this is a partial and improper way of understanding disasters associated with natural hazards. From the above diagram, the classification or distribution of factors affecting humankind in relation to natural disasters has been shown in items 2, 3 and 4. Items 5-8 show the social causation factors wherein item 5 shows how social processes plays a prominent role in determining who is mostly at risk from hazards. It indicates how people are at risk at home and places of work, all due to the nature of buildings they occupy while at work as well as their

dwellings where they reside. It also shows the level of hazard protection provided by such buildings as determined by their structural quality. Item 6 talks about gender, ethnicity, age group, and disability and immigration status.

The above-mentioned can influence disasters in different ways. For example, different ethnic groups have different cultural ways of living and activities that may not be nature or environment friendly. Different practices can therefore influence or increase the impact of a disaster and as such regarded as the causal factor.

Item 7 reflects how social systems and power relations can be a disaster risk. Of importance is that different groups of people will have different levels of vulnerability, and such vulnerability is determined by power relations and social systems rather than natural effects. Item 8 indicates how political and economic systems at both national and international scales can be causal factors to the disaster.

Political and economic systems of the world, country or region determine the differences in people in relation to income, health, safety, location and employment (Wisner et al. 2004: 7).

In the case of Guatemala, Wisner et al. (2004: 9), argue that the cause of the earthquake was not only because of poor housing material, living in dangerous places and lack of access to relief aids, but political ideologies that had been engraved into the local population over centuries of historic processes that led to a significant deeply-rooted vulnerability that made the impact of the earthquake so horrific (Anderskov. 2004: sl).

An example of a naturally-caused disaster on the causation spectrum is the tsunami that ravaged South East Asia in 2004. During the tsunami, rich and

poor were victims of the disaster. Numerous holiday-makers and sub-economic inhabitants were hit by the tsunami on 26 December 2004. This tsunami claimed thousands of lives (Wikipedia; Tsunami, 2008: sl).

2.4 Components of the Pressure And Release Model

As it has been mentioned at the beginning, and for the purpose of this study, the Pressure and Release model was used to determine the natural and social vulnerability of the population of Thulamela Local Municipality with regard to the flood of 2000 and then the response and recovery measures were evaluated. Recommendations based on the analysis will be presented. The components of the Pressure And Release model are explained below.

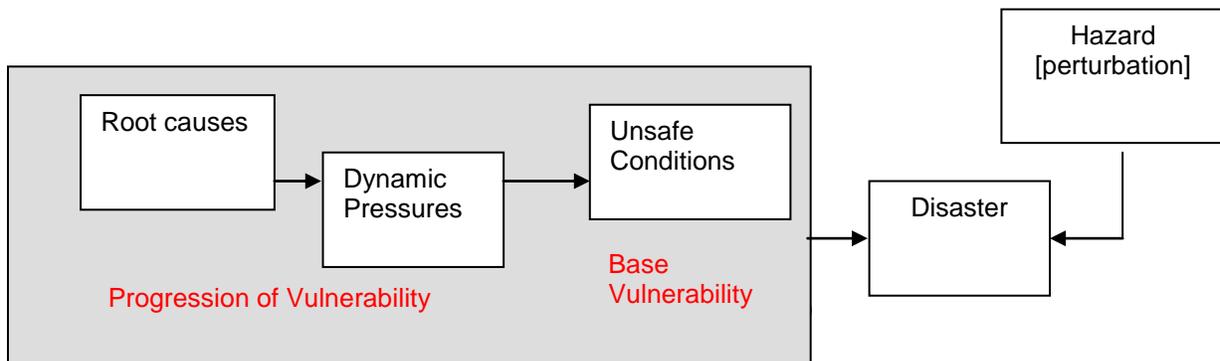


Figure 2.2

Figure 2.2 shows a clear framework of how the process of the Pressure And Release model unfolds. The progression of this study will give the reader an understanding of how the Pressure and Release model process determines the vulnerable conditions of the inhabitants of the Thulamela Local Municipality.

2.5.1 Root Causes

The process of releasing pressure can reduce the impact of a disaster. The reduction of impact or release of pressure is achieved by addressing the root causes that were identified in the PAR model. By addressing the root causes which will lead into an automatic release of pressure, will enable one to achieve safe conditions as opposed to the unsafe conditions that emanates from the PAR model as a result of root causes not being attended, thus developing into dynamic pressure which brings about unsafe conditions and make a disaster inevitable. By reducing the root causes, one can also manage to reduce the impact of the hazard.

It would be worthwhile to indicate here that the most vulnerable people at Thulamela Local Municipality were the economically disadvantaged. However, the temporally distant factor and the beliefs and culture also played a role in their vulnerability and root causes of the disaster.

The temporally distant factor, according to Chigunta (2002: 1), refers to the fall in welfare as a factor that can be exacerbated in past history. For example, the fall in welfare in Africa is due to the fact that past wars and civil strife in countries such as Sudan, Somalia, Rwanda and environmental disasters like drought in Ethiopia and Zimbabwe have led to a spiral effect from which there is no escape.

It can therefore be said that the most important root causes can be determined by factors such as economic, demographic and political processes that are viewed as primary contributors to vulnerability rising in a community.

With regard to the root causes in respect of economic and political ideologies, a perfect example can be that of the Chernobyl gas explosion in Russia. The Chernobyl disaster, also known as one of the worst nuclear disasters of the 20th century, occurred in the former USSR, currently known

as Russia, on 26 April 1986. With reference to the Pressure And Release model, the root causes of the Chernobyl disaster can be attributed to the political and economic ideologies embraced by the former Soviet government (Chernobyl: Big Nuclear Tragedy s.l.).

Lack of information and participation led to heightened impacts of radiation and radio-active debris which continued to be released for eight days after the disaster (Chernobyl: Big Nuclear Tragedy s.s.:4). This was all because of a political ideology that needed to be achieved at all costs.

2.5.2 Dynamic Pressures

“Dynamic pressures are processes and activities that translate the effects of root causes both temporally and spatially into unsafe conditions” (Wisner et al.2004:281). The diagram of the PAR model reflects the dynamic pressures under macro-forces. They are indeed the second step towards the progression of vulnerabilities that will ultimately lead to unsafe conditions. It is from the unsafe conditions that the disaster emanates.

Note should be taken that it does not have to be the culmination of all dynamic pressures as reflected on the PAR model that will ultimately lead to the disaster. Two or three activities of dynamic pressures can lead to a severe unsafe condition that ultimately leads to a disaster.

For example, deforestation can be so severe as a dynamic pressure that it makes the physical environment to be dangerous for people, thus making it inevitable for disaster to occur, should there be floods. Due to ways in which dynamic pressures operate to channel root causes into unsafe conditions, it then becomes important to indicate how the pressures play themselves out in a strong spatial and temporal sense.

The above-mentioned process can be shown by giving an example of endemic disease and malnutrition. Note must be taken that the basic

nutritional and health status of people are strongly linked to their capability to survive disruptions to their livelihood, whether disruptions are in the form of disease or flooding, earthquake or drought. The capability to survive such disruptions becomes an important measure of their resilience in the face of external shock. The fact is that people who are undernourished and sick succumb quickly in times of famine than those who were well-nourished and healthy. This proves that there is a relationship between nutrition and disease, which is often evident after a hazard impact (especially when people are forced to seek refuge and come into close contact with one another).

