THE SOCIAL, PSYCHOLOGICAL AND ECONOMIC IMPACT OF FLOODING IN GA-MOTLA AND GA-MOEKA COMMUNITIES OF MORETELE DISTRICT IN NORTH WEST PROVINCE, SOUTH AFRICA

By

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DECLARATION

I …… declare that the social, psychological and economic impact of flooding in Ga-Motla and Ga-Moeka communities of Moretele district in North West Province, South Africa, is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Signature: ……....

Date: ……..

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ABSTRACT

The purpose of this study was to investigate why the Ga-Moeka and Ga-Motle villages in the Moretele Local Municipality were victims of floods after heavy rains. Another aim was to determine how the communities in those villages were affected socially, economically and psychologically by floods.

The methodology section was divided into three major subsections, namely the research instruments, data and analysis. Questionnaires were used and they were completed by random sampling from Ga-Moeka and Ga-Motle communities. Fifty questionnaires were sent out to community members of the two villages, which were divided into four parts to elicit personal information, social, economic and psychological impact information of the respondents.

The results of the questionnaire revealed a high level of concern within the two communities. According to the social impact, most people felt badly affected as most of them did not receive assistance. A small percentage managed to get help from their municipality. In terms of the economic impact, it was large in terms of replacing property that had been destroyed by floods; medical expenses as many of them received little income; most of those who were working, earned between R500 and R2000. Regarding the psychological impact, a large percentage suffered shock and experienced trauma for less than a week although a very small percentage suffered trauma for a year at least.

It is recommended that there must be upgrading of the infrastructure in the area in terms of building of a new dam or recapacitation of the existing dam, roads and the drainage system; that there must be a relocation plan, compulsory insurance, early warning systems, and that there must be good communication in the communities during floods.

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LIST OF ACRONYMS

AIDS	Acquired immune deficiency syndrome
ALNAP	Active Learning Network for Accountability and Performance
EEA	European Economic Area
EU	European Union
FEMA	Federal Emergency Management Agency
FFDWRS	Flood Forecasting, Warning and Response System
GIS	Geographic Information Systems
HIV	Human immunodeficiency virus
IOM	International Organisation for Migration
OCHA	Office for the Coordination of Humanitarian Affairs
PAFRICS	Participatory Flood Risk Communication Support System
STATSSA	Statistics South Africa
STI	Sexually Transmitted Infection
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization
ZVAC	Zambia Vulnerability Assessment Committee

CHAPTER 1

INTRODUCTION

1.1 Introduction

Flooding world-wide is accompanied by losses and related human health impacts. This was argued by Penning-Rowell, Tapsell and Wilson (2005:1). Being the most common type of disaster worldwide, flooding is divided into three major types which are categorised as the river floods, flash floods and coastal floods (Smith 1999:9).

Kent (2001: 137-138) suggests in his article that there has to be standards established based on human rights when dealing with disaster protection and development. He further alludes that governments ultimately have an obligation to provide protection and the human right to disaster protection which means there are some services to which people are entitled. He suggests appropriate institutional arrangements with disaster mitigation and relief agencies in place before having agreements with domestic and international agencies.

The report by Pirbhat Women Development Society, Shahdadkot Sindh (s.a.: 2-5), confirms that rains caused great disasters in Sindh and Balochitan provinces of Pakistan. The flood water from major rivers damaged and destroyed a large number of human habitations, agriculture and livestock. During the disaster, hundreds of people were left homeless and were living along roads and banks of watercourses because houses, schools and mosques had collapsed.

1.2 Background Information

Ga-Motla and Ga-Moeka are villages next to each other in the geographical area of Moretele, North West, South Africa. Their geographical coordinates are 25 degrees 20’0” South, 28 degrees 3’0” East for Ga-Moeka and its geographical coordinates are 25° 21' 0" South, 28° 4' 0" East for Ga-Motla according to the maplandia website.com accessed on 8 April 2009.

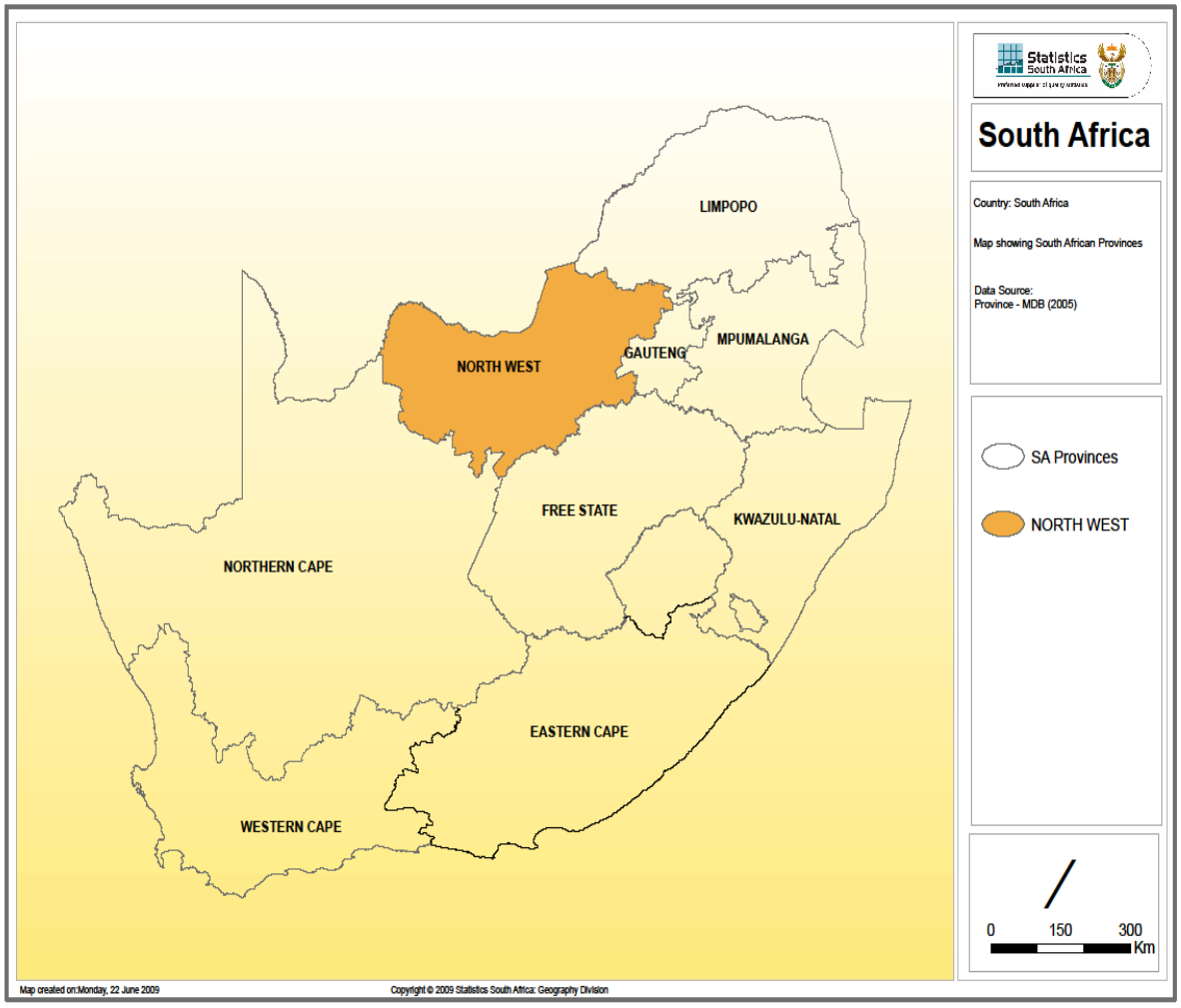

Fig. 1.1: South African Provinces

According to the poster presentation of Rudolph, Dlamini and Hlungwani (s.a.:s.p.) Moeka has 2 500 households, three schools including an adult education centre for 1 200 learners. Unemployment is extremely high in this village with prevalence of childhood diarrhoea, teenage pregnancy, STIs and HIV/AIDS. One public health clinic is six kilometres away and the Jubilee hospital 20km away.

It was mentioned by the Moretele Local Municipality Disaster Manager (24 July 2009) that Ga-Motla and Ga-Moeka were next to the Tswaing Crater Museum and the water from the streams in Soshanguve, Mabopane and Winterveldt were flowing to the Soutpanspruit when there were floods. She reported that according to the Technical Engineer of Tswaing Hydrometer Logical Crater Museum, the water runs off at 58,78m3 per second and the size of the catchment area is 7, 250ha.

The map in Figure 1.2 from Statistics South Africa depicts the Moretele Local Municipality in the North West.

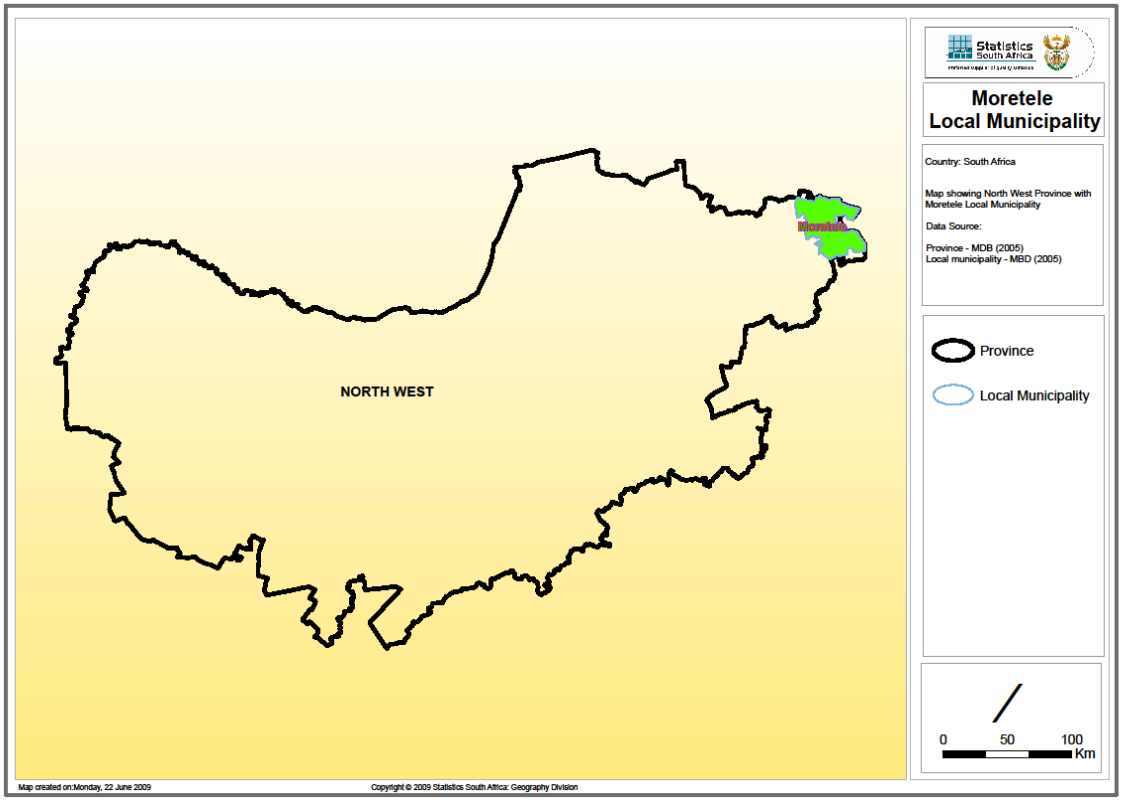

Fig. 1.2: North West Province with Moretele Local Municipality

According to a resident of one of the villages in the area, Moeka has accommodated people from the surrounding areas of Hammanskraal-Moretele District as well as those coming from far, for example Limpopo and Mpumalanga to find employment in the city. The people living in Moeka are of different cultures. It is a place of the Tswana people from the former Bophuthatswana homeland during the Dr Mangope regime. After the 1994 democracy, more people of different cultures came to live in the village. Currently we find Zulu, Venda, Pedi, Shangaan and Ndebele-speaking people in the village (Community member 24 July 2009).

The map in Figure 1.3 shows the two villages with rivers and dams nearby which exacerbate flooding during heavy rains when they filled to capacity.

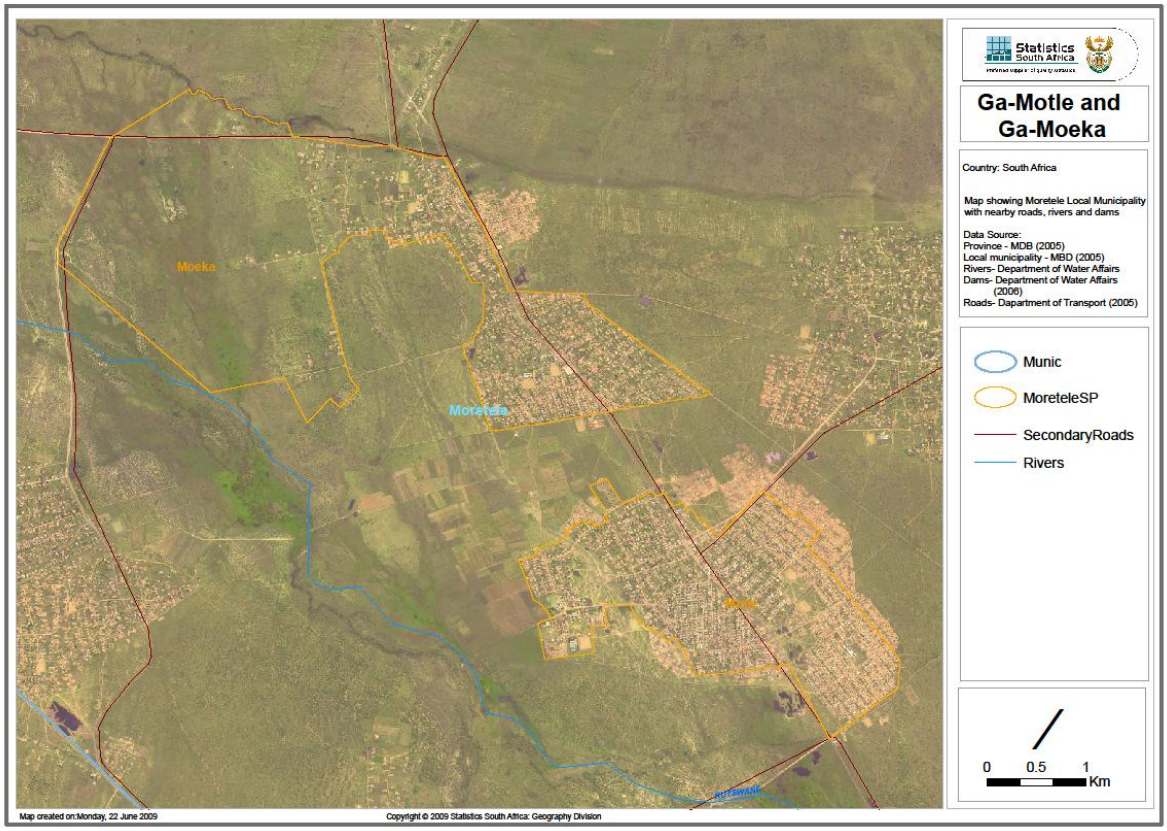

Fig. 1.3 Ga-Motle and Ga-Moeka with Moretele as Local Municipality

1.3 Population

Moeka always suffers the consequences of floods when there are heavy rains. Floods usually affect the poor inhabitants of informal settlements along river banks who have no power to overcome such disasters, which destroy their settlements and belongings according to Santosa's abstract.This village is situated on a lower level compared to other neighbouring villages. There is an unnamed dam and a river nearby which when it has rained heavily and it is full to capacity, most of the water runs down towards the village which causes its flooding. Once the dam and river have burst their banks, schools, clinics and other businesses are disrupted because there is transport to schools or other institutions.

Usually the flooding takes three days before everything can go back to normal. Students do not attend school and they fall behind in their school work. One official from the Moretele local municipality mentioned that there were no flood lines identified in the two areas and therefore it was difficult to advise communities regarding safer places to build. Table 1.1

shows the number of school going children and adults, who miss school because of flooding in the area (Statistics South Africa 2001: s.p.).

