

**NATURAL DISASTER RISK, VULNERABILITY  
AND RESETTLEMENT:  
RELOCATION DECISIONS FOLLOWING THE  
LAKE NYOS AND MONOUM GAS DISASTERS  
IN CAMEROON**

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## ABSTRACT

This thesis examines contemporary challenges within “natural” disaster risk, vulnerability, resettlement and disaster management in Cameroon. Its empirical focus is on the experiences of the Lake Nyos and Lake Monoum gas disasters which occurred in the mid-1980s, and on the processes that surrounded resettlement and subsequent relocation of affected populations. The underlying aim is to understand the social context of risk and vulnerability, and consider how such knowledge can be integrated in the development planning process of Cameroon. The research adopts the position, now common in the political ecology of hazards, that disasters occur due to the interaction between human and physical factors, and that disaster risk reduction measures should incorporate socio-economic and socio-cultural problems. The thesis combines evidence from questionnaire surveys, interviews, documents and field observations, in order to produce a detailed understanding of the processes at work.

Results are presented in study populations; three that were affected by the gas disasters (the displaced victims of the Lake Nyos disaster presently living in resettlement camps, former displaced victims of the Lake Nyos disaster who have moved back to the disaster zone and the residents in and around Lake Monoum who were not resettled and have not moved from the disaster area) and a set of key stakeholders involved in disaster management in Cameroon.

Most disaster research in Cameroon focuses on the technical aspects of natural hazards/disasters. There is conspicuous lack of research or published materials that addresses the social aspects of natural disasters. Research findings show that Cameroon’s disaster management framework has been oriented to address mostly the crisis phase of natural disasters. This view is confirmed by the case study results, which reveal that the management of the Lake Nyos disaster focused on the immediate aftermath of the disaster, without contingency planning for the displaced survivors. Results also reveal that the resettlement of disaster survivors has created social conditions that have led to their relocation back to the disaster zone.

Results regarding several risk-related themes strongly indicate that disaster managers in the government sector generally perceive risk from a technical, scientific or physical perspective. Past experience and socio-cultural factors appear to be more responsible for risk perception and attitudes to risk in the disaster affected populations. The relocation of the Lake Nyos disaster survivors back to the disaster area and the non-relocation of Njindoum residents within the vicinity of Lake Monoum indicate that both lakes are not considered to be a prohibitively serious threat. Analysis of relocation decisions shows that motivations for relocation are caused mainly by social, economic and cultural factors, which arise from resettlement.

Based on the research findings, a new disaster model is presented that shows the linkages, influences and interaction between Relocation Decisions and Disaster Management, Risk Perception and Vulnerability.

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## ACRONYMS AND ABBREVIATIONS

BUKILSDA .....	Buabua Kimbi Lake Nyos Cultural and Development Association
CP .....	Civil Protection
CPDM .....	Cameroon People's Democratic Party
CRED .....	Centre for Research on the Epidemiology of Disasters
CRC .....	Cameroon Red Cross
CVL .....	Cameroon Volcanic Line
DCP .....	Department of Civil Protection
DM .....	Disaster Management
DO .....	Divisional Officer
DRM .....	Disaster Risk Management
DRR .....	Disaster Risk Reduction
EMS .....	Emergency Medical Services
ENAM .....	Ecole National D'administration et Magistracy
FSZ .....	Foumban Shear Zone
GD .....	Government Delegates
GDP .....	Gross Domestic Product
GLOCECOHADIM ....	Global Centre for Compliance, Hazard and Disaster Management
HDI .....	Human Development Index
HPI .....	Heifer Project International
ICLND .....	International Conference on the Lake Nyos Gas Disaster
IDNDR .....	International Decade for Natural Disaster Reduction
IDOs .....	International Development Organisation
IDPs .....	Internally Displaced Persons
IFRC .....	International Federation of Red Cross
IMF .....	International Monetary Fund
IOCP .....	International Organisation of Civil Protection
IRSL .....	Impoverishment Risk and Sustainable Livelihood
IRR .....	Impoverishment Risk and Reconstruction Model
ISNDR .....	International Strategy for Natural Disaster Reduction
IWGCL .....	International Working Group on Crater Lakes
LM .....	Lake Monoum
LMD .....	Lake Monoum Disaster
LN .....	Lake Nyos
LND .....	Lake Nyos Disaster
LNM .....	Lake Nyos and Monoum
MBO .....	MR Bamenda Organisation
MDDT .....	Movement for Democracy, Development and Transparency
MDG .....	Millennium Development Goals
MHESR .....	Ministry of Higher Education and Scientific Research
MSPE .....	Ministry of Sports and Physical Education
MTAD .....	Ministry of Territorial Administration and Decentralisation
NCDC .....	National Civil Defense Council
NCRMRA .....	National Committee for the Reception and Management of Relief Aid
NDPMP .....	National Disaster Prevention and Management Program
NFS .....	National Fires Service
NGOs .....	Non-Governmental Organisations
NIC .....	National Institute of Cartography
NIGMR .....	National Institute of Geological and Mining Research
NMDP .....	Nyos and Monoum Degassing Project