There are many ways in which dynamic pressures channel root causes into unsafe conditions and to specific time-space convergence with a natural hazard. A good example of this can be shown in the outcome of floods in Bangladesh and the landslide and earthquake in parts of north Pakistan.

The capital of Bangladesh, Dhaka, is situated in the flood plain of the Buriganga River. To the north-west is a large zone of low-lying, flood-prone land in the vicinity of Nagor Konda. In this area, squatter settlements grew rapidly in the 1980s, as they did in many areas around the capital (Shaker, 1987: 48). This area had been densely settled, particularly since 1970, mostly by poor landless families from the south and east of the country (Rashid, 1977: 104). According to (A Ali, 1987: 88), the former landless people who inhabit this depression are there because of its proximity to Dhaka's vegetable market. Already the chain of explanation of their vulnerability can be seen at work: rural people who are landless have few alternatives and many seek the economic opportunity provided by the urban vegetable market. But this means living in unsafe locations.

As newcomers, and extremely poor, the squatters in this low-lying areas had no access to the structures of power that control marketing.

They also had insecure title to land in the economic depression, and therefore no access to credit to allow them to increase their productivity and compete with better-established markets. The mention of markets and investments as well as debt, are reflected as dynamic pressures as portrayed in the PAR model.

The landslide and earthquake impact in north Pakistan evolves from the collapse of houses in Karakoram. This case comes from an interdisciplinary study of housing safety in the Karakoram area of northern Pakistan (Davis 1984b; D Souza 1984). The research team carefully examined local dwellings and settlement patterns within the context of a rural economy. They found that the communities were at risk from a range of hazards. In this region, traditional dwellings were built with masonry walls. A series of timber bands were set at regular intervals in the height of each wall to hold the stones together and the complex timber roofs were constructed with a very heavy covering of earth to provide insulation. The siting of most buildings was equally dangerous: to avoid reducing their meagre land-holdings (all available flatland was used for agriculture), many houses were built on exceedingly steep slopes, putting them at risk from landslides.

The result was an extremely hazardous situation, with a number of factors together producing these unsafe conditions, including reduced concern about building safety and the diversion of money intended for dwellings to fulfil every-day needs (Wisner et al. 2004: 58). There was also lack of knowledge in construction techniques, shortage of skills and change in the availability of building materials that contributed to house collapse.

In turn, some of these factors (especially the lack of both skills and materials) could be directly attributed to 'dynamic pressures'. First, the shortage of timber for building and other purposes in the region had arisen because of deforestation, mostly due to illegal felling and corrupt practice (Blaikie & Sadeque 2000:118) Second, there was a serious shortage of

skilled carpenters and masons. Therefore, buildings were constructed and maintained by farmers and labourers who freely admitted that they knew very little about the task. In trying to piece together the reasons for the absence of knowledgeable builders, another dynamic pressure emerged (Blaikie & Sadeque, 2000:104).

2.5.3 Unsafe conditions

An unsafe condition, which is the specific form in which the vulnerability of a group of population is expressed, is the third link in the progression of vulnerability as illustrated in the PAR model. Examples of these would include people having to live in hazardous locations, being unable to afford safe buildings, lacking effective protection by the State, having to engage in dangerous work , or having minimal food or entitlements that are prone to rapid and severe disruption.

In everyday life, people live and work in unsafe conditions. In this sense, unsafe conditions can refer to their dwellings at home or buildings they occupy while at work. There are so many factors that can contribute to the unsafe conditions in these two areas of occupation. It can be due to the structural conditions or emergency measures.

It is also important to understand that unsafe conditions, as the third link to the progression of vulnerability, emerge as a result of root causes that develop into the dynamic pressures which ultimately bring about the unsafe conditions.

Unsafe conditions can also be due to unprotected buildings and infrastructure (physical environment), low income levels (local economy), special groups at risk (social relations) or lack of disaster preparedness (public actions and institutions) (Wisner et al. 2004: 51).

From the example of the Chernobyl disaster, unsafe conditions can be shown as to how they manifested. People were living in close proximity to the Chernobyl

plant. Approximately 49 000 people lived in the radius of 3km of the plant and 135 000 people lived in the radius of 30 km.

A high degree of human vulnerability existed due to the high number of people living very close to the plant. Another unsafe condition was created by the location of the nuclear plant. Chernobyl is situated at the juncture of several river systems and an artificial lake. The Dnipro River, which is adjacent to Chernobyl, supplies 72% of the Ukraine's water supply (Chernobyl: Big Nuclear Tragedy s.a.:2).

2.6 Use of the PAR Model

Most non-governmental organisations use the PAR model as the basis for community based self study of vulnerability and capability. In the application of the PAR model, the community must define its own vulnerabilities and capabilities, not outsiders. They also must decide what risks are acceptable to them and which not (Morrow 1999: 11).

According to (Wisner 1988a; Anderson and Woodrow 1998: 288), the employment of the concept of vulnerability as a tool in and by the community also involves a thorough analysis with and by the residents of their own resources and capacities. It is in the hands of local people that the logic of their situation, the phenomenology of their living with risks, forces them to be aware of and to discuss their strengths and capacities, as well as their weaknesses and needs.

2.7 The Progression of Safety

The Progression of Safety is actually the reverse of the Pressure And Release model (PAR). The objective of the progression of safety is to reduce risks by addressing the root causes, dynamic pressures and unsafe conditions. This simply means that the PAR model can be reversed to provide security instead of risk.

The output of the PAR model is the release which leads to the disaster. This opposition of the PAR model also means that the socio-economic and political mechanisms (dynamic pressures) that elevate root causes into unsafe conditions for specific group of people can be prevented, changed or reversed. The following diagram of the progression of safety, illustrates the 'release' process as a reversal of disaster pressure.

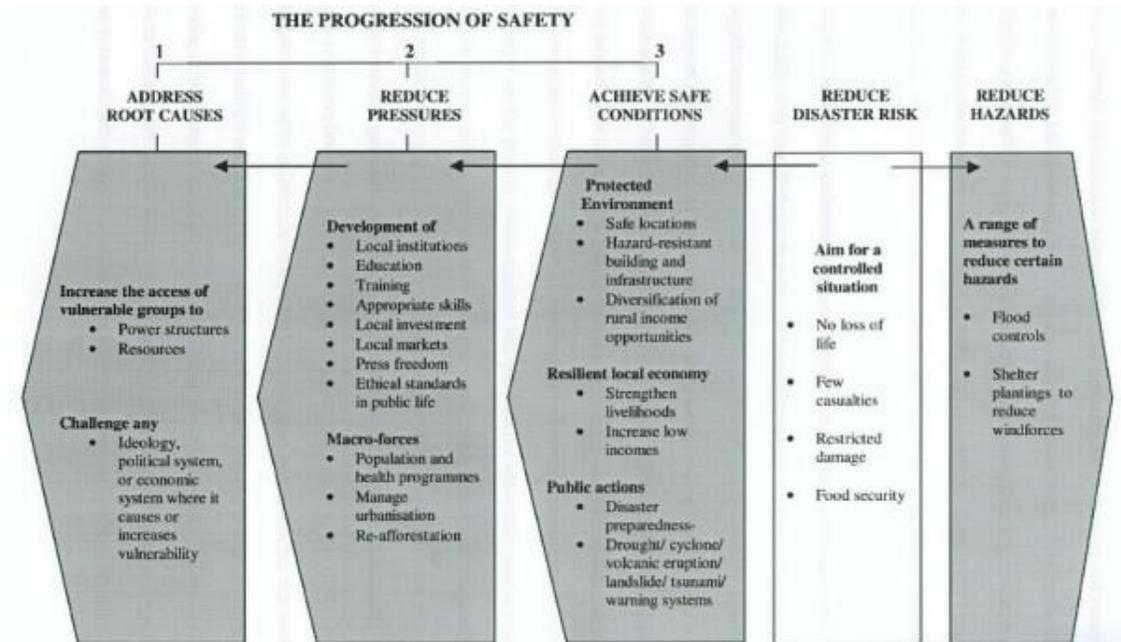


Figure 2.4 The Progression of Safety: The release of 'pressures' to disasters (Wisner et al. 2004: 344).