TABLE 1.1: STUDENTS ATTENDING SCHOOL (INSTITUTION)

	Moeka	Motle
None	3861	7250
Pre-school	139	340
School	1927	3568
College	14	35
Technikon	15	30
University	16	32
Adult education centre	9	39
Other	3	3

People need to replace and restore whatever has been damaged by the floods, for example houses have to be rebuilt, furniture has to be replaced and other new items have to be bought. It is always difficult to do that because most families are not well off and cannot afford to pay for all that. Those who can afford insurance are the ones who are able to rebuild and buy new furniture. The Ga-Moeka and Ga-Motle communities are one of communities with more people without an income. According to Statistics South Africa (2001), households amounting to 1 489 in Moeka and 1 863 in Motle do not have income every month according to Table 1.2 below. They are more than the households that have income every month. From the data it can be deduced that Moeka and Motle are poverty-stricken communities, who cannot afford to put back houses in their original form like before they were damaged by floods.

TABLE 1.2: MOEKA HOUSEHOLD INCOME (STATSSA)

	Moeka	Motle
No income	1489	1853
R1 - R4 800	391	1030
R4 801 - R 9 600	1135	2232
R9 601 - R 19 200	1360	2573
R19 201 - R 38 400	1149	2467
R38 401 - R 76 800	304	885
R76 801 - R153 600	86	132
R153 601 - R307 200	16	62
R307 201 - R614 400	-	39
R614 401 - R1 228 800	-	-
R1 228 801 - R2 457 600	56	24
R2 457 601 and more	-	-
Not applicable (institutions)	-	-

1.4 Problem Statement

Ga-Moeka and Ga-Motle are village portions in the Moretele Local Municipality. The villages face problems due to flooding after heavy rains. There is great concern that during flooding there is significant increase in the vulnerability of the people living there due to the uncontrollable water which may cause health hazards and deaths. There is also a concern that the property gets damaged due to long lasting floods.

According to (Dutta & Tingsanchali 2003 cited by Sagala 2006: 2) around the world, most countries do not have any methodology of estimation of loss due to a natural disaster. It is argued by (Smith & Ward 1998 cited by Sagala 2006: 2) that information on loss estimation that is caused by floods of different magnitudes and its loss return period are very crucial in developing policies for rational flood alleviation of an area.

(Ward 1978: s.p.) points out that the encroachment of settlements on to floodplains continues to grow, in ignorance of the flood hazard. The settlements continue sometimes with full cognizance of the flood hazard in the belief or hope that society will come to aid either in the form of improved flood protection or, after the event, government or organizations will come with financial assistance. Ga-Motla and Ga-Moeka villages have experienced the same move where people end up with negative social and economic impacts caused by floods (Wards 1978: s.p.), continue to say floods become hazards when they impinge unfavourably upon human activity and therefore flood hazard must be considered not simply as a physical but also as a socio-economic and psychological phenomenon.

This research aims to contribute to the analysis of the impact and losses due to floods socially, psychologically and economically.

1.5 Research Objectives

The purpose of this study is to understand how severe the flooding impact is on the social, psychological and economic levels of Ga-Motla and Ga-Moeka communities in the North West Province, Moretele District. Figure 1.4 shows clearly how the two places of interest, Ga-Motla and Ga-Moeka are close to each other. The specific objectives are:

- To determine how the Ga–Moeka and Ga-Motle communities are affected socially by floods.

- To determine how the Ga–Moeka and Ga-Motle communities are affected economically by floods.

- To determine how the Ga–Moeka and Ga-Motle communities are affected psychologically by floods.

- To determine why Ga-Moeka and Ga-Motle are being flooded.

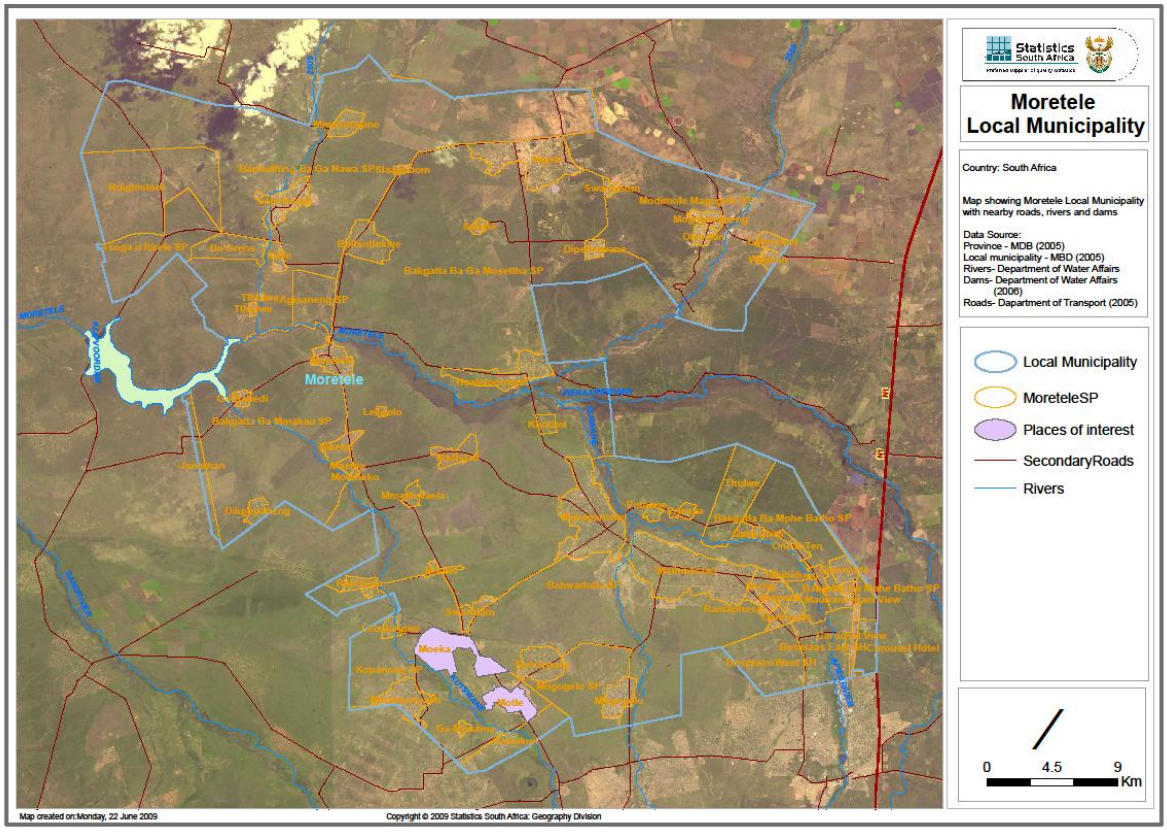

Fig. 1.4 Moretele Local Municipality with nearby roads, rivers and dams

1.6 Critical Research Questions

The social, psychological and economic impact of flooding in Ga-Moeka and Ga-Motle communities in Moretele municipality require formulation of critical research questions,which are essential for the development and guidance of the research proposal (VOCE 2004: 1).

- **Sub-objective one:**
  How are the Ga–Moeka and Ga-Motle communities socially affected by floods?

- **Sub-objective two:**

How are the Ga–Moeka and Ga-Motle communities economically affected by floods?

- **Sub-objective three:**

How are the Ga–Moeka and Ga-Motle communities psychologically affected by floods?

- **Sub-objective four:**

Why are the villages of Ga-Moeka and Ga-Motle being flooded more than other neighbouring areas?

1.7 Research Methodology

The purpose of research methodology is to depict how the Moeka and Ga-Motle communities have been affected economically, socially and psychologically by the floods in their area during heavy rains. The results obtained from the questionnaires ascertained the extent of how they had been affected in the above areas. The outcomes suggest how the local municipality will have to address the consequences of the impact which will help in terms of planning and budgeting.

1.8 Research Design

According to Barbie and Mouton (2006: 72, 74), research design addresses the planning of scientific enquiry, where one designs a strategy for finding out something. It is a blueprint or plan of how one intends conducting a research. It is divided into two major aspects and they are: to first specify clearly what it is that you want to find out and secondly to determine the best way to do it. Terre Blanche & Durrheim define it as a "strategic framework for action that serves as a bridge between research questions and the execution or implementation of the research" (1999:29).

In this project, the first aspect of specifying clearly what it is that one wants to find out is to find out the social, economic and psychological impact of floods on Ga-Moeka and Ga-Motle communities in the Moretele Local Municipality of North West Province. The second aspect is to determine the best way to do it.

The communities of Ga-Moeka and Ga-Motle were studied by collecting their data using a structured questionnaire. It was drafted and distributed to a sample of members of the two communities to complete. In using a questionnaire, the aim was to try and get valid, reliable and unbiased information from the respondents. The types of information that are usually gathered in a questionnaire are attributes, behaviour, events, beliefs and attitudes or opinions. More than 80% of the questions were closed questions and 20% were open-ended questions. Closed questions can be answered by one word or a phrase and they are easy and quick to answer and give facts. It further enables the researcher to keep control of the conversation whereas with open-ended questions the respondent is given the opportunity to view his opinions and feelings, to think and reflect and lastly to control the conversation.

The questions were completed in the absence of the researcher. This technique is low cost and the data can be collected simultaneously from a large number of respondents. Late submittance can be experienced which is a disadvantage, but can be controlled by follow-ups. The fact that respondents completed the questionnaires on their own, causes the researcher to have no control over the order in which respondents answer their questions or whether respondents consult each other or not during the completion period (Health Technology Assessment 2001:37).

1.9 Methodology

The methodology section is divided into three major subsections, namely the research instruments, data and analysis. Questions were used and they were completed by samples from Ga-Moeka and Ga-Motle communities.

1.9.1 Research Instruments (description and justification)

In this research, a survey was used as a technique to collect data from Ga-Moeka and Ga-Motle communities. In a survey, conclusions are drawn from one transitory collection of data. Questions are posed to willing participants; their responses are summarized with percentages, and in the end inferences drawn about a particular community (Dim 601 2007: 196). When planning a survey, it is important to consider the following aspects:

- Response rate which is measured relatively to the size of the sampling
- Cost of obtaining data
- Timelines which include contact, response and follow up modes

- Sources of error which may affect the results of the survey
- Data quality which is the extent to which nonrespondents would have responded differently than respondents (Background on the survey process: s.a.: 9 – 17).

The questionnaire was divided into four parts and was supposed to elicit personal information, social, economic and psychological impact information of the respondents.

1.9.2 Data (population and sample: strength, weaknesses)

"Data *are empirical representations of concepts, and measurement links data to concepts*" according to Neuman (2006:181). A quantitative research was used in this research. Identifying the characteristics of an observed phenomenon or exploring possible correlations among more than one phenomenon relates to the quantitative research. The situation is examined as it is (Dim 601 2007: 191). In this quantitative research, data was produced in the form of numbers. A structured questionnaire was distributed to the sample of the community.

Under this section, information on age, gender, marital status, respondent's addresses was gathered. Other types of information collected were based on their income, schooling, daily activities, households, residence, transport, sicknesses, relationships and causes of floods in terms of how they relate to the flood impact. The aim was to gain more understanding of the characteristics of the respondents.

1.9.3 Analysis (techniques and justification)

The sample consisted of 40% of scholar respondents and 60% of non-scholar respondents. The aim of distributing percentages like this was because non-scholars were older than sixteen years and might have experienced more of the flooding in this area than scholars. Sampling is when units are selected randomly to represent the population. The sampling depends on how homogenous or heterogeneous the population is – if the population is heterogeneous, a larger sample is needed and if the sample is homogenous, a smaller sample is needed (DIM 601 2007: 220 – 221).

Most of the questionnaires were distributed at schools, homes and other local places like shops and clinics. The 40% of scholar respondents was needed in order to represent the extent of a number of students losing classes during floods and the 60% of respondents who

were a combination of respondents who were working, not working and who were middle aged and older.

This combination shows how working people are disturbed by the floods as they end up not going to work and those who stay at home, but are unable to do their daily chores because of the floods. The samples in Table 1.3, 1.4 and 1.5 were randomly selected where each group is representative of the community. They represent the stratified random sampling where all the groups are distinctively different – scholars, non-scholars, employed, unemployed and married (DIM 601 2007: 215).

TABLE 1.3 RESPONDENTS' PROFILE: EDUCATION

Respondents as per unique group	Number	Percentage
Scholars	6	12%
Non-Scholars	42	84%
Others	2	4%

TABLE 1.4 RESPONDENTS' PROFILE: EMPLOYMENT

Respondents as per unique group	Number	Percentage
Employed	17	34%
Unemployed	33	66%

1.5 RESPONDENTS' PROFILE: MARITAL STATUS

Respondents as per unique group	Number	Percentage
Married	10	20%
Single	36	72%
Other	4	8%

1.10 Limitations

Each and every research or study has limitations according to Thomas & Nelson (1996). These are possible shortcomings that may influence the results of the research or they cannot be controlled. A researcher can also impose delimitations in his research by choice in order to effect a workable research problem.

In administering a questionnaire, total honesty by participants may not be gained. Participants may not answer all questions or may give a socially correct answer. A solution to this problem is to give an easy questionnaire and explain to respondents why the research

is important. Be courteous, thank them for their help and offer to share the report with them (Goddard & Melville: 2001, 48).

This research will also not include the people of Ga-Ratsiepane. The water manages to reach nearby areas, but not as badly as the Ga-Motla and Ga-Moeka areas. The two villages are looked at because they are so close to each other that one may be unable to distinguish where one village starts and the other one ends. The other limitation is that interviews and questionnaires will be done with people aged 15 years and up to make more sense of the research.

1.11 Ethical Consideration

In administering a questionnaire, ethical concerns were taken into consideration. A careful approach of not harming people by disregarding their privacy, not respecting them as individuals or subjecting them to unnecessary research was considered. Collected data from community members was kept confidential by not identifying them when giving a report, (Goddard & Melville 2001: 49).

1.12 Conclusion

This chapter created an understanding of how the research was structured. It also provided information on the methods that were used in conducting the research, which consisted of the research instruments, data and analysis. A brief explanation of ethical considerations and limitations of the research was also given.

CHAPTER 2

LITERATURE REVIEW

2.1 Background

Literature review is a discussion of related literature about a topic of interest to assist in discovering a fact, the truth or a point of light. It has the function of sharing what others have done in similar areas. The literature review, to name but a few benefits provides new ideas and approaches, reveals sources of data, gives confidence in the topic, help in interpreting and making sense of findings (Research Methodology 2007: 70). Terre Blanche and Durrheim (1999 :18-19) also state that literature review puts the research project into context by showing how it fits into a particular field; also to assist researchers to focus on important issues and variables that have a bearing on the research question.

2.2 Introduction

Floods are one of the most common hazards which cause death, injuries, property damage, and contamination of drinking water and disruption of electrical services. The neighbourhood and the regional communities are affected, sometimes for over a period of days (Emergency Survival Programme 2008: 1). In Europe, Pistrika and Tsakiris (2007:2) allude that the scale and frequency of floods are likely to increase in the future because of climate change, inappropriate river management and infrastructure development in the areas where they are always flooded. Climate change causes new developments on flood plains, which increase pressures on the urban system. This leaves less potential water storage space when there is an event of flooding (Gill 2004: 17).

2.3 Types of Floods

There are different types of floods which become disasters when they have destructive effects on human settlements. The river floods or seasonal floods are caused by seasonal precipitation over large catchment areas, melting of snow or a combination of these. Flash floods or tropical storm floods are accompanied by heavy rainfalls which become too much

for the streams and rivers to handle, and they overflow and produce floods. Lastly, the coastal floods where storms, winds and other events cause ocean water to overflow and lead to onshore flooding (United Nations Educational, Scientific and Cultural Organization: United Nations Environment Programme 2004: 2).

Smith (1999: 9) believes that floods are the most common type of disaster worldwide and he also mentions the three major types being categorized as river floods, flash floods and coastal floods. The majority of Australians are located along the coastal areas where flooding is the most common disaster scenario. Ward (1978: 16 – 27) argues the types of floods in this fashion:

i) Flash floods which are associated with violent, convectional storms which are of the short duration, and is measured in minutes not hours. These types of floods occur everywhere in the world.

ii) There are also single event floods which have a substantially longer duration than flash floods and result from a variety of rainfall conditions in which widespread rains of several hours or days can move over a drainage basin. Those are commonly associated with cyclonic storms.

iii) Multiple event floods happen when successive flood peaks follow closely on each other because of complex weather situations. Flooding of this type may last for a period of several weeks or months and can be the disastrous one of all flood occurrences.

iv) Seasonal floods – flooding can recur annually in a wet season on a massive scale for several months and can bring either great benefit or catastrophe. The Nile river flooding assures adequate crop yields, but in India flooding causes great distress and loss of life.