NRO .....	National Risks Observatory
NWP .....	North West Province
OCHA .....	Office for the co-ordination of Humanitarian Affairs
RD .....	Relocation Decisions
RDA .....	Research and Development Association
RP .....	Risk Perception
SAP .....	Structural Adjustment Program
SCNC .....	Southern Cameroon National Congress
SDF .....	Social Democratic Front
SDO .....	Senior Divisional Officer
SLA .....	Sustainable Livelihood Approaches
SLF .....	Sustainable Livelihood Framework
UNCED .....	United Nations Commission on Environment and Development
UNDP .....	United Nations Development Program
UNDRO .....	United Nations Disaster Relief Organisation
UNDHA .....	United Nations Department for Humanitarian Affairs
UNEP .....	United Nations Environmental Program
UNESC .....	United Nations Economic and Social Council
UNHCR .....	United Nations High commission of Refugees
UNICEF .....	United Nations Information Cultural and Education Forum
UNISDR .....	United Nations International Strategy for Disaster Reduction
UNOCHA .....	United Nations Office for the Coordination of Humanitarian Affairs
URC .....	Ukpwa Resettlement Camp
USAID .....	United States Agency for International Development
USOFDA .....	United States Office for Foreign Disaster Assistance
VCA .....	Vulnerability and Capacity Assessment
WHO .....	World Health Organisation
WCDR .....	World Conference on Disaster Reduction
WSSD .....	World Summit on Sustainable Development

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# CHAPTER ONE

## GENERAL INTRODUCTION

### 1.1 INTRODUCTION TO THESIS

This thesis examines contemporary challenges within “natural” disaster risk, vulnerability, resettlement and disaster management in Cameroon. Its empirical focus is on the ongoing post-disaster experiences of survivors of the Lake Nyos and Lake Monoum gas disasters, which occurred in the mid-1980s. The central aim is to understand the social context of risk, vulnerability and relocation decisions for the affected populations. In a more general sense, the thesis also sets out to consider how social perspectives on risk can be integrated more effectively in the planning process of Cameroon. This case study research is a product of the largest catastrophic disaster that Cameroon has experienced (Lockwood and Meyer, 1989; Kusakabe, 1989). This was the forceful release of poisonous gases from the Lake Monoum and Nyos volcanic crater lakes in North Western Cameroon (Figure 1.1) in 1984 and 1986 respectively, commonly referred to as the Lake Nyos and Monoum (LNM) gas disasters.

### 1.2 LAKE NYOS AND LAKE MONOUM DISASTER EVENTS AND THEIR CONTEXT

At about 9 p.m. on Thursday August 21<sup>st</sup> 1986, forcefully ejected poisonous gases from Lake Nyos flowed northwards, covering an area about 20 km long by 15 km wide (Figure 1.2) (Baxter and Kapila, 1989) and affected about 10,000-20,000 people. The gas asphyxiated and suffocated<sup>1</sup> 1746 people in four villages (Lower Nyos, Subum, Cha and Fang) and displaced 4,430 more (Freeth and Kay, 1987; Kling et al, 1987; Kusakabe et al., 1989; Tazief, 1989).

In Nyos village, more than 90 percent of the population died, in Subum 30 percent and in Fang 6 percent (Othman-Chande, 1987). About 8,300 livestock and domestic animals were also killed, of which 55 percent were cattle (Shanklin, 1988). Medical, chemical and isotopic evidence from the Lake Nyos disaster (LND) suggested that the bulk of gas released was carbon-dioxide that had been stored in the lake and the victims exposed to the gas cloud died of carbon dioxide asphyxiation. Subsequent clinical findings on 845 survivors admitted to the Nkambe and Wum government hospitals after the disaster revealed that they suffered mostly from musculoskeletal, respiratory, skin lesions, neuromuscular and eye problems (Othman-Chande, 1987; Baxter et al., 1989 and Baxter and Kapila, 1989). This disaster rapidly drew international attention to this little known

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<sup>1</sup> CO<sub>2</sub> is denser than air and can be dangerous when it collect in low lying places, and may cause death by suffocation.

lake in North West Cameroon. The Cameroonian authorities with substantial aid and relief assistance from the international community experienced for the first time the challenges involved in the management of a large scale disaster.