It is proper to mention the good deeds of some African farmers in their attempt to prevent famine. Some farmers embarked on village-based and regional grain storage and that provided food reserves. These food reserves rid those farmers of the burden of indebtedness and the cycle of the 'hungry season' that could have escalated into famine. Famine is a disaster and in this case, has been prevented, simply through grain storage. This shows that the process of disaster has been addressed as it is done in the progression of safety model, which is about addressing root causes and unsafe conditions.

Governance is one of the factors that play a central role in reversing vulnerabilities or disasters. According to Vasta (2002b), governance goes beyond the entity of government. It refers to norms, traditions and processes that impinge on the exercise of formal power and authority. It encompasses government, the private sector and civil society and a complex intersection among these segments. The government's policies, resources and capacities are shaped by the participation and stake holding of civil society and the private sector in the political process. The distribution of power and authority is actually decided through reconciliation of competing priorities of different segments.

The above statement simply means that good governance is a good omen to dynamic pressures and root causes of vulnerabilities. Note should be taken that good governance embraces ideologies, power relations and resource flows that determine the relationship between the state and civil society. Good governance has aspects that are cultural, political, social and economic. The above mentioned aspects can be the root causes as depicted in the PAR model, hence the reversal of the vulnerabilities in the progression of safety model. The fact is that root causes, dynamic pressures and unsafe conditions can be reversed through a range of activities. It therefore stands to be seen whether Thulamela Local Municipality had attempted to reverse the root causes, dynamic pressures and unsafe conditions of the people of Thulamela before the 2000 floods.

If attempts were there through various mitigation measures like awareness programmes and any other means or activities, then there is a need to find out the problems or difficulties the Thulamela Local Municipality encountered in its endeavour to reverse the unsafe conditions, dynamic pressures and root causes. This therefore leads into the evaluation of the municipality's response and recovery measures and implementation of such measures and determines how effective it was. This is what this study is all about.

2.8. Criticism of the PAR model

Due to the chain of explanation it forms, the PAR model is simply an analytical tool, subject to a number of inadequacies. One weakness of the model is that the development of vulnerability is not properly integrated with the way in which hazards affect people. It is a static model (Wisner et al. 2004: 91). It also exaggerates the separation of the hazard from social processes to emphasise the social causation of disasters. In reality, nature forms a part of the social framework of society, as is most evident in the use of natural resources for economic activity (Wisner et al. 2004: 92). The other weakness of the PAR model as criticised by Middleton and O'keefe (Wisner et al. 2004: 92) is that it does not provide a detailed theoretically informed analysis of the exact interactions of the specific environment and society at the pressure point, for an example, where and when the disaster begins to unfold. Middleton and O'keefe argue that (Wisner et al. 2004: 92) have a distaste for large political issues.

Middleton and O'keefe again claim that the combination of the PAR and the Progression of Safety model is capable of producing no more than the following tautology: "People are vulnerable because they are poor and lack resources, and because they are poor and lack resources, they are vulnerable" (Wisner et al. 2004: 32).

According to (Hassen 2008: 44), the framework of the PAR model is primarily to explain vulnerability to disaster to identify strategies for disaster risk reduction. It directs its attention to unsafe conditions leading to the vulnerability of a society and emphasises socially differentiated vulnerability.

Regardless of the criticism, the PAR model can be used as a combination or separately, with the analysis of vulnerability in a society, to organise the research on vulnerability to disasters.

2.9 Conclusion

The most important point to note is that the PAR model and the objective of this chapter is to indicate that disasters are more of a social realm than natural one. This is why there have been talks of a spectrum of causation. It must be taken into consideration that disasters can be placed either under natural causes or social causes, the two different causes being different spectrums.

Chapter three of this study will focus on the PAR model to analyse the case study of the Thulamela Local Municipality.

CHAPTER 3

EMPIRICAL RESEARCH

3.1 INTRODUCTION

“Empirical research is research that derives its data by means of direct observation or experiment, such research is used to answer a question or test a hypothesis. The results are based upon actual evidence as opposed to theory or conjecture; as such they can be replicated in follow up studies. The use of empirical evidence negates the effect of personal (i.e., subjective) experience.” (http://en.wikipedia.org/wiki/Empirical_research).

The researcher found it important to use the empirical research method to investigate the Thulamela Municipality’s response and recovery to the 2000 floods. To achieve the desired results of this case study, which is to make recommendations to the Thulamela Local Municipality on the measures that need to be implemented before and after the floods, the empirical research method becomes important in the sense that it integrates professional knowledge with empirical data to inform instructional development decisions.

It also establishes a relationship between intervention and behavioral response, which is what is needed in the Thulamela Local Municipality, rather than responding to an event that had already happened. It is also important to realise that empirical research will enable the Thulamela Local Municipality’s disaster management practitioners to understand and respond to dynamics of situations (context). It will also enable the disaster practitioners to be able to build on what is already known to work (mitigation measures).

This chapter provides a brief description of the way of life and livelihood system of the inhabitants of Thulamela Local Municipality. The value that the Thulamela

community adds to the national interest will also be briefly described to show the importance of this community in the national economic contribution. The above will be discussed with focus on the causes, impact, response and recovery to the 2000 floods in the Thulamela Local Municipality and its aftermath.

This chapter will also provide a description of the traditional methods being used to mitigate and or minimise losses due to various hazards, specifically the floods. The researcher finds it important to look at these methods to understand the need to support the sustainability of these livelihoods. This understanding is necessary to lay the foundation for the identification of proper actions and policies that build on existing capacities and knowledge.

3.2 METHODOLOGY

According to Welman, Kruger & Mitchell (2007: 2) methodology is that which considers and explains the logic behind research methods and techniques. This study of Thulamela Local Municipality used qualitative methodology. The reason for using the qualitative research method in this study was to provide insights into the setting of a disaster problem and to generate ideas from those affected by the disaster to how the municipality should have responded and what needs to be put in place. With regard to Thulamela Local Municipality, the qualitative method of research was also used to reveal the mistakes and shortcomings of the municipality and communities as perceived by the affected and other role-players.

It must be understood that it is the nature of this study that actually determined this qualitative methodology. Through this methodology, the researcher would like to explore the opinion of the municipal manager, traditional leaders and the communities about their experience of floods in the area in 2000.

Most previous floods (response and recovery) research studies conducted were qualitative in nature. In Thulamela Local Municipality, several qualitative case

studies have also been conducted. These are qualitative studies based on the experiences of the people affected by the floods and role players in response and recovery. Examples of such studies include case studies on how the community is affected and what access they have to the facilities and utilisation of such facilities.

In the Thulamela Local Municipality, the municipal manager, Vhembe Regional Disaster Manager, Municipality's Programme Manager, municipal employees, traditional leaders and the community members affected were interviewed and the findings were mainly associated with poverty, lack of resources, knowledge, infrastructure and cultural beliefs. These findings will be discussed in detail later in the chapter.