2.4 Flooding

Wisner *et al*. (2007: 201) say that flooding has shown a remarkable impact internationally and locally, the damage which has been costly to even developed countries like Australia and Europe. The disasters caused by floods affect not only individuals but also governments, planners and insurers. They cause more economic losses than any other hazards. Floods are known risks and that is why there are always both self and social protection measures. Dams are used as flood controls but because some are not built or

maintained as required, especially in terms of capacity, when a dam is overflowing water is released to avoid dam damage or overspill and that turns into downstream flooding.

Flooding is taken as the second largest meteorological disaster in China, and has detrimental effects on people's lives. They further cause economic loss, the environment becomes destroyed and the local society also experiences long-term effects (Maosong, *et al.* 2008: 78).

EurAqua (1996: 4) is the European Network of Fresh Water Research Organizations and includes 15 publicly funded Research Organizations from 15 EU and EEA countries. The countries have put papers in place on floods, drought and institutional aspects which were presented during three different workshops. They all showed how floods were emphasized by different participants, and also determined by their country's individual geographic characteristics. Belgium for instance raised different aspects of flood protection science and policy like the ability to predict floods, their frequency and intensity, coordination of actions before, during and after the flood event, the socio-economic impact of floods and flood protection, technical possibilities of flood prevention and risk reduction and hydrological effects of potential global warming.

In the study of the Water Research Commission on National Flood Nowcasting System, (Author 2007: 4), the aims of the project which were built on previous research and development were;

- To put in place a national flood forecasting system.
- To use the system routinely, to use the system to alert vulnerable people, industry and disaster managers.
- To have recent information from satellites, radars and gauge estimation of rainfall,
- To provide flood nowcasts or forecasts to sensitive regions in as much detail as required,
- To interact and work with local Disaster Managers and local authorities
- To convert flows to inundation levels and
- To provide training initiatives for local disaster managers.

These will give warning of floods and the necessary steps can be taken to mitigate flood disasters.

Miller (1997), People at Risk and Strategies for Prevention report that floods are the most common natural disaster which causes large numbers of deaths. The study shows that floods are caused by different issues and this study indicates how floods can be mitigated and how citizens can be better informed. It will also help decision-makers to make mitigation policies in designing and implementing flood protection and alleviation measures.

People keep on developing land that is on the floodplain because of the soil being fertile there despite the risk of losing property and life. Flood plain management is instituted in this kind of situations in order to control floods. This is done by water resources, living resources and cultural resources, for instance keeping other plant and animal species which are of economic value like reed beds which provide material for traditional types of housing. In most cases dams fail to keep water and this overwhelms communities that are below the valley, sometimes with little warning. This can be prevented by dam safety regulations governing the design, construction and maintenance of dams. Existing dams should be checked against modern safety criteria.

Smith and Viljoen (2001: 35) denote that the degree to which a specific reach in a river is prone to flood damage will be determined among other things by the occupational pattern, topographical, geological and hydrological characteristics of the reaches. This means for the occupational pattern of flood plains, it is clear that the occurrence of floods could make progressively higher demands on aspects such as planning and control of both the floods and the utilization patterns in these flood plains. There are different factors which determine the damage potential of floods:

- The rainfall in the catchment area, which causes a specific land phase flood.
- The volume of water per second that will reach the river.
- The specific volume of water in a specific reach in a river, which determines the nature, extent and quality of the flood in the reach.
- The characteristics of a river.

A specific flood in a reach can result in flood damage depending on the position of human activities in the flood plain, the type of human activities in the flood plain and the structural and non-structural flood control. There is what we call primary flood damages and they are categorized into direct and indirect losses. The direct losses include municipal property and public lands, residential and other buildings in urban areas, moveable equipment in buildings in urban areas, property of other public authorities, agricultural land, crops and harvest,

livestock and other animals, fixed improvements and other equipment on farms. The indirect losses are in productive manpower, returns from resources like agricultural land and delays in transportation and other services.

According to Smith and Boardman (1989 s.p.), flood events leave visual evidence to be used in attempting to reconstruct flood history. Observation as a method can be used relating to destruction of artefacts such as walls and bridges. These can provide evidence in the short term, but probability of repair and problems of dating make them unsuitable over longer time scales. Tree-growth rings may also be useful in the short to medium term for evidence, but can be difficult to interpret where a change in land-use is a possibility. Lichens can be used as evidence over periods of up to and in excess of 100 years.

Disasters may be political or economical events which influence the hierarchical organization upsetting economics balances. They cause social disruption, disorganization and massive migration as social events. They may produce trauma, fear, stress and shock as psychological events according to Van den Bos and Bryant (1987: 11).

People are drowned and lots of deaths cases are reported as helpless human beings are swallowed by choking waters. Livestock and crops upon which nations depend become obliterated by floods. The level of damage by floods tends to increase with an increase of flood depth and also flood duration (Elliot & Leggett 2002: 29).

Flooding causes peril, but also have benefits for people. People use flood plains for agriculture which flourishes on rich alluvial soil that has been washed down by the flooding rivers, of which, one third of the world's population still depend for their food (Champ 1983: 19).

Man has always devised methods of fending off threatening waters by building dams that would divert or regulate floods, diversion channels to share the burden of a flood with the main river and levees or embankments to contain rising water. The people of Barotseland in Zambia always move to higher ground and wait for the floods to subside. This is unthinkable for urban dwellers that are always rescued by timely warnings accurately predicted. Nowadays sophisticated technology of radar equipment, satellites, computers and automatic stream-level and precipitation sensors are used by meteorologists and hydrologists. The early warning systems produce important information which is useful for drawing contingency plans and defining immediate actions to respond to floods (ALNAP 2008: 4).

Malele (2009: 29) argues that poor urban governance often make urban dwellers, their properties and the environment more vulnerable to the impacts of a number of hazards like flooding, diseases, fires and pollution.

2.5 Flood Risk

Flood risk is the likelihood of a flood event to cause damage to human health and life, the environment and economic activity. In quantifying the flood risk, the results are either in monetary units or loss of life units if the losses are measurable or are in qualitative terms in the case of intangible damages which are social, environmental or cultural (Pistrika & Tsakiris 2007 : 5).

2.6 Causes of Floods

There are two key elements that cause floods – rainfall intensity and duration. The rate of rainfall explains the intensity, and the duration is how long the rain continues. Flash floods take a few minutes or hours to develop after an intense rainfall or failure of a dam or levee, or sudden release of water held by ice or debris jam. These floods can catch people unprepared (Master's in Disaster 2007: 1-2).

Flooding can be caused by eruptions of water that are let loose by the bursting of man-made dams. Dams are subjected to pressure and the volume of water impounded behind them is enormous. Because water itself is extremely heavy, a well-designed, properly located and soundly constructed dam may only remain safe for hundreds of years and could not forever withstand wear, exposure and hydrostatic pressures that build up within the reservoir. To avoid disasters, dams must regularly be inspected and repaired. Floods can cause calamities and be taken as agents of death and destruction, but they also bring measureless bounties of blessings (Champ 1983: 20).

During a state of flooding, people in India and Pakistan sought refuge in tree tops and they lost their lives as they were bitten by venomous snakes. Rats are also driven out by floods and they spread diseases. Even the floodwaters themselves often cause diseases like cholera and typhoid which can kill a huge number of people (Champ 1983: 19).

Flooding is caused climatologically which may be in the form of excessively prolonged rainfall or melting ice. Some of the floods are not directly caused by climatology, for example

from excessive high tides associated with storm-surge effects caused by a combination of very low barometer pressure and high wind speeds; others are caused by earthquakes, landslides or failure of dams and other control works (Ward 1978: 6).

Barredo (2009: 101) in his article argues that there is evidence that societal change and economic development are the principal factors responsible for the increasing losses from natural disaster to date. He assessed normalized flood losses in Europe from 1970 to 2006. In his discussion after using relevant data, he says there is no evidence of a clear positive trend in normalized flood losses in Europe. Again based on a hypothetical scenario without climate change, he says flood losses would continue to increase as a consequence of societal and economic factors.

2.7 Elements at Risk during Floods

There are different elements that are involved and affected during a flood hazard. These elements are divided into physical, economic, societal and environmental aspects. Under the physical, infrastructure, critical facilities like schools and clinics, utilities like power supply and water supply, transport, communication and government services are affected.

The economic element includes business and trade activities, access to work and impact on the workforce that are affected. The societal elements which are affected are vulnerable age categories, low income group and gender. The last element which is the environmental aspect includes loss of biodiversity, damaged landscape, physical and chemical changes in the surroundings (Westen 2005: 23.)

2.7.1 Schools at risk during floods

Schools are vulnerable to floods. Damage to schools because of floods may include site damage, structural and non-structural building damage, destruction of service equipment, loss of contents and health and safety threats due to contaminated flood water. Flooded schools are usually closed while cleanup and repairs are undertaken. The severity of the damage and lingering health hazards determine the length of closure. There are schools that are already located in flood hazard areas and they may proactively undertake risk reduction measures. Schools are regularly identified to serve as short-term or long-term shelters. This

is because they have kitchen and restroom facilities, gymnasiums, cafeterias and wide corridors (FEMA 2004: 36, 46 & 59)

Schools do have plans in place to protect students and staff during a disaster. They also practise common emergency actions like evacuation, lockdowns and shelter-in-place during an emergency (Yale Centre for Public Health Preparedness 2008: 1-2). Sydney High School students have installed, monitored and collected data from a network of rain and river gauges, and linked it to a computer system in their school. This provides the Sydney community with advanced warning time in the event of future flooding (Sydney High School 2008: 1).

2.7.2 Children at risk during floods

Records by Tinh (Flood Kindergarten: Community Need to Community Solution) for Viet Nam showed that children comprised a majority of casualties during their previous floods. Children are separated from their parents, get lost in crowds or are swept away in the floods during crisis moments. During the 2002 disaster, no child died, but those who died were in their homes or on their way to school. The Vietnamese government has considered flood safety training and swimming lessons for children, also adding that to their curriculum.

The literature review of the Emergency Sector in Vietnam (2003: 5-6) argues that children continue to drown every year in the Mekong Delta despite the efforts of giving swimming lessons, distribution of life jackets and raising of awareness.

It was found by Brett (2001:1) that children find natural disasters terrifying because their entire world is disrupted and they are likely to feel fearful or angry. Some become clingy and dependent, refuse to go to school or childcare. It was also found that they might regress and become babyish with signs of withdrawal into inappropriate quietness or depression, others become disobedient.

According to Shile, s.a. children's future and psyche in North Karnataka was interrupted by floods in the year 2009 -10. The highest number of students dropped out of school and others who were in the flood affected areas did not enrol. Children undergo trauma during floods and the memories of that event haunt them. Some of them are relocated and they feel alienated and did not get nutritious food because of displacement from their villages. This leads to serious implications for their growth.

During the Kosi Floods, Bihar in India in 2008 there was measles vaccination in relief camps. There was also a provision of supplementary measles dose to all eligible children of six

months to 14 years in areas of congregation like camps, embankments and roadsides. Extra effort was put in to ensure that all beneficiaries in the 9 - 59 months age range received measles vaccine and were given vitamin A supplementation. This prevented high mortality. Children with diarrhoea were treated with low osmolar ORS sachets and a 10-day course of zinc (Varkey *et al*. 2009).

Children are highly vulnerable to climate change and disaster impacts. They are impacted both in the immediate and longer term as documented by a number of recent reports. Those of them who live in marginal environments and situations of poverty are more vulnerable. It was evident following the 2004 Indian Ocean Tsunami that the high mortality and morbidity rates were women and children under the age of fifteen. It is projected that climate change will increase the numbers of children affected by disasters, from an estimated 66.5 million per year in the late 1990s, to about 175 million per year in the coming ten years (Back, Cameron & Tanner 2009: 8).

It was reported in a Humanitarian Aid Decision (2006: 2) that in El Salvador, children under 11 years who were affected by Hurricane Stan work as street vendors, and this places great burden on their ability to attend school. Children over 12 years of age are often poorly educated.

2.7.3 Gender at risk during floods

According to Walker (1994: 4 – 5) women are affected by disasters, not just in their reproductive roles, but also in their roles as producers in their economy and providers of their families. They always lose earning capacity during a disaster and they worry about unemployment and lack of income. They have particular difficulties in managing their households without male support. Their supportive social networks are likely to be impaired in times of disaster and social dislocation.

Women are always afraid during a disaster. They have a feeling of insecurity and uncertainty and cannot concentrate on any work. Women also experience health problems because of tensions and psychological problems, which result in menstrual periods problems. Because camps do not have bathrooms and latrines, they always feel uncomfortable when they cannot bathe for days and if they do, they do it in a limited space in front or behind their shelter before day-break. They suffer most because of scarcity of water and children do not bathe because of lack of water.

Women are always uncertain about the future of their children during a condition of a disaster and they worry about children's schooling. They become afraid that their children

will turn into beggars if they do not go to school. Most of the women in shelters are unemployed and their shelters are always provided without doors, which renders them unable to leave their houses to seek employment (Walker 1994: 37 – 38).

Enarson and Scanlon (1999) conducted a study in Canada's Red River Valley focusing on gender patterns in flood evacuation. They found that the early gender-focused studies in cases of women caring for children, parents' spouses and kin is a highly significant aspect of disaster impact and that gender differences appear throughout the disaster cycle. Men came out to be one-dimensional "rescuers" and women appeared needy and rescued by men, expressed normative emotions and worked in stereotypical roles.

They concluded that women and the evacuation men experienced before, during and after were more the same than different and those were shaped by local flood subculture and by the ties of social class, life stage, ethnicity and family history. Fordham and Ketteridge (1996) say men dominate emergency management; they are responsible for the provision of basic necessities such as food and water at the designated centres whereas women take senior management positions in the care-providing areas such as social work, counselling and home help.

The Huaiau Commission did research on women's views from the frontline and found that women reported that they were excluded from emergency preparedness and response programmes.

2.7.4 Infrastructure at risk during floods

River systems happen to alter their course as a response to floods which lead to disruption in transport, agriculture and urban land-use (Bryantm 1991: 138).During flooding, the floods are accompanied by fire because power lines become broken and main switches are ruptured. Other systems like communication and transport are disrupted, bridges become washed down, rail tracks and highways also become affected by being torn apart (Champ 1983: 19).

In the North Western, Northern and Central Provinces of Zambia in Lusaka, some bridges, particularly those that were constructed by communities were easily damaged by floods due to poor workmanship; even schools that were built by communities collapsed because they were built out of pole and mud (The Zambia Vulnerability Assessment Committee (ZVAC) 2007: 14).

According to Kunreuther and Linnerooth-Bayer (1999: 10), if there is a delay in infrastructure repair because of unavailability of recovery funds, the length of time of household disruption and business interruptions will increase. In terms of the damage to health infrastructure, some facilities become inaccessible for several days because of damage to buildings and equipment. Non-structural systems like electrical, mechanical and medical components may render the services inoperable (Few, Matthies & Kovats 2004: 75).

2.8 Shelters Accommodating Victims of Floods

Security issues in camps are a problem during floods. Women and children are harassed by unknown people in camps as a result of migration of a large number of communities from flooded villages to camps in the cities. Families stay together under one shelter and women urge for security especially at night and noontime (Pirbhat Women Development Society s.a.)

Mali experienced heavy rainfalls which caused flooding where displaced families sought shelter in schools for several weeks and this caused Malian Government officials to postpone the start of the school year countrywide. Mali signed the grant agreement with the United States Government through the United States Agency for International development (USAID) for assistance to flood victims by rehabilitating schools, decontaminating school toilets and distributing food to affected families (USAID 2007: 1).