3.2.1 The Nature of the Research

The Thulamela case study or research was of a qualitative nature and was done through interviews and utilising questionnaires. Note should be taken that the researcher did not use the quantitative method simply because he did not intend to acquire only statistics of the impact of the disaster. It is therefore proper to highlight some differences between qualitative and quantitative methods of research. Such differences will be shown in the table below.

Table 1: Qualitative versus Quantitative Research (Neill J. 2007).

Qualitative	Quantitative
The aim is a complete, detailed description.	The aim is to classify features, count them, and construct statistical models in an attempt to explain what is observed.
Researcher may only know roughly in advance what he/she is looking for.	Researcher knows clearly in advance what he/she is looking for.
Researcher is the data gathering instrument.	Researcher uses tools, such as questionnaires or equipment to collect numerical data.
Data is in the form of words, pictures or objects.	Data is in the form of numbers and statistics.
Qualitative data is more 'rich', time consuming, and less able to be generalised.	Quantitative data is more efficient, able to test hypotheses, but may miss contextual detail.
Researcher tends to become subjectively immersed in the subject matter.	Researcher tends to remain objectively separated from the subject matter.
Subjective - individuals interpretation of events is important e.g., uses participant observation, in-depth interviews etc.	Objective seeks precise measurement & analysis of target concepts, e.g., uses surveys, questionnaires etc.

Note must be taken of the differences in data collection methods between the qualitative and quantitative methods. Data collection methods associated with qualitative research, are either unstructured or semi-structured techniques such as individual in-depth interviews (Snap Surveys, 2009: 88), and the findings are generally non-conclusive and cannot be utilised to make generalisations about the entire population of interest. It is normally used to develop an initial understanding of the subject matter which can then later be used for further

decision making. It is also for this purpose that the qualitative method was used, with the aim of providing recommendations for future prevention strategies.

3.2.2 Sampling Methodology

Purposive type of non-probability sampling was used to select the respondents because the researcher was interested in interviewing only the respondents that met his criteria of inclusion, namely, direct and indirect victims of floods, managers who were managers of the area in the year 2000 and traditional leaders who were in those positions during the time. In purposive sampling, a particular case is chosen because it illustrates some feature or process that is of interest for a particular study, though this does not simply imply any case one happens to choose (De Vos, Strydom, Fouche & Delport, 2005: 328).

“The number of sampling units necessary to enable valid inferences to be made regarding the population is generally considered an appropriate number for the sample size” (Marshall, 1996: 168). This means that the larger the size of the sample, the smaller the probability of having a random sampling error. But, on the other hand, due to the fact that the sampling error is inversely related to the square root of the sample size, there is little to be gained from having a sample size that is too large (Marshall, 1996: 168). The ideal sample size is therefore very dependent on the factors being investigated and the aim of the study, as the case is with this study.

According to Marshall (1996: 168), samples for studies that are qualitative in nature tend to be quite small, and not truly randomised, since for a sample to be truly random all properties of the population under study need to be known.

In qualitative studies it is important to remember that some of the respondents being interviewed are more knowledgeable on the subject matter than others, and that these respondents are more likely to provide better insight and

understanding into the study. This means that choosing people at random to answer questions of a qualitative nature would be equivalent to randomly asking people on the street how to fix a broken car rather than asking a mechanic: asking the mechanic would have a more productive outcome (Marshall, 1996).

Studying small samples can be very useful in qualitative research, and this is often misunderstood. Many researchers believe that the ultimate goal of the research is to be able to generalise it, and this would ultimately mean a larger sample size is more efficient. However, an appropriate size for a sample in qualitative research is one that allows efficient and adequate answers for the main research questions. Both simple questions and very detailed studies might require only single digit sample sizes for adequate answers to be obtained, while for complex questions, large samples might be needed (Marshall, 1996: 169).

Due to this sampling method, the researcher conducted investigations through observations and interviewing respondents whilst taking notes in the process. The researcher obtained data in a permissive non-threatening environment while relying on victims experience to deliberately obtain units of analysis in such a manner that is representative of the relevant population.

The sampling method allowed the researcher to redesign the questions and to focus on central themes. The researcher discovered additional themes and concepts and built them towards an overall explanation. Application of this method led the researcher to begin the final data analysis, put into one category all the material from all interviews that speak to one theme or concept, compared material within the categories to look for variations and nuances in meanings, compare across the categories to discover connections between themes.

The researcher then integrated the themes and concepts into a theory that offered an accurate, detailed, yet subtle interpretation of the research arena.

The sample was selected for the purpose of identifying specific respondents that met his criteria of inclusion.

3.2.3 Objectives

The main objective of this study is to make recommendations to the Thulamela Local Municipality on the measures that needs to be implemented before and after the floods. The objectives were to:

- Protect the community from floods;
- Investigate the extent of the damage that took place in 2000;
- Develop a risk mitigation and disaster preparedness plan;
- Develop an emergency response plan and procedure;
- Recommend short- and long- term management goals to prevent floods;
- Study and recommend methods for funding implementation of Thulamela Local Municipality, and
- Develop guidelines for other municipal areas in South Africa.

Recommendations will be made based on the knowledge of experts, affected people and community leaders in the affected communities.

This study focused on a population that was affected by the floods rather than on the knowledge of the general public who were not affected.

Respondents were assured of confidentiality to protect them and avoid victimisation. In this way, no findings can be apportioned to any respondent.

3.2.4 ANALYSIS

Due to the research methodology being qualitative, the researcher decided to use the thematic analysis methodology (Botha, 2008) which befits the qualitative

nature of the research. This method of analysis enabled the researcher to be broad in analysis and reflect on the direct response of the respondents as well as identification of key words, leading into reflection on recommendations which will be covered in the next chapter. The researcher will then summarise each theme.

3.2.4.1 **Thematic Analysis**

A thematic analysis is done when all the data are available and the researcher is aware of issues evident in the data (Botha, 2008). Nevertheless, “thematic analysis is particularly idiosyncratic” and may focus on phrases that are often repeated, case studies or answers to research questions (Grbich, 2007: 32).

Ryan and Bernard (2000: 780) explain that themes are often abstract and vague constructs that researchers identify before, throughout and after data collection. A researcher’s own experiences with a phenomenon, as well as the literature often provide insight for appropriate themes. Yet, researchers usually derive the themes from the narrative (Ryan & Bernard, 2000: 224). In this regard Grbich (2007: 239) emphasises that it is important in a thematic analysis to derive themes from the data.

3.2.4.2 Themes

QUESTIONNAIRE RESPONSE THEMES

- **Municipality's capacity to respond**

"Lack of resources"

"Municipal resources were stretched and failed to control circumstances"

"No specialised personnel"

"Lack of knowledge by municipal officers"

"Poor budget"

"Municipality was understaffed"

- **Municipality's response**

"The JOC was operating from Muledani and all government departments were represented"

"Government supplied cars"

"No one had a plan on what to do"

"We responded well"

"Response was successful"

"SAPS and SANDF played a major role in response"

"Safari Club delivered food to very remote areas"

"People were evacuated to schools and churches"

"RDP houses were distributed"

"Temporary tents were issued to affected people"

- **Response and recovery plan**

"Municipality had no plan"

"Municipality only had the generic plan"

"No specific flood response plan"

"Vhembe District still to draft the Disaster Management Plan for Local Municipalities"

- **Preparedness**

"Municipality was not ready for the disaster"

"Technical staff conducted awareness programmes"

"Municipality had only one person, the Special Programmes Manager acting as the disaster practitioner"

"There was a contact plan which was active and intensive"

"Early warning systems were not in existent"

• **Communication**

"Poor communication"

"Technological communication was not good"

"Cell phones and landlines had no reception"

"Communities were cut off"

"Municipality had less than three radio communication"

"Only the Manager has the official cell phone and activates other stakeholders"

"Inaccessible roads"

"Communication was done through ward councillors and ward committees and was not effective"

"Ward Councillors liaise with Special Programmes Manager"

• **Training of Disaster Management officials**

"Disaster Management did not submit any training needs to skill development facilitator"

"Non-submission of training needs for employees"

"They can only attend own seminars and workshops"

"Attended disaster conferences nationally as per invitation"

"No disaster management expert"

"No official with disaster management qualifications, but experience"

• **Budget**

"Disaster management is poorly budgeted for"

"Poor financial support and technological resources"

"Only R1.5m per year for response only and specifically for emergencies for the District and not for the local municipality"

"Local municipality must have own budget as per section 54:3 of the Disaster Management Act"

• **Needs assessments**

"Needs assessment was conducted through selected teams led by councillors and community leaders"

"Needs assessment was conducted through dialogue"

"Needs assessment teams visited the affected areas"

"Those in need were clearly identified"

"Feed back of needs were Provided to JOC"

- **Success of response and recovery measures.**

“Communities stood up and assist civic organisations and were assessing own villages”

- **Future adjustments**

“Establishment of disaster management centre which is fully equipped and populated”

“Development of response and recovery plans informed by identified risks”

“To identify and workshop early warning systems to be known by all people in the area”

“Establishment of technological and information systems”

“Recovery process must be included in the IDP”

“District must draft the disaster management plan for the municipality”

“Need to shift from response and recovery and focus on risk reduction”

- **Challenges encountered**

“Non-existence of response and recovery plan”

“People resisted moving from dangerous areas”

“Houses were being allocated from the Province and was delaying process of distribution”

“Process of identifying and awarding RDP houses was very long”

“Bureaucracy”

“Roles and responsibilities were not clearly defined”

“Misinterpretation of Disaster Management Act led to misunderstanding of roles by stakeholders and role players”

“Early warnings from SAWS were arriving after incidents”

“No access to the affected people as most areas were cut off”

“Some victims could not be relieved by housing schemes, like the RDP”

“Limited budget”

“Municipality had only one vehicle and one trained person”

3.3 KEY WORDS FROM RESPONDENTS

From the analysis, the following key words from the respondents were identified:

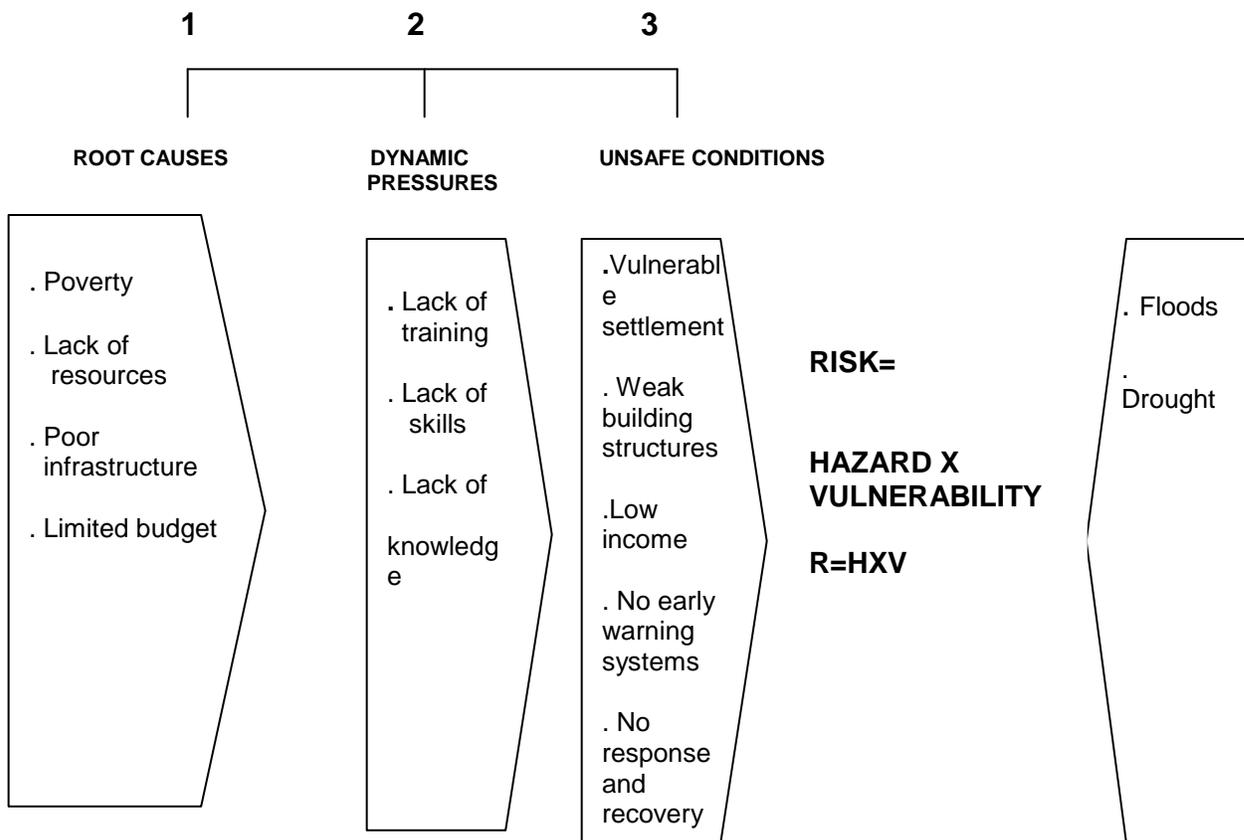
- Limited budget;
- Poor means of communication;
- Lack of knowledge;
- Non-existence of response and recovery plans;
- Lack of human and technological resources;
- Poor infrastructure;
- Poverty, and
- Preparedness.

The above-mentioned key words, which form the basis of the findings, will be discussed with reference to the PAR model. It will be shown how these key words led to the manifestation of the disaster as explained in the PAR model. The PAR model will also be used as a schematic representation of these key words.

3.4 THEMATIC ANALYSIS AS PER THE PAR MODEL

It is evident that the respondents reflected on the PAR model (the progression of vulnerability), indicating how the situation unfolded leading to the disaster. It is therefore proper to analyse the data gathered in comparison to this model, which the researcher chose as a theoretical orientation to this study. Looking at the key words as emanating from the themes, which are direct translations from the respondents, the aspects of root causes, dynamic pressures and unsafe conditions, as indicated in the PAR model, are predominant. As such, the analysis will follow the same format of the PAR model.

The PAR Model as reflected by the respondents in Thulamela



3.4.1 ROOT CAUSES

The root causes of the disaster in the Thulamela Local Municipality, as per the respondents, were due to lack of resources, poverty, poor infrastructure and limited budget. Note must be taken that the municipality had only one vehicle allocated to the disaster office and one cell phone allocated to the programmes manager. According to Blaikie et al (1994: 99), these aspects are root causes of natural disasters. This, therefore, means that if the Thulamela Local Municipality had resources, both human and technological, it would have had the capacity to address root causes that are as a result of these aspects. The same applies to poverty and infrastructure. Note should be taken that a lot of people died because they did not afford to live in houses built to withstand the floods. Most of

the affected people were poor staying in mud houses or weakly erected structures.