People in the rural areas of Lusaka were integrated within communities when it flooded, again in tents, churches, rural health and community centres. In the Central Copper belt Province, the urban people found shelter at unused structures like bars and taverns (ZVAC 2007: 13)

2.9 Effects of Flooding

There are effects of flooding which can be divided into primary, secondary and tertiary of long-term effects. The primary effects can be in the form of physical damage to any type of structure like buildings, bridges, roads, cars and sewer systems. The other form is of casualties where people and livestock die because of drowning. Secondary effects are water supplies which can be contaminated, water-borne diseases, crops and food supplies shortage and other species of trees which are non-tolerant can die from suffocation. Tertiary

or long-term effects are of an economic nature – there is a decline in tourism, rebuilding costs, food shortage which normally leads to price increases, etc.

World Health Organization (WHO) (2002: 2-3) supports the effects of floods by saying there are direct and indirect health effects caused by floods. Direct effects are mortality from drowning, heart attacks and injuries and indirect health effects include infectious diseases, poisoning and post traumatic stress disorders.

In Ward's (1978: 2) preface he says floods are regarded as the most dramatic interaction between man and his environment; it articulates the sheer force of natural events and man being unable or having inadequate efforts to control them. He goes on to argue that the flood disasters are man-made because man has put himself at risk by settling and developing in flood plains. He says agriculture, industry, roads, bridges and railway lines are put in floodable positions.

Branswell *et al.* (1996: 1-3) argue that in Canada, Quebec, the torrential rain left chaos in its wake and the only thing that was left was to rebuild shattered lives. The results of the rainfall were catastrophic with many rivers overflowing and the floodwaters ripping through roads, damaging bridges, destroying hundreds of homes and sweeping some away. It was also argued that the disaster forced cancellation of festivals and celebrations which affected tourists, with their hotels and other accommodations lacking power, roads, tracks and bridges washed out.

Another argument of torrential rains was stated by (Stojaspal *et al*. 2002: 2) that the same downpours sent floodwaters raging from the Baltic to the Black Sea, killing at least 100 people and damaging building, infrastructure and crops.

It was mentioned by Charles (2004: 50) that the people of Lozi (Barotse) of the upper Zambezi wetlands in Western Zambia shifted from the flooded plains around March and April of every year to upland homes for them to escape the hazardous floods which threaten their lives and property.

In Buffalo Creek in 1972, one hundred and twenty five people died in the floods and thousands lost their homes; the community was crowded into trailer homes. That resulted in a collective trauma which lasted longer than the individual trauma. After a year and a half of the event, 570 survivors still suffered emotional disturbance (Gruntfest 1995).

It was reported by OCHA (2010: 1) that in one of the Ugandan districts, floods submerged crop fields and vital infrastructure like roads, schools and houses. That affected about 33 305 people largely through the loss of crops. Southern (1979: 175) argues that the impact of

floods is dependent on the mode of life and economies of the affected communities, the frequency and magnitude of the rainfall, and the willingness, capacity an understanding of the dangers involved by communities at risk.

2.10 Coping Mechanisms for Floods

Communities have concepts of coping mechanisms and they are:

- Communities do not do anything about floods but learn how to live with them.
- The usage of non-structural measures like flood insurance
- The usage of intensive and extensive structural technologies, for example floods levees, terracing of land and soil conservation.
- Joint usage of non-structural measures and structural technologies which are believed to be the best alternative (Dewi 2007: 15).

In the case study of floods in the Bagmati and Rohini basins in Nepal, families tend to use coping mechanisms and strategies for floods as follows: saving themselves and valuables, saving food and supplies, saving animals and their fodder and in cases where there is severe flooding, families release their livestock and move to safer places (Case Studies: Adaptive Capacity and Livelihood Resilience s.l.: 127).

ALNAP (2008: 3) argues that coping with recurrent flooding, reciprocal support among neighbours, immediate family members and wider kinship networks is a vital safety.

2.11 Flood Forecasting and Warning

There are benefits to flood forecasting and warning. The flood forecasting provides a basis for warning and for people to make informed decisions to reduce losses by floods. The warnings should be communicated to those at risk. The recipients of warnings must be capable of acting and responding effectively to reduce potential losses of people and property within the available time window. Reduction of the adverse impact of flooding depends on the three elements, which are the nature of the flood event, the development of

effective flood forecasting, warning and response system (FFWRS) and the characteristics of the flood as indicated by Parker, Tunstall and Wilson (2005: 1).

Silverstein (1992: 171) advises that in trying to prevent and reduce damage of disaster, science and technology have produced electronic disaster intelligence-gathering systems like satellite sensors, atmospheric weather sensors, earthbound detectors and oceanic monitors, search and rescue and rubble examination and emergency medical and environmental remedies and all these are done or applied to save lives and property.

In a study done by Krasovskaia *et al*. (2007: 387) focusing on perception of flood hazards in countries of the North Sea region of Europe, they said extreme floods were rare events, and they still came as a surprise to inhabitants of the floodplain. These people are often lulled into a false sense of security by the technical protective measures undertaken. When assessing the flood risk, it includes the perception of risk by the general public and decisions-makers, on top of the meteorological events, hydrological regimes, flood hazard mapping and technical means.

In trying to get the perception of flood hazard, laymen were asked questions directly instead of studying their behaviour in a flood situation. It was found that there were more similarities than differences between countries in the way people perceived flood hazards. Some of the findings are that there was limited interest in flood hazard, poor involvement in flood issues and sentimental rather than logical reasoning for living in areas at risk of flooding among other things. He concluded that public perception and common sense cannot replace science and policy but they can certainly provide the impetus for the decision-making process.

2.12 The Use of Geographical Information Systems (GIS) and Remote Sensing for Flood Disaster Management

Geographic Information Systems (GIS) is software which assists with the procedure to collect and analyze spatial data for hazard and risk assessment for various natural and man-induced hazards (6th Regional Training Course: 2010:1). There is an approach for flow routing of floods in a GIS based model. This approach determines the rainfall runoff response and flood routing through catchment. The flow velocity depends on the location and on the local slope, roughness and hydraulic radius (Li, *et al.* 2003: 91).

A remote sensing and a GIS-based flood vulnerability assessment of human settlements were used in a case study of Gangetic West Bengal in India. India has a problem of river

flooding. From September to October 2000, 22.1 million people were inundated by floods and the administration of the country was caught unprepared for the condition. Remote sensing and GIS assisted in the creation of national level flood hazard maps. Data on population density and other socio-economic factors had been integrated with hydrological information in order to identify and prioritize zones for implementing measures for anti-flood.

The satellite imageries created by remote sensing and GIS enables one to obtain detailed classification results which help in formulating planning measures. This also enhances the capability of the spatial database to estimate vulnerability of settlements to an extreme flood event (Sanyal & Lu 2005: 3699 – 3700).

Emphasis on non-structural measures of flood management and control are greater than structural measures. The non-structural measures are flood forecasting, flood-inundation mapping and flood plain zoning. Remote sensing is an indispensable tool in the study of floods because it has the capacity to provide near real-time data, enables preparation of maps of inundated areas and capacity to assess damages (Kale s.a.: 42).

2.13 Communication during Floods

In Bangladesh, a public awareness programme was launched to communicate benefits of flood preparedness so that the communities could become safer. The awareness project was to change the existing perception and attitude to motivate behavioural change. An example is taken of one of Bangladesh municipalities where people use the cheapest common transport which is called rickshaw jams. Placards are placed in these jams which carry messages to promote benefits of house raising, tree planting or food storage as flood preparedness actions. Commuters have one in 200 chances of being exposed to these placards. Other methods used are billboards, posters, movie houses, municipal official letterheads, drama and folklore songs (Asian Disaster Preparedness Centre 2004: 1, 2, 4).

Sudan floods (2008: 1) developed an emergency communication plan. In the plan, all the emergency stages, communication objectives, infrastructure, audience and communication products were tabled. An example of the emergency communication plan is provided in Table 2.1.

TABLE2.1 SUDAN FLOODS 2008 EMERGENCY COMMUNICATION PLAN

Emergency Stages	Communication Objectives	Infrastructure	Audience	Communication Products
Pre-emergency	To encourage community and individual preparedness	Flood Task force	Public	Email messages

Risk communication is necessary between residents, local communities and government agencies. Risk communication is used to prevent flood disasters. A new system called Participatory Flood Risk Communication Support System (Pafrics) was developed by the Research on Social Systems Resilient to a natural Disaster Project Team. The system uses three support functions, namely learning support for flood risk literacy, making a choice of flood disaster mitigation measures and the holding of workshops (Takouchi & Suzuki 2006: 213).

2.14 Flood Mitigation

Flood mitigation measures have to be considered at the early strategic stages in order to reduce and manage the flood risks, especially those associated with development. The drainage system should also be part of the strategic approach to flood management (Entec 2006: 29).

Marikina City in the Philippines has succeeded with their flood mitigation programme which has dramatically decreased the exposure of floods to residences, businesses and critical facilities. This was achieved by the city's priority projects to concrete roads, construction and rehabilitation, massive dredging operations, demolition of obstruction caused by illegal settlers and the continued improvement to existing diversion channels and interceptors (Metropolitan Manila s.a.: 2, 3).

Tumbare (2000: 6) also agrees to flood mitigation which includes emergency preparedness plans, river catchment management and the comprehensive international agreements to reduce atmospheric pollution.

2.15 Capacity Building in Disaster Management

Capacity building could help to close the gap in disaster management by sharing and transferring of knowledge, recognition of the role of each stakeholder, increase in awareness among agencies and public, bringing of specific solutions for the country, development of coordination among main stakeholders and reduction of duplication of activities (Samarakoon s.a. 9).

WHO (2008: 1) emphasized the importance of undertaking training and capacity building initiatives for emergencies in Bangladesh. The Department for Environment Food and Rural Affairs (2010: 3) agrees in its draft strategy for skills and capacity building in local authorities for local flood risk management that local authorities are the best placed bodies to take responsibility by improving knowledge and skills of existing staff members.

According to Gwimbi (2009: 71), capacity building in rural communities against negative flood impact has to be done through livelihood resilience building and resilience strategies.

2.16 Integrated Flood Management

Integrated flood management embraces principles embedded in integrated water resource management and those of risk management. This integration embraces land and water resources development in a river basin, use of floodplains and the reduction of loss of life due to flooding. There is a combination of policy, regulatory, financial and physical measures in trying to cope with floods, and at the same time recognize that floods cannot be fully controlled (Water Meteorological Organization & Global Water Partnership 2008: 29).

According to Green (2002: 3), integrated flood management involves integration across the catchment between land and water management, and between different uses and functions of water management. The effectiveness of integrated flood management needs increased cooperation and collaboration across sectors and public participation. From the start, there should be greater mobilization and rallying for greater stakeholder participation. Greater stakeholder participation in flood policy development is vital because it enables inhabitants of flood-prone regions to choose their risk level of readiness. Participation at local and national levels of government agencies, technical specialists and local residents is critical in carrying out risk assessment of the area (Water Meteorological Organization & Global Water Partnership 2006: 31).

2.17 The Social, Psychological and Economic Impacts of Floods

2.17.1 The social impact

The social impact has the consequences of altering the way in which people live, work, play, relate to one another, organizing to meet their needs and generally cope as members of a society according to Provention Consortium Secretariat (2007: 1). Floods cause social disruption which can seriously undermine the quality of life of individuals and affected communities (Werrity *et al.* 2007: 16).

The social aspects of vulnerability to floods can be used as tools to develop policies that can minimize risk and maximize the ability of communities to anticipate and adapt to the flood hazard. Investigations into the past floods impact will characterize the social aspects of vulnerability of individuals and communities. It is difficult to generalize the relationship between the scale of the event and the actual or the potential hardships suffered because the same event may have different effects on the adjacent households. If communities have to adapt to the flood hazard, there is a long-term increase in coping capacity which can arise from combined changes in individual behaviour, resources, infrastructure and functions of individuals and their communities (Werritty 2007: 8 – 9).

There are health effects in terms of the consequences of flooding and they are categorized into those happening during or immediately after the flooding, those that develop in the days or early weeks after the flood and the longer effects which appear after or would last for months or years (WHO 2002: 2).

IOM (2008:1) reported that heavy rains had once affected Zimbabwe, Zambia and Mozambique and that there was an increase in reported diseases ranging from malaria, diarrhea and skin diseases due to bad sanitation and stagnant water. People had been unable to seek medical assistance due to bridges having been washed away and clinics being far. Access to many communities was not there. People lost their belongings.

Survival of a hazard depends on an individual, family or community in that they have a choice to heed the warning of a hazard, if not, they bear the brunt of losing property, suffer injury, loss of friends or relatives or death. Before the event, there are warnings for evacuation. Because people have a sense of home in a particular area, that over-rides the common sense about the threat of a disaster, they continue living in that very dangerous

area. This is because home is familiar with people that one knows even at a personal level. Also that it is difficult to give up the historic identity with the area, maintaining links with the past or with ancestors and to sustain one's roots. No threat will make them leave the place, and they always rationalize the threat to minimize the occurrence. It is also true that if the place is attractive in its own way, it is likely to grow in population despite any calamity (Bryant 1991: 259-260).

Foster (1980: 247) is of the view that communities exhibit a high degree of solidarity during the emergency phase of a disaster because there is an intense desire to help each other without expecting reward or compensation. He says that this community spirit is as a result of sharing common problems and participation in collective attempts to tackle them; and further says conscious efforts should be made to enhance and nurture the community morale.

The poor living conditions of very large numbers of people add to the dimensions of a disaster. A disaster often causes greater degrees of social exclusions. Poverty causes disasters and disasters worsen poverty which then gives rise to feelings of vulnerability and fatalism (Beristain 2006: 9 – 11). The people who live in flood plain areas are often poor people because they cannot buy legal land and they end up occupying vacant land along the riverside. It is also found out that many planned settlements are also built on landfills in the lowland areas (Sagala 2006: 2).

2.17.2 Psychological impact

One of the effects of a disaster is that tens of thousands lose their lives, and those that survive suffer pain and disability according to Ehrenreich (2001:5). The obvious short-term effect is emotional, and grief may also be long term. There can be longer-term responses that are interpersonal, societal and economic in nature. The psychological effects of a disaster are created by direct social and economic effects.

In the wake of a disaster, people grieve for their loved ones, treasured personal memorabilia, lost documents and lost familiar neighbourhoods. Following a disaster, a wide variety of emotional disturbances occur with chronic grief, depression, anxiety or guilt. After it has happened, some people have difficulty in controlling anger, suspiciousness, irritability and hostility and others get withdrawn or avoid people. Disturbed sleeps by nightmares and flashbacks of disasters may occur in other people. Some of these feelings lead people to drug abuse or alcohol.

There is what is called secondary traumatisation. This is when “secondary victims”, who are families of those affected, onlookers and observers, relief workers, medical and mental workers, all experience serious emotional effects. Other people that can be traumatised are journalists, human rights workers and relief workers that do need assessment. For people to have emotional trauma after a disaster has struck, might be called a “second disaster” which is the effect of the response to a disaster.

There are victims that are forced to take refuge in a shelter after a disaster has happened. They are confronted by personal and material losses, loss of privacy, community, independence, familiarity of the environment and certainty with respect to the future. Very often or always family roles and ordinary work roles are disrupted. In addition to the above, poor sanitation, inadequate shelter, contaminated water and food may produce epidemics which spread illnesses that result in death. In most cases women are raped and assaulted. All these bring distress to the victims of a disaster. Victims may show psychological effects in the hours immediately following a disaster, over weeks or even a year or two after the event. Other people show unexpected reappearance of symptoms during anniversaries of a disaster. Reactions of a disaster have to be resolved so that they are not the source of distress and dysfunction for individuals, families and society (Ehrenreich 2001:1-13).

Bland *et al.* (1996: 18,23) report that disaster have been found to be associated with increased prevalence of severe psychiatric symptomatology, post traumatic stress disorder, anxiety, depression, somatic complains and nightmares and sometimes a delayed onset of some of the symptoms are experienced. Some disaster associated distresses are not simply a function of exposure to a disaster, but rather are dependent on consequences such as resulting in evacuation or financial loss. People deal with death and grief; they overcome the problem of fatalities following a disaster by having a funeral service of those who died, which is the worst outcome of a disaster. Destruction of property leaves longer scars.

Usually after the scene of a disaster and evacuation, people want to go back to resettle in the same place they were living before the disaster. This happens because of a number of reasons; some of them are that people do not have an alternative place to live or an alternative job to undertake, to protect their property which show that humans are territorial and it is not easy for them to surrender their property.

A psychological benefit is that going back to resettle at the same place and rebuild as fast as possible, makes people forget the actual event, because they are kept busy by something they are familiar with, and because their minds are kept off the disaster; they build up self-esteem and overcome feeling of hopelessness. Rebuilding is also a sign of loyalty to friends or relatives who have been called by a disaster and show respect of ancestral links, not to

mention religious beliefs. Some people believe that modern-day technology can prevent destruction in future disasters, for instance building on rubber bungs to prevent destruction by earthquakes (Bryant 1991: 264 – 267).

Bush (1979: 31 – 36) states that a disaster is an intrusion into the total life of an individual – emotionally, physically and spiritually. Individuals undergo sub-stages which are a period of denial, when he does not admit the threat and a period when he acknowledges the threat. People tend to believe in personal immunity where they say a disaster cannot happen where they live and when it does happen, it cannot happen to them. The consequences of denial lead people to placing themselves and their property in grave danger by refusing to heed the warnings, the consequence of anticipation, of admitting that the treat leads to advanced precautionary measures and people become intensely alert to indications of the threat.

It was found out by Penning-Rowell *et al*. (2005:1) that adults who experienced floods had a four-fold higher risk of psychological distress compared with the non-flooded. During the flood situation in Vietnam, affected people were struggling to cope amid the loss of family members, destruction of homes, property, crops, livestock and lack of clean water (Emergency Appeal 2008:1).

2.17.3 Economic aspects

Wards (1978:173-175) alludes that floods cause considerable damage, but can have beneficial effects like deposition of an agricultural land and the recharge of soil moisture. He further says there are tangible and intangible damages. Quantification of intangible usually poses major problems; these include fear, anxiety, annoyance, distress, insecurity, ill health and ultimately loss of life. The loss of human life and homes during floods is tragic and has sudden impact according to Schneidergruber *et al.* (2004).

The tangible damages can be divided into a further subdivision of direct and indirect categories. When referring to direct damages, he says they result from direct physical contact of damageable property with flood water which is assumed to be the cost of restoration of that property to its pre-flood condition. Examples of direct damages include physical damage to buildings and their contents, bridges, roads, railways, agricultural land and loss of agricultural crops.

Damage to public infrastructure such as roads, electricity, energy supply system, buildings, industrial facilities and private property are the most immediate evident effects of flooding as stated again by Schneidergruber *et al*. (2004). In explaining the indirect damages, they are losses resulting from the breakdown of certain physical or economic linkages and its

examples are loss of production, loss of income and business and delays in transportation of goods.

In his article, Vlachos (1995: 1-2) says floods is a *"sociological"* phenomenon which extends beyond hydrological conditions and which encompasses consequences regarding the well-being of human communities. The social environment is always changing because of the urbanization, sprawl, increasing densities or industrialization and these in turn may affect vulnerability to floods of the population. The geographical distribution of river valleys and low lying coasts attract humans for their settlement. Urbanization and deforestation increase the magnitude, the frequency and the intensity of floods.

As Bryant (1991: 260) mentions, a decision to evacuate to a safer place represents an economic decision because it costs money. It is a loss of income also for people who do business in the area. Direct financial loss by most community members initiate monetary problems that are related to inflation in the prices of available housing and business premises, increases in land values and the cost of rebuilding. There is always pressure for compensation or special fiscal assistance to cover private property losses (Foster 1980: 248).

According to Grossi and Kunreuther (2005: 38 -39) there are certain challenges for insurance in terms of natural disasters as they involve potentially high losses that are extremely uncertain. These can cause huge economic damages and loss of many lives. One factor that influences that is that natural disasters involve spatially correlated losses from a single event.

Banerjee (2007) mentions that agricultural wages decline sharply in districts that experience severe flooding in Bangladesh. They experience long periods of continuous inundating and deep flooding which pose a severe threat to the economy of Bangladesh. The agricultural workers are affected by abnormal floods regarding their wages and these workers constitute almost 40% of the total rural population. These workers are poor and landless and they have their wages as their principal sources of livelihood. What happens is that in the early monsoon months, the severe and prolonged flooding will destroy crops and disrupt normal production activities in the submerged fields. When this is happening, the demand for agricultural workers for land preparation crop plantation, harvesting and post-harvesting processing decline, which adversely affect the yield. Usually the decline in demand for agricultural labour in flood months continues even in post flood periods in the regions that experience the most severe inundation.

CHAPTER 3

A SOCIO-ECONOMIC PROFILE OF RESPONDENTS

3.1 Introduction

This chapter provides a descriptive profile of respondents in terms of socio-economic characteristics such as gender, marital status, education, employment and their salary ranges. It covers fifty respondents used in this survey who were from Ga-Moeka and Ga-Motle villages in the Moretele Municipality. One hundred and fifty questionnaires were given out, but only fifty of them were returned. One of the reasons for the low response could be that uneducated people fear to commit themselves on paper as they were asking numerous questions about the questionnaire. They seemed not to be free to participate.

3.2 Background of Respondents

The majority of respondents, 60% were female and the males were 40%. The high percentage of female respondents could be attributed to a number of factors and one of them was that men were generally involved in migratory labour practices whereas women normally remained at home.

TABLE 3.1: GENDER DISTRIBUTION OF PEOPLE INTERVIEWED

Gender distribution	Percentage	Frequency
Male	40	20
Female	60	30

In terms of the marital status of respondents, in Figure 3.1, it was found that 72% of people interviewed were single, 20% married, four percent separated, two percent divorced and two percent widowed. This finding showed that the two villages were full of single people who were vulnerable when flooding occurred because they did not have a partner to look up to for help.

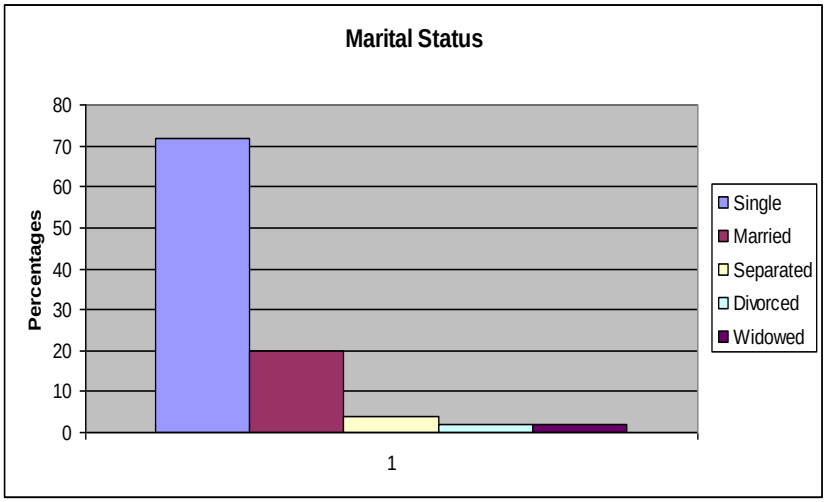

Fig. 3.1Marital Status of respondents

When one looks at the educational information of respondents, most of them were non scholars. The reason could be that higher percentages who were interviewed were adults. Out of all respondents, only 12% were scholars, 84% were non scholars and four percent did not indicate their educational status. This question was only seeking to identify problems of scholars and non scholars during flooding. Scholars in most cases were unable to go to school because of floods. The graph in Figure 3.2 indicates their educational range.

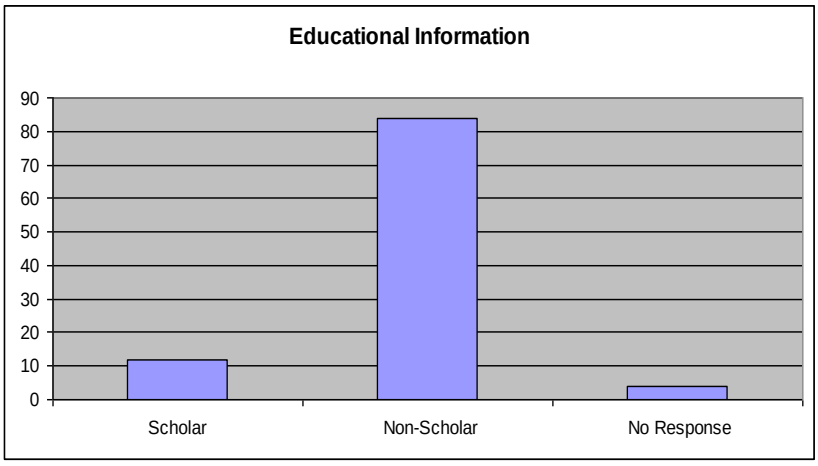

Fig. 3.2 Educational Information of respondents

3.2.1 Employment

Most of the families had only one person working. In Table 3.2 the findings show that 48% was the highest from respondents compared with only two percent of people not working in a household. If only one member was working, it does not necessarily mean he/she was earning a better salary, but it could be the one who earned between R500 and R2 000. If

there were diseases contracted at times of floods, most of them were unable to afford to seek medical help. Deaths could occur because of that situation. It again showed that people living in the area were dependent on government support.

TABLE 3.2: NUMBER OF PEOPLE WORKING IN A HOUSEHOLD

Number of household members working	Percentage	Frequency
One	48	24
Two	24	12
Three	4	2
Four	2	1
None	22	11

The depiction of the graph in Figure 3.3 shows that many people, at 60%, did not show their salary ranges because there was a high percentage of unemployed people in the area.

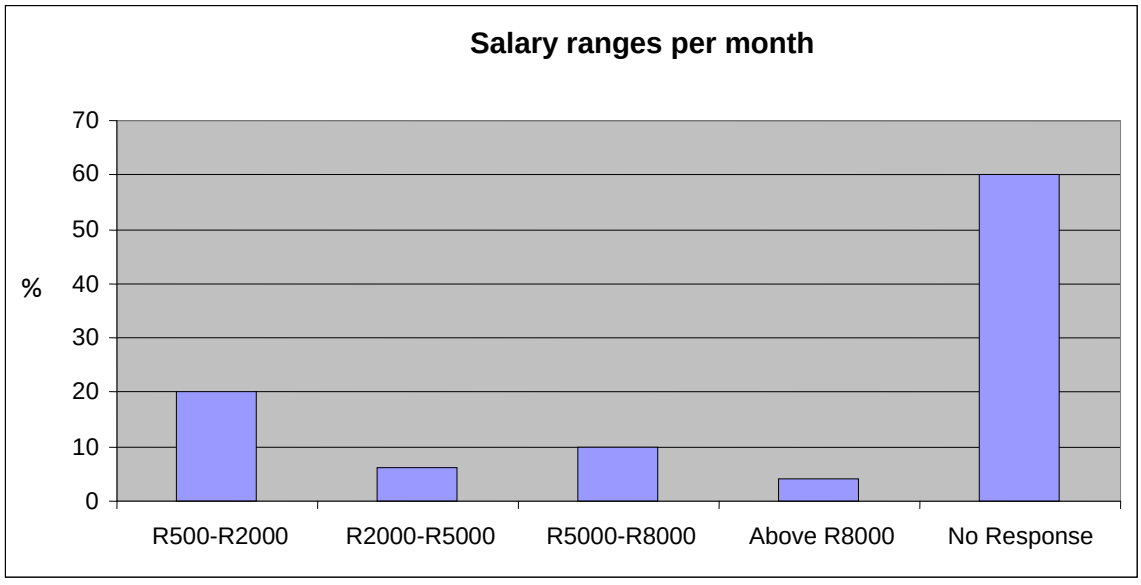

Fig. 3.3 Salary Ranges per Month

Figure 3.3 regarding the salary ranges depicts the socio-economic problems that the community had in the area. The problem of affordability of activities related to losses because of floods would be experienced by many people.

A high percentage of 56% of households consisted of three to five members. That was a depiction of average families residing in the area, and they could manage if those families

received average salaries. Table 3.3 indicates how the number of members in a family varies.

TABLE 3.3: NUMBER OF HOUSEHOLD MEMBERS

Number of household members	Percentage	Frequency
Alone	4	2
0 - 2	2	1
3 - 5	56	28
6 - 8	30	15
Above 8	6	3
No response	2	1

3.2.2 School going children

The survey revealed as shown in Table 3.4 that 28% of households indicated that they did not have school going children, 48% had one or two going to school, 16% had three to four while six percent had five to six children going to school. Two percent did not respond. In total, 70% of children were going to school. This depiction shows that most of the school going children are affected when the area experiences floods.

TABLE 3.4 NUMBER OF SCHOOL GOING CHILDREN

Number of school going children	Percentage	Frequency
0	28	14
1 - 2	48	24
3 - 4	16	8
5 - 6	6	3
No response	2	1

3.3 Summary

This chapter provided a profile of respondents studied in terms of various factors. Some of the factors discussed had a marked impact on how people behaved after flooding had occurred in their area and therefore provided a deeper insight into how such communities could be assisted.

The information gathered showed that Ga-Moeka and Ga-Motle communities were affected by floods. Sixty percent of them *(fig. 3.3)* did not show their salary range which indicated a high percentage of unemployed people in the area, and therefore they could not afford to replace their belongings if they had been damaged by the floods. Most of them were not educated. A high percentage of 84%, indicated in Figure 3.2, were non scholars and four percent did not indicate their educational status, therefore could not get decent jobs which could pay for their needs, for example going to the doctor if they contracted diseases caused by floods or attend psychological sessions if they were psychologically affected by the floods.

Of the people interviewed, 72% as can be seen in Figure 3.1, were single, 20% married, four percent separated, two percent divorced and two percent widowed. This large percentage of singles showed that they did not have the support of a partner during distress therefore stress levels might rise. The majority of respondents at 60% evident in Table 3.1, were female and the males at a low of 40%. Women are believed to be more vulnerable, and floods increase their vulnerability and the risks of their livelihood (Fordham 1998: 127).

CHAPTER 4

SOCIAL, ECONOMIC AND PSYCHOLOGICAL IMPACTS OF FLOODS

4.1Introduction

The purpose of this chapter is to describe the impact of flooding on Ga-Moeka and Ga-Motle communities and to highlight social, economic and psychological factors affecting the impact. The chapter also aims to determine whether the factors stated in the discussion had any influence on how flooding impacted in their area. The analysis reported in this chapter is based on the data gathered through questionnaires.

4.2 Social Impact of Floods in the Area

The social impact section deals with how communities in Ga-Moeka and Ga-Motle experience flooding, its frequency, the causes, members of families affected, school going children, reasons for staying in affected areas, how scholars are affected, assistance during flooding, reasons for flooding, warnings and their future plans.

In the analysis 96% (48) indicated incidence of flooding in the environment whereas four percent (two) did not. This high rate of people experiencing floods is a confirmation of floods in the area.

The frequency of the floods in the area is determined by how many times during the year the communities experienced floods. There were members of the community who experienced floods once, twice or thrice a year,- very frequently - then there were those who did not experience it at all. It was established that the most frequent flooding was twice a year indicating how many times a year the people had to suffer the consequences of floods. For the people in Ga-Moeka and Ga-Motle twice a year was too much since their profile showed that a high percentage of them were not working to be able to cover the costs during and after the floods. In Table 4.1 the frequency of the floods in indicated.

TABLE 4.1 PROFILE OF INCIDENCE OF FLOODING

Incidence of flooding in a year	Percentage	Frequency
Once	14	7
Twice	56	28
Thrice	16	8
Very frequently	12	6
No Flooding	2	1

The respondents in the survey area had to pinpoint the cause of flooding whether it was from heavy rains, bursting of a dam, overflowing river or building in the floodplains. The results of the survey can be seen in Table 4.2.

TABLE 4.2 CAUSES OF FLOODS

Causes of flooding	Yes	No
Heavy rains	45% (90)	10% (5)
Bursting of dam	60% (30)	40% (20)
Overflowing river	6% (3)	94% (47)
Building in the floodplain	2% (1)	98% (49)

The analysis shows that more people believed that flooding was caused by bursting of a dam nearby and the second highest believed it was because of heavy rains. After heavy rains or a dam bursting, the whole area was covered in water.