Poor infrastructure was another root cause of the disaster. It has been established that low bridges were washed away and other weakly erected bridges collapsed. It must be noted that a total of 321 bridges were swept away. The destruction of bridges resulted in several communities being cut off from the rest and a total of 97 villages were cut off. This led to those cut off being unable to take their dead to mortuaries, forcing them to stay with the dead as they could not bury due to continuous rain that was filling up the graves the moment these were dug. This was a source of diseases and trauma to the effected. Due to collapse of bridges, and communication structures, most villagers ended up not receiving any information from the officials and as a result did not know what to do to help them. A closer look to the diagram of the PAR model will clearly indicate that all the aspects discussed above are shown as root causes of the disaster.

3.4.2 DYNAMIC PRESSURES

Dynamic pressures as reflected by the respondents were in the form of lack of training and skills. These are some of the aspects those Blaikie et al (1994: 198) mention as dynamic pressures towards unsafe conditions. From the thematic analysis it has been gathered that the Thulamela Local Municipality never capacitated the disaster management office. Evidence to this is the fact that the disaster management office never submitted any training needs to the skills development facilitator. The disaster management office also did not have any subject matter expert and there was no one with disaster management qualifications although there was one officer with experience. This is a clear indication that the municipality lacked training and skills to address the disaster as it unfolds. This lack of knowledge from both the officials and villagers was the other aspect of dynamic pressure.

The above-mentioned are depicted in the PAR model as those matters that put dynamic pressure leading to the disaster.

3.4.3. UNSAFE CONDITIONS

Unsafe conditions in the Thulamela Local Municipality were reflected through aspects of the physical environment, the local economy and public actions and institutions. According to Blaikie et al (1994: 178), these aspects bring about unsafe conditions leading to a disaster. The occurrence of these aspects was reflected by the respondents in the thematic analysis and is discussed hereunder.

Within the Thulamela Local Municipality, it has been established that some people living in dangerous areas resisted being moved to safe areas. Their resistance was due to desire to be near grazing fields, their cultivating fields and water sources. Some were attached to the lands which they viewed as ancestral. This resistance led to several deaths of villagers and one example is that of a family of six living at the foot of the mountain when they were covered by a deluge of soil in Tshakhuma.

Unprotected buildings in the form of weak structures and mud houses were very unsafe as these could not stand the heavy rainfall. Most of them collapsed in the early stages of the disaster. These types of buildings are the results of poverty. Of importance to note is that the municipality did not have an answer to the resistance to move and poverty alleviation.

Local economy as an unsafe condition was due to low income levels. Note should be taken that the majority of people in Thulamela are unemployed and those who are employed are low earners and as such could not afford strong and proper dwellings. According to Thygerson, frequently accidents are not unforeseeable, because most of them are not chance occurrences but rather

reflect inefficiencies in the system. Accidents occur because people make mistakes. Human error frequently underlies unsafe conditions such as poor design, construction and maintenance; therefore, most accidents are still attributable to human error.

In public actions, as depicted by the PAR model, lack of preparedness leads to an unsafe condition. The respondents revealed that lack of preparedness was the key word in this case study. The rain took everyone by surprise. No one knew what to do. There were no early warning systems in place and also there was no one skilled in disaster management.

Although there was a contact plan, a response and recovery plan was non-existent and the budget was minimal.

The PAR Model shown earlier bears testimony to the aspects discussed above as those that brew unsafe conditions which ultimately leads to a disaster, as happened in the Thulamela Local Municipality.

3.5 FINDINGS

This case study, through the views of the respondents, found that the disaster in Thulamela Local Municipality emanated and manifested due to the following:

- Poverty;
- Lack of human and technical resources;
- Limited budget;
- Poor infrastructure;
- Poor means of communication;
- Lack of knowledge and skills;
- Non-existence of a response and recovery plan;
- Non-existence of the disaster management plan;

- The municipality's lack of preparedness, and
- Non- existence of early warning systems

It has been proven that the existence of the above mentioned causative factors plays a major role in aggravating the impact of disasters. Evidence to that is an example of other countries that have managed to minimise the impact of natural disasters.

Successful response to disasters requires dedicated and deliberate efforts. According to Sylves (2008: 77), response entails providing emergency aid assistance, reducing the probability of secondary damage, and minimising problems for recovery operations.

One example of efficient and successful response is that of Cuba. Cuba was devastated four times in 2004 by hurricanes, yet the number of fatalities was very low compared to nearby Haiti. This was because of Cuba's formula for success in early warnings, i.e. public awareness of hazardous risks, public policy commitment and application of scientific knowledge. The Thulamela Local Municipality, on the other hand, lacked all of the above; hence they could not be effective in its response. Cuba's response capacities have been integrated in education, health and other government policies.

It is also important to reflect on the critical role of the civic community in the San Antonio disaster response to the hurricane Katrina and Rita in 2005. "What became increasingly clear as the disaster unfolded was that no unit of government had the capacity to adequately respond to the crisis. From the beginning of the disaster response, city, county, state and federal government agencies in San Antonio relied heavily on the non profit sector. Part of this reliance was by design being codified in national, state and local emergency response plans that designate non profits such as the American Red Cross or Salvation Army as key responders. Rather than building an independent capacity

to respond, as time went on, the many government agencies involved grew increasingly dependent on the non-profit sector. As the crisis moved from the immediate response phase into the long-term recovery phase, the non-profit sector assumed the burden of both planning and service delivery” (Palomo-Gonzalez. A & Rahm. D: 2008:228). It is the way San Antonio approached the response and recovery that brought successes. Thulamela Municipality has to learn from such practices to minimise the impact of disasters.

Vietnam also had successes against floods in the Mekong Delta. Their success was due to “roles of local actors. They had the people’s committees made up of local executive branches of government, organized at the provincial level, district and rural or ward (urban) levels. They had a network of mass organizations that were mobilized to provide assistance” (Tran P.G & Few. R: 2007: 143). It is important to involve locals in the planning and implementing of response measures. They know what they want and what needs to be done. This example is unlike in Thulamela where the community did not play any significant role in the response to the disaster.

Another example of success in flood response and specifically evacuation can be drawn from the Netherlands evacuation of 1995. The reasons for success in the Netherlands were due to “disciplined behavior of the public, preparations and a real threat-potential severity of floods was visible” (Van Duin M.J. & Bezuyen M.J: 1995). Just looking at the discipline of the public, the opposite can be said about the Thulamela residents. It has been established during the study that a considerable number of people died because they resisted the advice of the municipality, who wanted them to move from dangerous areas, although for various reasons. If the people were disciplined and listened to the advice, so many lives would have been saved. Opposite to the Netherlands, the Thulamela Local Municipality was not prepared for the disaster. It is now clear that preparedness plays a vital role in minimising the impact of disaster.

“In Peninsular Malaysia, structural flood measures are a key component of the government’s policy response to floods hazards and disasters. Flood forecasting and warning are linked to temporary public evacuation and relief measures as a further policy response. Malaysia has been developing policies to address both rural poverty and exposure to floods” (Chan, 1972). Contrary to this, in Thulamela Local Municipality, there was non-existence of policies and plans designed to minimise the impact or respond to the floods. There was no specific flood plan and this led to an inefficient way of responding to the floods because there were no guidelines.