Respondents had to give reasons why they went to live in the Ga-Moeka and Ga-Motle areas. They responded that it was next to where they worked, close to relatives and friends, a cheaper place to stay, owning places and having nowhere to go. The highest percentage of 50 found the place to be cheaper. The lowest percentage of six decided to have their own places and did not stay with their parents. The issue of flooding did not deter them from seeking a place to live in the two areas.

TABLE 4.3 PROMPTS TO STAY IN GA- MOEKA AND GA-MOTLE

Prompts to stay in Ga- Moeka and Ga-Motle	Yes	No	No response
To be next to school or work	26% (13)	72% (36)	2% (1)
To be next to relative or friends	10% (5)	88% (44)	2% (1)
It is cheaper to stay there	50% (25)	48% (24)	2% (1)
To have own place to stay and not stay with parents	6% (3)	92% (46)	2% (1)
Had nowhere to go	14% (7)	82% (41)	4% (2)

Of the respondents, 70% did not respond to this question because many of those interviewed were single women. The impact of flooding on schooling was not bad as only 10% were absent only for one day, four percent were absent for two weeks, eight percent were absent for the whole week and eight percent had never been absent. Table 4.4 shows if flooding caused absenteeism.

TABLE 4.4 IMPACT OF FLOODING ON SCHOOLING

Impact of Flooding on Schooling	
Absent for one day	10%
Absent for two days	4%
Absent for the whole week	8%
Not absent at all	8%
No response	70%

The analysis showed that there was no correlation between flooding and schooling. In Ga-Moeka and Ga-Motle flooding did not cause too much disruption at schools because most of the residents did not go to school, only a total of 22% were affected by floods during school time.

4.2.1Aid received during floods

Of the respondents 66% indicated that they did not receive any help from any source during floods as compared to 34% who did as shown in Table 4.5.

TABLE 4.5 ASSISTANCE DURING FLOODS

Getting help during floods	**Percentage**	**Frequency**
Yes	34	17
No	66	33

Respondents had to answer where they were getting help from during floods in their area and this is made clear in Table 4.6. The analysis indicated that the people in the area received a little help from neighbours (20%), relatives (16%), friends (4%), municipality (6%) or NGOs (2%). This was a disturbing position because the municipality was expected to take the lead in assisting victims of floods and in Ga-Moeka and Ga-Moeka it showed that the municipality was not involved and that there was lack of awareness regarding the plight of the people. The people themselves were not aware of the kind of help they could get from the municipality, because if help was not coming they should be in a position to initiate in asking for what they rightfully deserved.

TABLE 4.6 PLACES OF ASSISTANCE

Places to get help	Yes	No
Neighbours	20% (10)	80% (40)
Relatives	16% (8)	84% (42)
Friends	4% (2)	96% (48)
Municipality	6% (3)	94% (47)
NGOs	2% (1)	98% (49)

It was evident as seen in Table 4.7 that 44% of people were able to do their everyday chores during flooding compared to the 30% who could not and 26% who was sometimes affected. This finding depicted that the impact of residents' social activities were not too seriously affected by the floods. Those who were affected attributed this to having water all over the place, having no transport and because of badly damaged roads.

TABLE 4.7 MANAGING EVERYDAY CHORES DURING FLOODING

Managing to do everyday chores during flooding	Percentage	Frequency
Yes	44%	22
No	30%	15
Sometimes	26%	13

4.2.2 Reasons for being prone to floods

The analysis in Table 4.8 is to examine reasons for flooding in Ga-Moeka and Ga-Motle. The statistical significance shows that 64% believed their villages were in the low lying area. It was, however clear that out of 64% of respondents that agreed, only 12% gave "built in the floodplain" as a reason, while four percent, 38% and 68% gave built next to a shallow river, built next to a dam, and no river or dam management as reasons respectively.

TABLE 4.8 REASONS FOR FLOODING

Reasons for Flooding	Yes	No
Low lying area	64% (32)	36% (18)
Built in the floodplain	12% (6)	88% (44)
Built next to a shallow river	4% (2)	96% (48)
Built next to a dam with low capacity	38% (19)	62% (31)
No river or dam management by local authorities	66% (33)	34% (17)

It was determined, as seen in Table 4.9 that 80% of respondents had been living in the two villages for more than ten years and 20% fewer than ten years.

TABLE 4.9 PERIOD LIVING IN THE AREA

Period living in the area	Percentage	Frequency
Less than ten years	20	10
More than ten years	80	40

Table 4.10 shows that 88% of interviewed people had not been warned beforehand that the area was prone to flooding compared to the other 12% that were warned.

TABLE 4.10 PREWARNED AGAINST AREA

Warned of the area before	Percentage	Frequency
Yes	12	6
No	88	44

According to Table 4.11, 58% of the respondents were not planning on leaving the area anytime soon. Ultimately 86% would move away compared to only 14% of them who wanted to leave immediately for a safe area.

TABLE 4.11 ESTIMATED TIME BEFORE MOVING

Estimated time before moving	Percentage	Frequency
Not planning to leave the place	58	29
Will ultimately move	28	14
Immediately	14	7

The depiction is that even if the area was flooded, more people were afraid to go and look for safer places because they would be too expensive for them. People would rather suffer the short term of the impact of floods than go away and live forever in an unaffordable place. This decision by the people to withstand the impact of floods should take the municipality to task to provide basic services to their people. Extensive public awareness had to be done to reduce the effects of floods in the area. The profile of respondents in terms of schooling, gender and marital status was not looked at.

1.12.1 Summary of the social impact of floods in the Ga-Moeka and Ga-Motle communities

The findings show that the communities have learned coping mechanisms during flooding in their area as discussed in section 2.9 because they were not willing to relocate. The municipality had taken a back seat since their assistance to the community was not visible. Since the communities benefit from the cheaper place to live, it was the responsibility of the municipality to come up with programmes that would assist them. According to the

municipality disaster manager, they were planning to have a catchment to ease the burden of residents when it was flooding.

4.3 Economic Impact

The section on the economic impact looks at how many people work in the household, mode of transport they use to travel, their income, their expenses and their properties. All the above-mentioned items are costing the community a certain percentage of their income when their area is flooded.

A high number of people interviewed prefer taxis and buses; 34% preferred taxis and 28% buses illustrated in Table 4.12. Of the respondents 14% used their own cars. It is not surprising as most of villagers do not own cars and they earn low salaries or government pensions. Eight percent travelled by train and only four percent walked to work. The relevance of transport for this research was to determine which mode of transport was affected most and what percentage was of those forced to be absent from work. Because flooding affect infrastructure, all the modes of transport would be affected by floods and many people might not report for work during floods in the area. Berning, Du Plessis and Viljoen (2001: 1) say that the damage to infrastructure is determined by the size of the flood in terms of the volume of water that flows through the flood-plain and the length of the roads and other structures within the boundaries of the flood line that might be affected.

TABLE 4.12 MODE OF TRANSPORT IN THE AREA

Mode of transport in the area	Yes	No
Use taxi	34% (17)	66% (33)
Use bus	28% (14)	72% (36)
Use train	8% (4)	92% (46)
Use own car	14% (7)	86% (43)
Walk to work	4% (2)	96% (48)

According to Table 4.13, 82% of respondents did not have medical aid as compared to only 18% who had. It is a bleak situation considering the fact that 94% of them are victims of floods. Undoubtedly there will be a percentage who are affected by water-borne diseases and have to get medication. According to respondents, 80% experienced water-borne diseases such as cholera and measles during the flooding season compared to 20% who did not.

TABLE 4.13 MEDICAL AID

Medical Aid	Percentage	Frequency
Yes	18	9
No	82	41

Of the 82% who did not have medical aid, water-borne diseases cost them between R200 and R300. Those who spent between R400 and R500 were the minority at four percent. No one spent more than a R1 000.00 or more on water-borne diseases. Based on the salaries these people get, the amounts specified are too high for them to be experiencing these diseases; the highest percentages of peoples earnings was between R500 and R2 000 per month. In addition there are other daily expenses , for example transport and electricity. This analysis as shown in Table 4.14 means that people would try to save the money they had and not go to health facilities for treatment.

TABLE 4.14 COSTS OF WATER-BORNE DISEASES DURING FLOODS

Costs of water-borne diseases per month during the flooding season	
Less than R200. 00	20%
Between R200. 00 and R300. 00	62%
Between R300. 00 and R400. 00	4%
Between R400. 00 and R500. 00	4%
R1000. 00 and above	None

In Table 4.15 is an indication of losses suffered during floods as 92% of respondents lost belongings compared to eight percent who claimed they had not lost anything. This is a high percentage considering that they needed to be replaced. In most cases the replacement values are much higher. This is not a good reflection of the people's financial status.

TABLE 4.15 LOSS OF BELONGINGS DURING FLOODS

Loss of belongings during floods	Percentage	Frequency
Yes	92	46
No	8	4

It emerged that 88% of **r**espondents lost between R500 and R5 000 after the flooding event. As indicated in Table 4.16. Only 12% lost between R5 000and R50 000. The analysis shows that the people do not own expensive belongings as can be expected with the income they receive shown in Figure 3.2. These results show that the government has to assist people because they cannot afford to replace their belongings.

TABLE 4.16 COSTS PER FLOODING EVENT

Costs for flooding event	Percentage	Frequency
Between R500 and R5 000	88	44
Between R5 000. and R50 000	12	6

Of the respondents only 18% had insurance and 82% did not have. There was a significant relationship between what the people earned and how they spent their earnings. What they mostly spent on was on their basic needs. They could not afford to pay extra money on insurance. Of the 18% that paid insurance, cost them from R100 to R500.

TABLE 4.17 INSURANCE FOR BELONGINGS

Insurance for belongings	Percentage	Frequency
Yes	18	41
No	82	9

Table 4.18 gives an indication of the insurance premiums people pay for their belongings how many could afford to insure.

TABLE 4.18 INSURANCE PREMIUM

Amount for insurance premium	Percentage	Frequency
<R100	10	5
R200 – R300	2	1
R300 – R400	2	1
R400 – R500	2	1
Over R500	2	1
None	82	41

4.3.1Housing

The people staying in the area use different types of material to build their houses;80% used bricks and cement which is the material which can withstand floods. Other material used was zinc (12%), mud (six percent) and wood (two percent). The analysis shows in Table 4.19 that there were still those that were very poor and lived in mud houses. This is where the government has to provide RDP houses; at the newly identified area where there is no flooding, referring to Table 4.19.

TABLE 4.19 TYPES OF BUILDING MATERIAL FOR HOUSES

Type of material for houses	Percentage	Frequency
Mud	6	3
Brick/ Cement	80	40
Wood	2	1
Zinc	12	6

Forty six of the respondents, according to Table 4.20, wanted to sell their houses and relocate and 54% wanted to stay put. It is clear that those who did not want to sell were either satisfied with their conditions or the uncertainty of relocating was too much for them.. Relocation affects different aspects of people's lives and therefore needs thorough planning so that they did not end up being worse off than before.

TABLE 4.20 WISHING TO SELL THE HOUSE

Wishing to sell the house	Percentage	Frequency
Yes	23	46
No	27	54

4.3.2 Financial assistance from government or other sources

Damages from floods are rising because of dense population concentration and vulnerable assets in high risk zones. The recovery process of disaster victims is placed primarily in the hands of government (Kunreuther & Linnerooth-Bayer 1999: 3). It emerged that only 12% of respondents received financial assistance from the government and other sources compared to 86% who did not get any help at all. The significance here is that the government or the local municipality is not doing enough to help the community. The findings in the Table 4.21 and Table 5.6 depict almost the same low results regarding assistance coming from government/ municipality and other sources. This also reveals that many people will have to be subjected to their current conditions for a longer period or even for the rest of their lives.

TABLE 4.21 FINANCIAL ASSISTANCE FROM GOVERNMENT OR OTHER SOURCES

Financial assistance from government or other sources	Percentage	Frequency
Yes	8	4
No	88	44
Sometimes	4	2

4.4 Psychological Impact Section

Twigger-Ross (2005: 27) states in his report that flooding has the potential of bringing immediate, medium and/or long-term effects to communities. The long-term effects are mostly psychological. The study on the psychological impact of respondents looked at what happened to them emotionally when they experienced floods, for example suicidal emotions, coping strategies, trauma, relationships during floods, illnesses and recovery as depicted in Figure 4.1 When respondents experienced floods, 46% of them shared the shock with their friends and relatives, four percent became angry and another four percent did not feel anything. Twelve percent of the respondents experienced trauma. There was no one who had felt like committing suicide. However, there is significant indication that people become very emotional during floods.

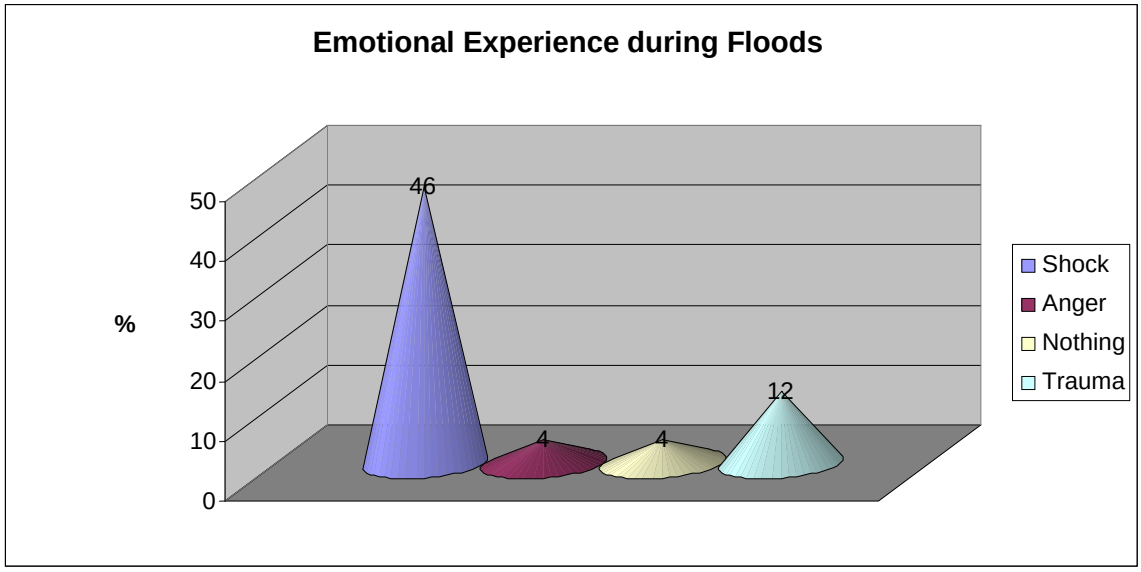

Fig. 4.1 Emotional experiences during floods

When looking at whether people felt suicidal during the floods, 88% never felt like that. Only two percent had felt suicidal, four percent said that sometimes felt like it and two percent always had the feeling when the floods came. There is no marked difference between the two groups of two percent as can be seen in Table 4.22.

TABLE 4.22 SUICIDAL FEELING AFTER FLOODS

Suicidal feeling after the floods	Percentage	Frequency
Yes	2	1
Never	88	44
Sometimes	4	2
always	2	1
It depends on the situation	4	2

Of the fifty people who responded to the questionnaire, it emerged that seven talked to friends and relatives when they felt suicidal, four went to church and only one person went for counselling as indicated in Table 4.23. The relationship between suicide and the impact of floods is minimal and this is an indication that people were able to handle the impact. The fact that not many people felt suicidal after the floods, corresponded with what they did when they felt like it; most of them did not do anything.

TABLE 4.23 COPING WITH FEELINGS OF SUICIDE AFTER FLOODS

What people do when having suicidal feeling after the floods	Percentage	Frequency
Go to church	8	4
Talk to friends	14	7
Go for counselling	2	1
Cry	0	0
Not applicable	6	3

This section's analysis is based on emotional feelings of the people living in the area. Living in Ga-Moeka and Ga-Motle provokes different feelings from different people. Some (22%) felt like relocating, some like staying. Others felt like living elsewhere (26%), 10% were uncertain and six percent did not feel anything. The highest percentage of people 26%, did not feel like relocating ever as is evident in Figure 4.2.

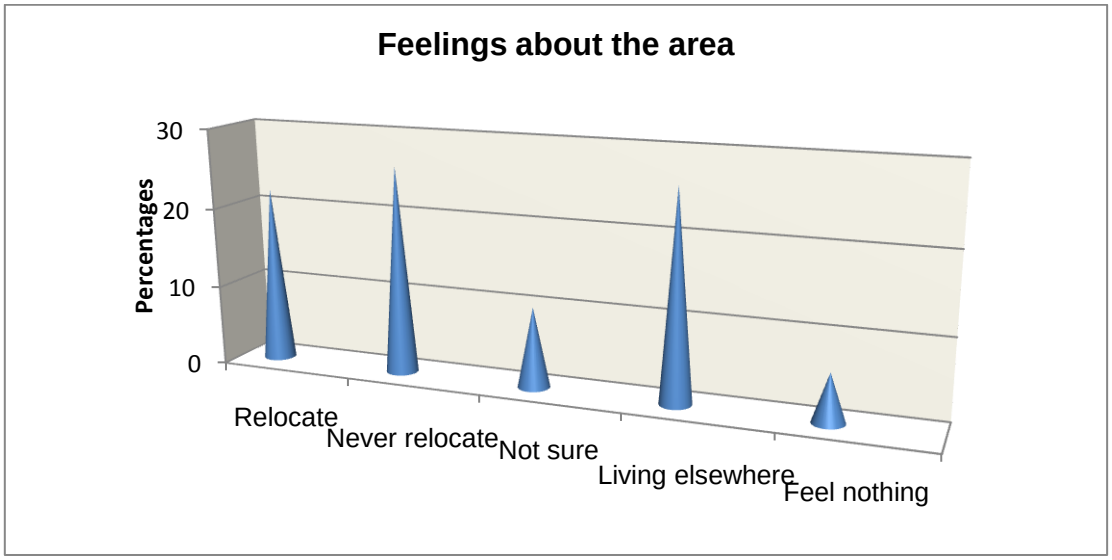

Fig. 4.2 Feelings about the area

When trauma is experienced, according to respondents it varies. Sometimes it lasts for less than a week, two weeks, three weeks, a month or a year. Figure 4.3 indicates that 18% experienced trauma for less than a week, two percent for two weeks, four percent for three weeks, four percent for a month and two percent for a whole year. The relationship between the duration of trauma and the impact of floods is minimal.

Hoedspruit's victim support unit (s.a.:1) explains trauma as an emotional shock which follows a stressful event and can manifest in various ways, like screaming, crying, withdrawing, complete calmness, emotional numbness and confusion or disorientation depending on the different personalities. It is illustrated in Figure 4.3.

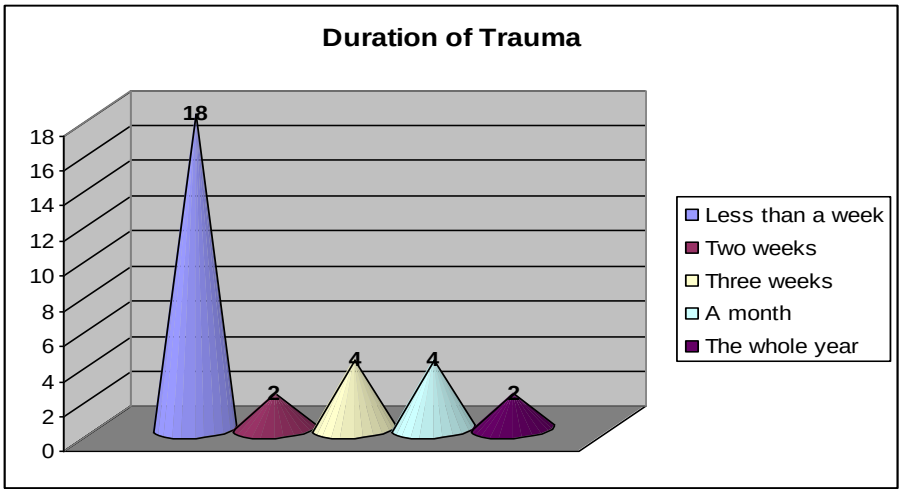

Fig. 4.3 Duration of trauma

In Table 4.24 it is clear that the 64% of respondents had normal relationships with family members after the flood, 12% were tense, six percent were happy even after the floods, ten percent had mixed feeling and eight percent did not comment. The normal relationships were positive signs which showed that there was not much harm done to families as such.

TABLE 4.24 RELATIONSHIPS WITH FAMILY MEMBERS

Relationship with family members	Percentage	Frequency
Normal	64	32
Tense	12	6
Happy	6	3
Mixed feelings	10	5
No response	8	4

Looking at Table 4.25, it is evident that compared to relationships with neighbours after the floods, it looked a bit different with; 20% normal, tense at 42%, happy at 14%, hatred at 14% and 10% breaking up their relationships. The cause of a highly tense situation could be that

they were worried about replacing their losses because most people were not working in the area as seen in Figure 3.3 showing the salaries that people earned.

TABLE 4.25 RELATIONSHIPS WITH NEIGHBOURS AND FRIENDS

Relationship with neighbours and friends	Percentage	Frequency
Normal	20	10
Tense	42	21
Happy	14	7
Hatred	14	7
Broke	10	5

The longest recovery period for the families after the floods was a year at 12% compared to the shortest of one week at 14%. For 28% it took two weeks, for 38% three weeks and for eight percent a month, as indicated in Table 4.26 Three weeks is an understandable average time to recover from the impact of floods. The analysis shows the highest percentage 38%, taking an average time to recover from the bad experiences they had during thee floods which resulted in loss of belongings and costs incurred to replace the losses.

TABLE 4.26 RECOVERY PERIOD AFTER FLOODS

Period for family to recover after the floods	Percentage	Frequency
A week	14	7
Two weeks	28	14
Three weeks	38	19
A month	8	4
A year	12	6

Spirituality has proven to be the highest coping strategy preferred after the floods and its impact according to the response of 48% in Figure 4.4. Some 36%, coped by talking to friends and relatives, two percent went for counselling, another two percent cried and 24% did nothing about it. Floods bring about emotional disturbances and losses and many people resort to their different ways of spirituality. Dewi (2007: 47) claims that there are different types of coping mechanisms which are economic, structural or social. The economic coping mechanisms are others like repairing minor damages to appliances, repairing damages to the house, constructing houses with reinforced materials, fixing things, purchasing cheaper food, continuing to go to work and saving money. The people in these two villages have to use those economic coping mechanisms.

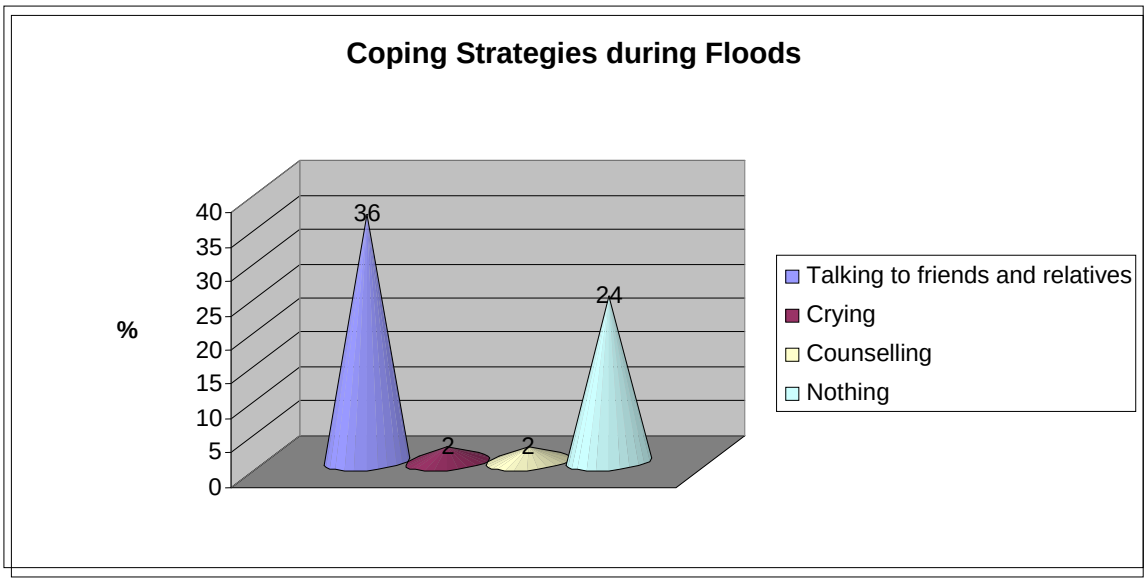

Fig.4.4 Coping strategies during flood

4.4.1Sicknesses/ diseases during floods

There were 86% of people contracting sicknesses/diseases during the floods compared to the 14% who did not contract any sicknesses/diseases. There is a high relationship between sicknesses/diseases and floods because a high percentage according to Figure 4.5 indicated that they had contracted sicknesses/ diseases during floods.

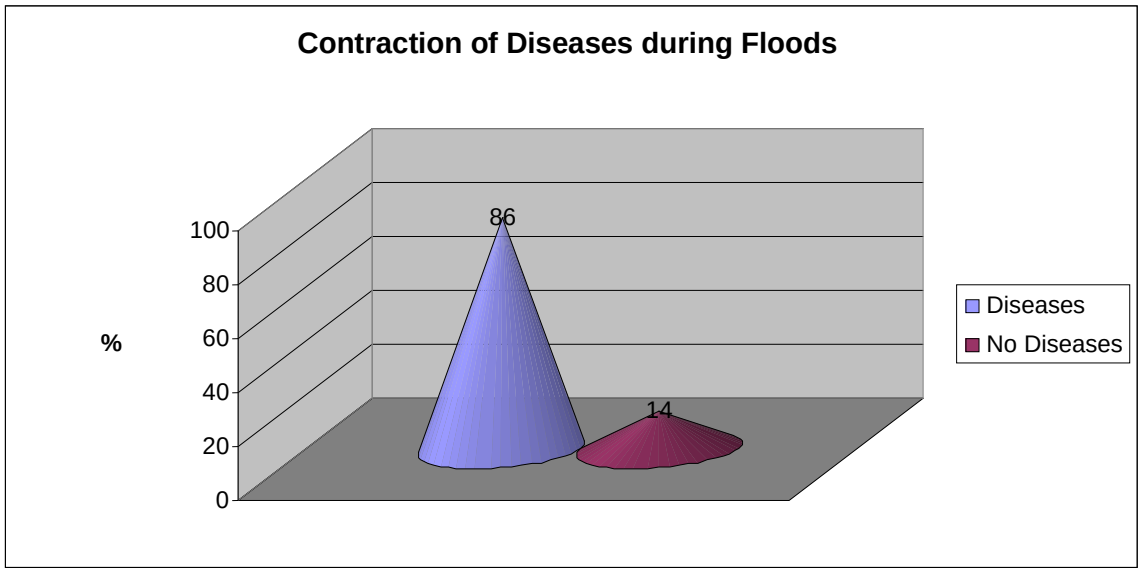

Fig.4.5 Contraction of diseases during floods

Floods cause various types of diseases/ sicknesses among the people. Some of them are dangerous and some are manageable. It depends on whether a person receives assistance to curb the disease/sickness to avoid its severity. According to Table 4.27, diseases and

sicknesses that are experienced during the floods are malaria at ten percent, the flu at 88%, diarrhoea at 14% and stress disorder at 16%. There was no indication of an experience of malnutrition. People visited clinics where they were diagnosed with these diseases. Since there was only one health centre serving Ga-Moeka and Ga-Motle, the centre was inundated by patients during the flood period. Mostly children were affected by diseases.

TABLE 4.27 TYPES OF DISEASES

Type of diseases	Percentage	Frequency
Malaria	10	5
Flu	88	44
Diarrhoea	14	7
Stress disorder	16	8
Malnutrition	0	0

As indicated by Figure 4.6, many families did not suffer loss of lives during the floods, namely 84% and only 16% experienced loss of life. Of them 24% lost fewer than five people over a period of ten years. Respondents were not asked the gender or age of the people they lost because of floods.

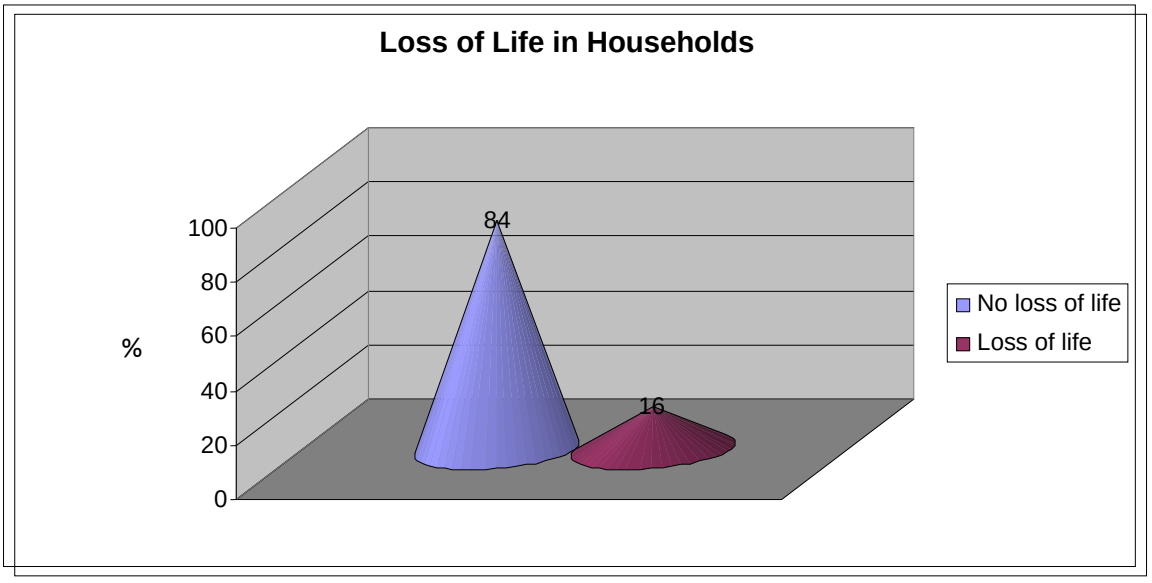

Fig. 4.6 Loss of life in households

4.5 Summary

This chapter has shown that when floods occurred, it influenced the social, economic and psychological factors of the community. It became clear that the floods definitely had an impact on the social activities of the people although the impact on school going children

was not very bad, because they managed to go to school after only a few days. Most people felt badly impacted as most of them did not get assistance and only a very small percentage managed to get help from their municipality.

The negative impact on the economy of the community has also been discovered. The impact was huge in terms of replacing property that had been destroyed by floods; medical expenses as many of them received little income; most of those who were working, earn from R500 to R2 000. They also lost on their salaries because they were absent from work because of the unavailability of transport during floods, which negatively affected the families they supported.

Psychological functioning of the people had been affected by the floods. A large percentage suffered from shock and experienced trauma for about a week afterwards and a very small percentage gets trauma that lasts for a year. Fortunately many people still had normal relationships even after the floods had subsided. A large number, however, contracted diseases which caused ill health.

CHAPTER 5

SUMMARY AND CONCLUSIONS

5.1Introduction

This chapter provides a summary of the study and presents its conclusion, as well as recommendations in terms of further research. In the summary, the objectives of the study are questioned to determine whether they have been achieved. In case of the non-achievement of specific objectives, reasons are provided.

5.1.1Specific objectives and its findings

The specific objectives of the study and its findings are summarized as follows:

- *To determine how the Ga–Moeka and Ga-Motle communities were affected socially by floods*

  The descriptive data provided by the study confirmed that the communities of Ga-Moeka and Ga-Motle were socially affected by flood events. This was particularly shown by the frequency of the floods in the areas which caused people not to be able to carry on with their daily responsibilities because of water that was everywhere, damage to roads and other infrastructure in and around the areas. The situation also influenced relationships with relatives, neighbours and friends either positively or negatively.

- *To determine how the Ga–Moeka and Ga-Motle communities were affected economically by floods*

  The data collected confirmed that the communities of Ga-Moeka and Ga-Motle were negatively affected, economically after the flood evenst. The reasons for the negative effects were that floods caused damage to their property and that needed to be replaced or insured. During floods people contracted water-borne diseases and sicknesses and they needed health care which was very expensive for them. Most of

the people of the two villages were not educated therefore they either earned very little or they did not work at all. That put a strain on their small income.