Argentina also provides a good lesson on its response to floods. “The Argentine’s government’s response to the 1982-83 floods was to implement flood defence projects around areas exposed and vulnerable to flood damage. The design and implementation of individual projects was left to individual provinces” (Von Lany, Palmer, and Sour & Avadas). This is a clear indication of commitment to risk reduction. With a significant budget, the same can be done at the Thulamela Local Municipality.

3.6 CONCLUSIONS

Thulamela Local Municipality is an area that is vulnerable to floods due to poverty, geographical set up, unplanned settlements, lack of infrastructure, and poor communication. These are therefore aspects that need improvement to protect people’s lives.

It is the responsibility of the Thulamela Local Municipality to design and implement measures to address all the vulnerabilities. Among other things, the municipality must develop and implement relevant policies, as the case in Peninsular Malaysia.

Of importance to note by Thulamela Local Municipality is the fact that the PAR model, as discussed earlier, clearly indicates elements of socio-economic and political nature that can develop into a disaster if not attended to. Same elements have been identified in the case study of Thulamela Local Municipality as the ones that led to the 1999/2000 disaster. It is therefore advisable for the Thulamela Local Municipality to study and implement the Progression of Safety model, which is the reverse of the PAR model. This will assist in addressing the PAR elements that prevail in Thulamela Local Municipality. However, the reversal must be done in conjunction with benchmarking in other flood-prone countries and in other parts of South Africa.

It is therefore important to indicate to Thulamela Local Municipality that lessons from the best practices should be studied and implemented where possible and relevant.

CHAPTER 4

RECOMMENDATIONS

4.7 Introduction

Disasters are unpredictable events that need communities and all levels of government to be prepared for any eventuality. The readiness is based on awareness programmes and developing programmes of risk reduction that are based on existing policies and guidelines. These events require emergency preparedness planning for effective response and recovery operations.

Thulamela Local Municipality did not have any plans nor the necessary capacity to respond to the floods in 2000. This situation led to poor response and recovery measures. The lack of capacity was as a result of lack of knowledge, infrastructure, budget, policies and the impact of poverty.

This chapter provides recommendations to the Thulamela Local Municipality on factors that need to be improved and implemented in the future for better disaster reduction, response and recovery.

4.8 Summary of findings

The findings to this case study clearly show the poor response and recovery measures as implemented by the Thulamela Local Municipality during the floods of 2000. Lack of capacity played a major role in this municipality's poor response.

Thulamela Local Municipality lacked clear policy interventions in the implementation of response and recovery measures. There is non-integration of

response capacities in education, health and other basic policies, which are the basics for effective response and recovery.

The findings revealed that the Thulamela Local Municipality was not prepared for the disaster. The study has shown that preparedness plays a vital role in minimising the impact of a disaster.

The findings also revealed that the Thulamela Local Municipality had no policies and plans designed to minimise the impact or respond to the floods. There was no specific flood plan and this led to an inefficient way of responding to the floods.

The findings of this study have shown in the previous chapter through the PAR model, which was reflective of the situation in Thulamela Local Municipality. Looking at the findings as reflected in the PAR model in chapter three, it becomes proper to explain those findings with reference to the Progression of Safety model, which is the reverse of the PAR model.

The root causes were found to be poverty, lack of resources, poor infrastructure and a limited budget. Thulamela Local Municipality has the responsibility of reversing these root causes. Such reversal can only be done through implementation of various strategies.

4.2.1 Addressing root causes

Root causes are deep rooted set of factors that together form and maintain vulnerability: Thulamela has a high rate of poverty which is a result of lack of employment and resources. Most of the community members solely depend on government grants for their income. Poverty affects the majority of people in Thulamela and the municipality can reverse it through job creation strategies. By

addressing poverty, the municipality will be conducting a risk reduction measure, which will ultimately lead to disaster reduction.

It is also a must that Thulamela Local Municipality build better infrastructure, starting from roads, bridges, communication systems and modern networks. Poor infrastructure led to bridges collapsing thereby cutting off many villages from the rest of the communities. With the improvement in budget, the municipality must build better infrastructure for the people of Thulamela.

This will not only enable the municipality to respond swiftly during disasters, but to save the community as this will also be a risk reduction measure. It is better infrastructure that makes the community to be able to access help and facilitates their move into safe areas. It is therefore proper for Thulamela Local Municipality to address this causal factor to disaster by enhancing the budget and infrastructure. The solution to this problem is to build strong and high bridges. Quality roads must also be built.

4.2.2 Unsafe conditions

The majority of the inhabitants of Thulamela are staying in vulnerable settlements composed of weak materials. To avoid continuous vulnerability of the people, the municipality must employ engineering measures to enforce building codes. Vulnerable people must be taught to build strong structures in those vulnerable areas.

Settlement areas are another cause of disasters as people settle in areas that are not safe. An example can be of Tshakhuma where six families were covered by soil from the mountain, due to them staying at its foot. In this case, villagers should be removed from such areas. The local government can build reconstruction and development houses for the villagers in a safe area.

4.2.3 Dynamic pressures

Information is power and as such should be made available to all. Lack of information as a cause of disaster can be addressed by ensuring that all members of the community can have free access to it. This could be achieved by radio announcements, television broadcasts, placards, workshops, teaching at schools, churches and other places of gathering like the chief's or headman's kraal. People must be informed of the state of the situation, looming hazards, what to do as well as what not to do. During the floods in 2000, a lot of people died simply because they did not know what to do. They were not informed.

The municipality's officials were not trained in disaster management; they had no skills and knowledge. No one knew what to do. The municipality must start empowering their employees and all disaster management operatives by training them. They must ensure that they submit all training needs to the training facilitator every year. This will go a long way in reducing the disaster risk as the officials will be knowledgeable of the measures to be taken before, during and after the disaster. Knowledge of disaster management will enable them to identify hazards and mitigate risks that can be brought by such hazards.

It must therefore be noted that vulnerability and risk reduction is the systematic development and application of policies, strategies and practices to minimise vulnerabilities and disaster risks throughout the community, to avoid (prevention) or to limit (mitigation and preparedness) adverse impact of hazards within the broad context of sustainable development. It is therefore important to show that the measures are development orientated and appropriate for reducing vulnerabilities.

4.3 COMMUNITY'S PERCEPTION OF THE MUNICIPALITY'S RESPONSE AND RECOVERY MEASURES

The researcher used interviews to determine the perception of the community of the response and recovery by the Thulamela Local Municipality. The respondents were affected by the floods, municipal employees, disaster management officials and the municipal manager.

The study revealed that the community believed that the municipality's response and recovery measures were not effective. To this end, many people whose houses collapsed or were washed away, have not yet received RDP houses. This means that there are numerous people who have not yet recovered from the floods disaster.

It is therefore the belief of the community that their socio-economic status including the conditions of their livestock, their safety and right to make their own choices of settlement are the pillars for their survival and coping strategies to floods disasters, something which the municipality did not effectively do. Although there had been consultations with the communities through ward councillors, almost all councillors' and municipal officials did not have any knowledge of the disaster and were not effective.

4.4 RECOMMENDATIONS AND CONCLUSIONS

The analysis and findings of the case study of Thulamela Local Municipality resulted in a number of recommendations. These are prioritised interventions and policy adjustments that will strengthen the coping capacity of the inhabitants of the Thulamela Local Municipality. These recommendations must be considered by the Thulamela Local Municipality, local community members, households, stakeholders and donors to strengthen the response and recovery measures of the Thulamela Local Municipality for future disasters.