- *To determine how the Ga–Moeka and Ga-Motle communities were affected psychologically by floods*

In terms of the psychological impact of floods, the study has shown that the communities suffered psychologically after the floods. People were shocked, tense, angry, suicidal or full of hatred. Many used coping strategies like talking to relatives, neighbours, friends, resorted to spirituality, counselling or doing nothing at all. Some took a short time to recover whereas others took longer.. They also contracted diseases and sicknesses which could be deadly and sometimes they lost lives because of flooding.

- *To determine why Ga-Moeka and Ga-Motle are being flooded*

The study has shown that there were different factors which caused Ga-Moeka and Ga-Motle to flood according to the respondents' perceptions. It was found that respondents attributed that to heavy rains, bursting of a nearby dam, overflowing of a river, the areas are on the floodplain and there was no dam or river management in the areas. It was also found that the municipality was not taking enough care of infrastructure in their area, for example there were no bridges, the roads were poor and dams did not have the capacity to carry the water when they were full.

5.2 Conclusions and Recommendations

In conclusion the issues outlined in the objectives identified at the start of the study have been examined and some insight has also been provided into the social, economical and psychological impacts on communities after the flood events in Ga-Moeka and Ga-Motle in the Moretele Local Municipality. The recommendations that are cited hereunder will assist the communities to receive assistance from municipalities in order to alleviate the impact of floods when they occur. They will also assist municipalities to know exactly where to put more strength in alleviating community's problems:

- *Upgrading the infrastructure in the area in terms of building of a new dam or recapacitation of the existing dam, roads and the drainage system*

It has emerged from the data gathered that one of the causes of flooding in Ga-Moeka and Ga-Motle is because of a dam which cannot withstand water during heavy rains and poor roads. Upgrading of the infrastructure systems can be a solution which will either reduce flooding or eliminate it completely. The local municipality must come up with a proposal to upgrade infrastructure, and an implementation plan with timelines to deliver on them.

- *Low lying areas and relocation plan*

The gathered data through respondents has shown that the two villages are in the low lying areas and they flood badly after heavy rains. It is recommended that there should be a strict location plan that is used by the municipality to place people in proper areas. People should not be allowed to build in an area where it is flooding. People who force their way to build in such an area have to be fined heavily or it can be used as a farming area. People who have already built can be moved to other safe areas. The local municipality must come up with a farming project where families can use their current land to plant and start farming businesses. The municipality must also come up with a system to reduce the water flow in the area by putting in proper drainage systems as part of floodplain management. People have to be moved to new RDP houses or be compensated for moving out of their current place to a newly found area for them. The project has to have strict timelines.

- *Compulsory insurance*

From the data gathered, it emerged that families do not have insurance for their properties because of the little income they earn. The recommendation here is that there should be compulsory insurance for families who do not want to relocate to compensate for their losses during floods. The study has shown that most of them do not want to relocate. The suggestion is that every family that does not relocate should contribute an average amount which will be calculated by an insurance company and there should also be another percentage that is contributed by the government towards that insurance. There should be a treasury request to implement this initiative. Kunreuther & Linnerooth-Bayer (1999: 10) say that in funding the disaster recovery, government has the option of using small amounts of private insurance, government

reserves and international assistance. According to Gill (2004: 54), most natural perils are insured under individual policies in the United Kingdom.

- *Early warning system*

Geographic Information Systems has been proven to assist with the procedures to collect and analyze spatial data for hazard and risk assessment. Maps can be created by the software which shows levels of flood hazards. These maps can be used for planning and prioritization measures for anti-flood.

- *Communication during floods*

Communication is very good during floods. It starts with awareness campaigns done with communities about their hazards. An example of Bangladesh municipality is a good one where messages of behavioural change are put up all over the place to remind people of what is proper behaviour to avoid flood disasters. Municipalities must have emergency communication plans where all stakeholders are involved.

5.3Suggestions by Respondents on the Solutions of Flooding in Ga- Moeka and Ga- Motle Villages

Respondents have given some suggestions to providing solutions for flooding in the area and they are:

- *Building of bridges by municipality/ government*

  The bridge will help in directing the water away from the villages and avoid more water from coming down and causing floods.

- *Building of dams with large capacities by municipality/ government*

  Dams with large capacities will help with keeping the water inside. The water can also be purified and be used for drinking purposes.

- *Dam management systems by the municipality/ government*

  Dam management will help the municipality and government to do proper planning in terms of funding the maintenance and renovations after a certain period after floods have occurred.

- *Building of better houses with strong foundations by municipality/ government*

  If people have to be moved to other higher places, municipality and government must use good materials for building. Thorough research must be done so that no new disaster is created in the new place, for example where there is no water and the area remains dry for a long time, but which may now cause fire disasters.

- *Building of better roads by municipality/ government*

  Ga-Moeka and Ga-Moeka roads are not well maintained; there are a lot of potholes which are caused by floods. Better and stronger roads are needed.

- *Building of drainage systems by municipality/ government*

  The drainage system will help to direct the water to nearest rivers.

- *Communities working together with municipalities*

  The people of Ga-Moeka and Ga-Motle feel they are not involved or consulted in the planning of their villages.

- *Proper civil engineering projects*

  Respondents believe that if roads and other infrastructure are planned and built properly, flooding will be less in their area.

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ANNEXURE: A

QUESTIONNAIRE

Please answer the following questions by marking with an X where applicable.

1. **PERSONAL INFORMATION:**

1.1 Name	1.12.2
1.2 Age	1.12.3
1.3 Gender Male Female	1.12.4
1.4 Marital Status Single Married Separated Divorced Widowed	1.12.5
1.5 Street Address	1.12.6
1.6 Schooling Scholar Non-Scholar	1.12.7

1.7 Employment Employed Unemployed	1.12.8
1.8 Salary range Less than R5 000 Between R5 000 – R10 000 Between R10 000 – R15 000 Between R15 000 – R20 000 R20 000 and above	1.12.9

RESEARCH QUESTIONS

SOCIAL IMPACT SECTION

2. Do you experience flooding in your area?

2.1 Yes	1.12.10
2.2 No	1.12.11

3. How frequent is flooding in your area?

3.1 Once a year	1.12.12
3.2 Twice a year	1.12.13
3.3 Thrice a year	1.12.14
3.4 Very frequent	1.12.15

3.5 No flooding	1.12.16

4. What causes floods in your area?

4.1 Heavy rains	1.12.17
4.2 Bursting of a dam	1.12.18
4.3 Overflowing river	1.12.19
4.4 Built on floodplain	1.12.20
4.5 Don’t know	1.12.21

5. How many members are in your household?

5.1 Alone	1.12.22
5.2 Between 0 and 2	1.12.23
5.3 Between 3 and 5	1.12.24
5.4 Between 6 and 8	1.12.25
5.5 More than 8	1.12.26

6. Age of your household members and mention how many in that age group

6.1 < 2	1.12.27
6.2 Between 2 and 15	1.12.28

6.3 Between 15 and 25	1.12.29
6.4 Between 25 and 35	1.12.30
6.5 > 35	1.12.31

7. How many school going children in the family?

7.1 Between 0 and 2	1.12.32
7.2 Between 3 and 5	1.12.33
7.3 Between 6 and 8	1.12.34
7.4 8 and above	1.12.35
7.5 None is going to school	1.12.36

8**.** What prompted you to come and stay in this particular area?

8.1 To be next to work and school	1.12.37
8.2 To be next to relatives and friends	1.12.38
8.3 It is cheaper to stay here	1.12.39
8.4 To have my own place and not stay with parents	1.12.40
8.5 I had nowhere to go	1.12.41

9. If you are a scholar, how does flooding affect your schooling?

9.1 Absent for 1 day in a week	1.12.42
9.2 Absent for 2 days in a week	1.12.43
9.3 Absent for 3 days in week	1.12.44
9.4 Absent for the whole week	1.12.45
9.5 Not absent at all	1.12.46

10. Do you get help during floods in your area?

10.1 Yes	1.12.47
10.2 No	1.12.48

11. If Yes, who do you get help from?

11.1 Neighbours	1.12.49
11.2 Relatives	1.12.50
11.3 Friends	1.12.51
11.4 Local Municipality	1.12.52
11.5 NGOs	1.12.53

12. Do you manage to do your everyday chores during floods?

12.1 Yes	1.12.54
12.2 No	1.12.55

13. Give reasons for your answer in 14.

14. Do you manage to go to shops, clinics, schools during flooding days?

14.1 Yes	1.12.56
14.2 No	1.12.57

15. Give reasons for your answer in 16

16. What do you think is the reason for the area to flood than other neighbouring areas?

16.1 Low lying area	
16.2 Built in a floodplain	1.12.58
16.3 Built next to a shallow river	1.12.59
16.4 Built next to a dam with low capacity	1.12.60
16.5 No river and dam management by local authorities	1.12.61

17. How long have you stayed in this area?

17.1 Less than 1 year	
17.2 Two years	1.12.62
17.3 Five years	1.12.63
17.4 10 Years	1.12.64
17.5 More than 10 years	1.12.65

18. Were you warned that the area gets flooded before by the municipality?

18.1 Yes	1.12.66
18.2 No	1.12.67

19. Are you planning to move to a non-flooding area?

19.1 Yes	1.12.68
19.2 No	1.12.69

20. If you are planning to move, when can that be?

20.1 In less than a year	
20.2 In two years time	1.12.70
20.3 In three years time	1.12.71
20.4 In four years time	1.12.72
20.5 Immediately	1.12.73

ECONOMIC IMPACT SECTION

21. How many people are working in your household?

21.1 1 member	1.12.74
21.2 2 members	1.12.75
21.3 3 members	1.12.76
21.4 4 members	1.12.77
21.5 None is working	1.12.78

22. What mode of transport does family members use to go to work?

22.1 Taxi	1.12.79
22.2 Bus	1.12.80
22.3 Train	1.12.81
22.4 Own car	1.12.82
22.5 Walk	1.12.83

23. What is the average income for the household per month?

23.1 Less than R1 000. 00	1.12.84
23.2 Between R1 000.00 and R5 000.00	1.12.85
23.3 Between R5 000.00 and R10 000.00	1.12.86
23.4 Between R10 000.00 and R20 000.00	1.12.87
23.5 R20 000.00 and above	1.12.88

24. What is the average expenditure for the household per month?

24.1 Less than R1 000. 00	1.12.89
24.2 Between R1 000.00 and R5 000.00	1.12.90
24.3 Between R5 000.00 and R10 000.00	1.12.91

24.4 Between R10 000.00 and R15 000.00	1.12.92
24.5 Above R15 000.00	1.12.93

25. Do you pay for a medical aid?

25.1 Yes	1.12.94
25.2 No	1.12.95

26. Do you experience any waterborne diseases?

25.1 Yes	1.12.96
25.2 No	1.12.97

27. What is the cost of outbreaks of waterborne diseases per flood event?

26.1 Less than R200. 00	1.12.98
26.2 Between R200.00 and R300.00	1.12.99
26.3 Between R300.00 and R400.00	1.12.100
26.4 Between R400.00 and R500.00	1.12.101
26.5 R1 000.00 and above	1.12.102

28. Do you lose belongings during the floods?

27.1 Yes	1.12.103
27.2 No	1.12.104

29. If yes, estimate the costs per flooding event?

28.1 Between R500, 00 and R1000, 00	1.12.105
28.2 Between R2000, 00 and R5000, 00	1.12.106
28.3 Between R5000, 00 and R50 000, 00	1.12.107
28.4 R50 000, 00 and R100 000, 00	1.12.108
28.5 R100 000, 00 and over	1.12.109

30. How much have you lost already since you started staying in the area?

29.1 Less than R10 000, 00	
29.2 Between R20 000, 00 and R30 000, 00	1.12.110
29.3 Between R30 000, 00 and R40 000, 00	1.12.111
29.4 Between R40 000, 00 and R50 000, 00	1.12.112
29.5 Above R50 000, 00	1.12.113

31. What is the replacement value of your belongings after the floods?

30.1 Less than R10 000, 00	
30.2 Between R20 000, 00 and R30 000, 00	1.12.114
30.3 Between R30 000, 00 and R40 000, 00	1.12.115
30.4 Between R40 000, 00 and R50 000, 00	1.12.116
30.5 Above R50 000, 00	1.12.117

32. Do you pay any insurance for your property?

25.1 Yes	1.12.118
25.2 No	1.12.119

33. How much insurance do you pay for your belongings (house, car etc)?

31.1 Less than R100, 00	
31.2 Between R200, 00 and R300, 00	1.12.120
31.3 Between R300, 00 and R400, 00	1.12.121
31.4 Between R400, 00 and R500, 00	1.12.122
31.5 Above R500, 00	1.12.123

34. What type of material is used for building your house?

32.1 Mud house	

32.2 Brick & cement house	1.12.124
32.3 Wood house	1.12.125
32.4 Zinc house	1.12.126
32.5 Other material	1.12.127

35. Do you wish to sell your house and stay somewhere else?

33.1 Yes	1.12.128
33.2 No	1.12.129

36. Do you receive any financial assistance from government or other sources after the flood event?

34.1 Yes	1.12.130
34.2 No	1.12.131

37. Is there any money left for monthly saving in the household?

35.1 Yes	1.12.132
35.2 No	1.12.133

PSYCHOLOGICAL IMPACT SECTION

38. What happens to you when you experience floods in your area?

36.1 Get angry	
36.2 Share the shock with friends and relatives	1.12.134
36.3 Feel like committing suicide	1.12.135
36.4 Experience trauma	1.12.136
36.5 Don't feel anything	1.12.137

39. Do you feel suicidal after the floods?

37.1 Yes	
37.2 Never	1.12.138
37.3 Sometimes	1.12.139
37.4 Always	1.12.140
37.5 It depends on the situation	1.12.141

40. What do you do when you feel suicidal?

38.1 Go to church	
38.2 Talk to friends and relatives	1.12.142
38.3 Go for counselling	1.12.143

38.4 Cry	1.12.144
38.5 No applicable	1.12.145

41. What is your feeling about this area you live in?

39.1 feel like relocating	
39.2 Will never relocate	1.12.146
39.3 Not sure about my feelings about the area	1.12.147
39.4 I wish I was living somewhere else	1.12.148
39.5 Not feeling anything	1.12.149

42. If you experience trauma during floods, how long does it last?

40.1 Less than a week	
40.2 Two weeks	1.12.150
40.3 Three weeks	1.12.151
40.4 A month	1.12.152
40.5 The whole year	1.12.153

43. How is your relationship with your family members after the flood?

41.1 Relationship broke down	

41.2 Was normal	1.12.154
41.3 Tense	1.12.155
41.4 Happy	1.12.156
41.5 Mixed feelings	1.12.157

44. How is your relationship with neighbours and friends after the flood event?

42.1 Relationship broke down	
42.2 Was normal	1.12.158
42.3 Tense	1.12.159
42.4 Happy	1.12.160
42.5 Hatred	1.12.161

45. How long did it take your family to recover from flood disruption?

43.1 A week	
43.2 Two weeks	1.12.162
43.3 Three weeks	1.12.163
43.4 A month	1.12.164
43.5 A year	1.12.165

46. What are your coping strategies during the flood?

44.1 Sleep	
44.2 Talk to friends and relatives	1.12.166
44.3 Go for counselling	1.12.167
44.4 Cry	1.12.168
44.5 Does nothing	1.12.169

47. Do you get sicknesses diseases during floods in your area?

45.1 Yes	1.12.170
45.2 No	1.12.171

48. If yes, what type of sicknesses are those

46.1 Malaria	1.12.172
46.2 Flu	1.12.173
46.3 Diarrhoea	1.12.174
46.4 Stress disorder	1.12.175
46.5 Malnutrition	1.12.176

49. Have you experienced any loss of life during floods?

47.1 Yes	1.12.177
47.2 No	1.12.178

50. If yes, how many in ten years time?

48.1 > 5	1.12.179
48.2 Between 5 and 10	1.12.180
48.3 Between 10 and 15	1.12.181
48.4 Between 15 and 20	1.12.182
48.5 < 20	1.12.183

51. Do you normally attend counselling after the flooding has happened?

49.1 Yes	1.12.184
49.2 No	1.12.185

52. Can you explain why if you do?