These recommendations are aligned with reference to policy implementation from best practices to enable Thulamela Local Municipality to learn from successes brought about in responding to floods by those countries.

4.5 **RECOMMENDATIONS**

From the research findings the following recommendations can be made:

- Response and recovery processes must be included in the Integrated Development Plan;
- Vhembe District Municipality must assist in the development of a disaster risk management plan for municipalities, including the Thulamela Local Municipality;
- The municipality must develop programmes of ensuring community resilience, and integrate these with the IDP;
- The municipality needs to shift from response and recovery and focus on risk reduction by capacitating its staff and councilors;
- The municipality must develop response and recovery plans for known hazards in line with its disaster risk management plans and integrated with its contingency plans;
- The development of the response and recovery plans must be informed by identified risks;
- The municipality must improve its funding of disaster risk reduction activities;
- The municipality must establish a disaster risk management centre which is fully equipped and staffed;
- The municipality must capacitate its disaster management structures with relevant and appropriate number of skilled personnel;

- The municipality must capacitate its disaster management structures with material, technological and transport resources;
- The municipality must employ engineers to improve its infrastructure;
- The Vhembe District Disaster Risk Management Centre must develop and implement awareness programmes, and
- The municipality must establish an effective communication centre and early warning system/s.

4.6 **RECOMMENDATIONS FOR FOLLOW-UP RESEARCH**

This case study investigated the response and recovery of the Thulamela Local Municipality to the floods of 2000. The researcher analysed data from the interviews of respondents to identify gaps in the way the municipality responded and implemented recovery measures.

It is evident from this case study that community members are of the opinion that the municipality's lack of capacity to respond due to the lack of policy interventions, will continue to make them vulnerable to floods and other disasters. However, the study did not prove that capacitating the municipality through policy development alone can improve their response and recovery implementation and save lives of the community.

Further studies should therefore aim at determining if policy intervention in Thulamela Local Municipality will be the solution to disasters in the area.

4.7 CONCLUSION

This case study has clearly shown that the municipality's lack of policies and capacity to respond and implement recovery measures to the inhabitants of Thulamela will remain a major factor contributing to the poor response and recovery. This lack of capacity will continue to make the communities vulnerable to the disaster risks and their impact.

Poverty and dependence on subsistence farming by the communities will always pose a disaster risk. This dependence on subsistence farming is due to poor socio-economic conditions. Non-existence of disaster policies, lack of infrastructure and insufficient budgeting are other factors that need improvement as they affect response and recovery capacity.

It is on the basis of the above mentioned that it is necessary for the Thulamela Local Municipality to implement an integrated approach of addressing those factors to support its response and recovery processes. Above all, this includes the socio-economic development that aims at reducing disaster risks and strengthening sustainability of livelihoods.

4.8 REFERENCES

Anderskov, C. 2004. Anthropology and Disaster - An analysis of current trends within anthropological disaster research, and an attempt to construct an approach that facilitates theory building and applied practices - analysed with vantage point in a case-study from the flood-prone Mutarara District in Mozambique.

Anderson & Woodrow.1998, Berke et al.1993. FFRC 2001:13-23

Botha, W. 2008. Developing an understanding of bullying targets' experience of and coping with abusive workplace situations. (Unpublished doctoral thesis). Johannesburg: University of Johannesburg.

Chan, N.W. 1972. Reducing Flood hazards exposure and vulnerability in Peninsular Malaysia.

Chernobyl: Big Nuclear tragedy. s.a. Retrieved from: <http://www.helium.com/items/92161-chernobyl-big-nuclear-tragedy>. 20 May 2009.

Chigunta, F. 2002. The Socio-Economic Situation of Youth in Africa: Problems, Prospects and Options. Retrieved from: <http://www.yesweb.org/gkr/res/bg.africa.reg.doc>. 29 March 2009.

Cutter, S. 2006. The Geography of social vulnerability: Race, Class and Catastrophe. Retrieved from: <http://www.understandingkatrina.ssrc.org/cutter/> 13 April 2008.

De Vos, A.S., Strydom, H., Fourie, C.B & Delpont, CSL. 2005. *Research at grass roots for the social sciences human service professions*. 3rd ed. Pretoria: Van Schaik.

Fisher, R.A. 2009. Empirical Research. Retrieved from: http://en.wikipedia.org/wiki/Empirical_research 23 April 2010.

Grbich, C. 2007. Qualitative Data Analysis. An Introduction. London: Sage.

Hassen A. 2008. Vulnerability to Drought Risk and Famine: Local Responses and External Interventions among the Afar of Ethiopia, a Study on the Aghini Pastoral Community. Retrieved from: http://opus.ub.unibayreuth.de/volltexte/2008/405/pdf/Ali_Hassen_web_low_version.pdf. 04 May 2009.

<http://www.businessdictionary.com/definition/disasterresponse.html>

ISDR. 2004. Living with Risk. A Global Review of Disaster Reduction Initiatives. Volume 1. Geneva: United Nations.

Lalumbe, T. 2008. *Interview with Mr T Lalumbe: Disaster Manager; Vhembe District Municipality*. Conducted on 12 August 2008.

Mouton, J. 2001. *How to succeed in your master's and doctoral studies: A South African guide and resource book*. Pretoria: Van Schaik.

Neill, J. 2007. Qualitative versus Quantitative Research: Key Points in a Classic Debate. Retrieved from: http://www.wilderdom.com/research_qualitative_versus_quantitative_Research.html. 24 April 2010.

Rubin, H. J., & Rubin, I.S. 1995. *Qualitative interviewing: the art of hearing data*. Thousand Oaks: Sage.

Ryan, G.W. & Bernard, H.R. 2000: 780. Data Management and Analysis Methods.

N.K. Denzin & Y. S. Lincoln. (Eds.), *Handbook of Qualitative Research*. (2nd Ed.). Thousand Oaks: Sage.

South Africa. 2005. *National Disaster Management Framework*. Republic of South Africa. Government Printer: Pretoria.

Struwig, F.W. & Stead, G.B. 2004. *Planning, designing and reporting research*. Cape Town: Hanli Venter.

Sylves, R. 2008. *Disaster Policy and Politics*. Emergency Management and Homeland Security.

Thygerson, L. A. 1997. *Accidents and disasters, Causes and Countermeasures*, New Jersey: Prentice –Hall, Inc

Tran, P.G. & Few, R. 2007. *Coping with floods in the Mekong Delta, Vietnam*.

Van Duin, M.J & Bezuyen, M.J. 1995. *Flood evacuation during the floods of 1995 in the Netherlands*

Vhembe District Municipality: *Disaster Management Relief Guidelines: 2*

Von Lany, P.H., Palmer, J., Sour, S.P. & Avadas, R.D. *Integrated flood risk management in the Rio De Laplata Basin within Argentina*.

Welman, J.C. & Kruger, S.J. 2001. *Research methodology*. 2nd ed. Cape Town: Oxford University Press.

Welman, J. C, Kruger, F & Mitchell, B. 2005. *Research methodology*. 3rd ed. Cape Town: Oxford University Press.

Wisner, B. Blaike, P. Cannon, T. And Davis, I. 2004. At risk, natural hazards, people's vulnerability and disasters. (2nd ed.) New York: Routledge.