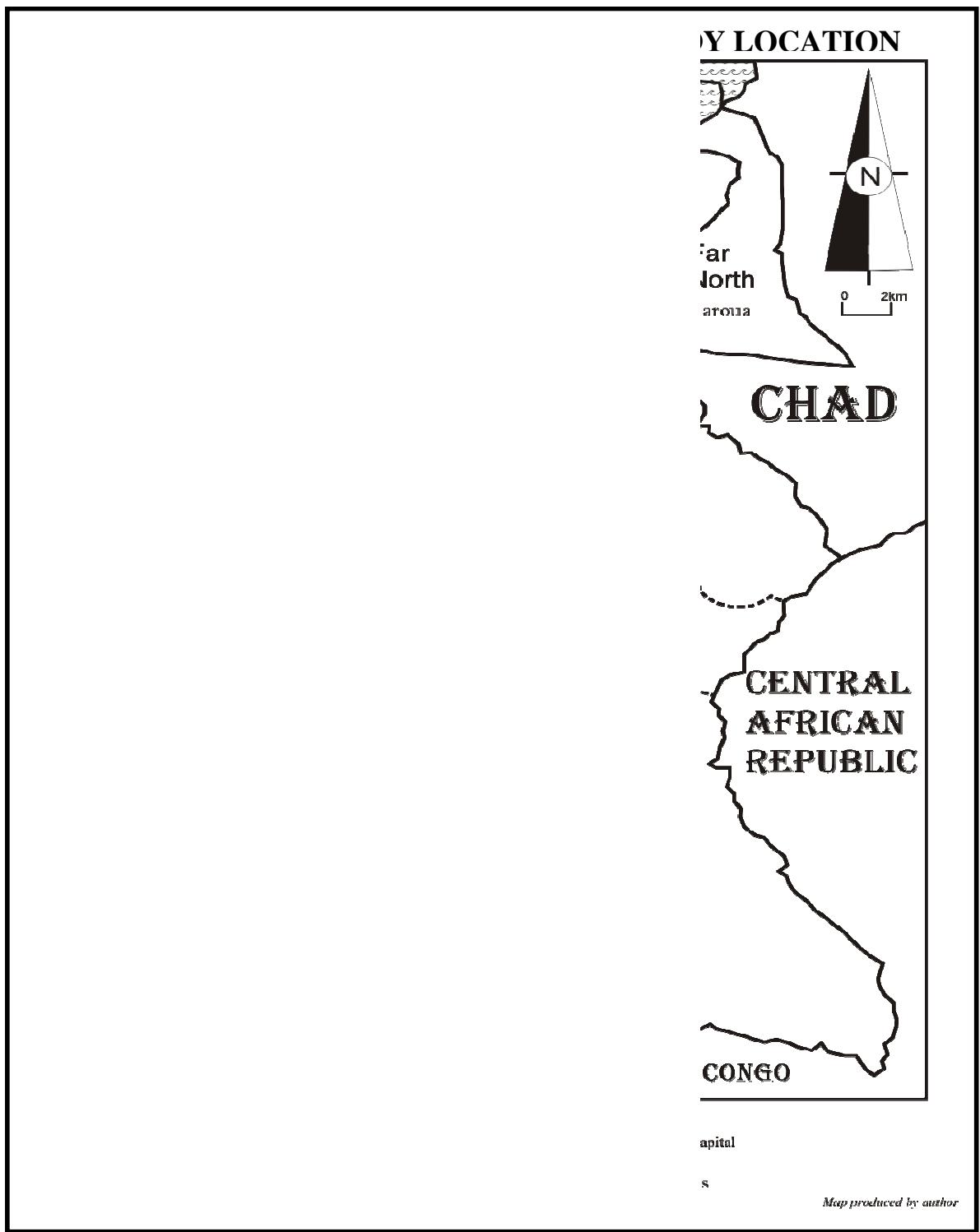


Figure 1.1: Location of disaster sites in Cameroon. *Source: Author*

Two years earlier, on 15th August, 1984, a similar sudden gas discharge from Lake Monoum killed 37 people in the low lying areas near the lake (Sigurdsson et al., 1987; Freeth and Kay, 1987; Shey, 1987; Kusakabe, 1989). The Lake Monoum disaster (LMD) was not taken to be such a serious event when it occurred and not much attention was

given to it, probably because the risk of the lake to a larger population was not known then. It was only after the LND two years later that all the sectors of the community started to reflect on the LMD, especially when the causes of death in both cases was established to be similar. The LNM disasters, which are the basis of this research, are given more in-depth analysis in subsequent Chapters, particularly Chapter six, which examines the management of the disasters.

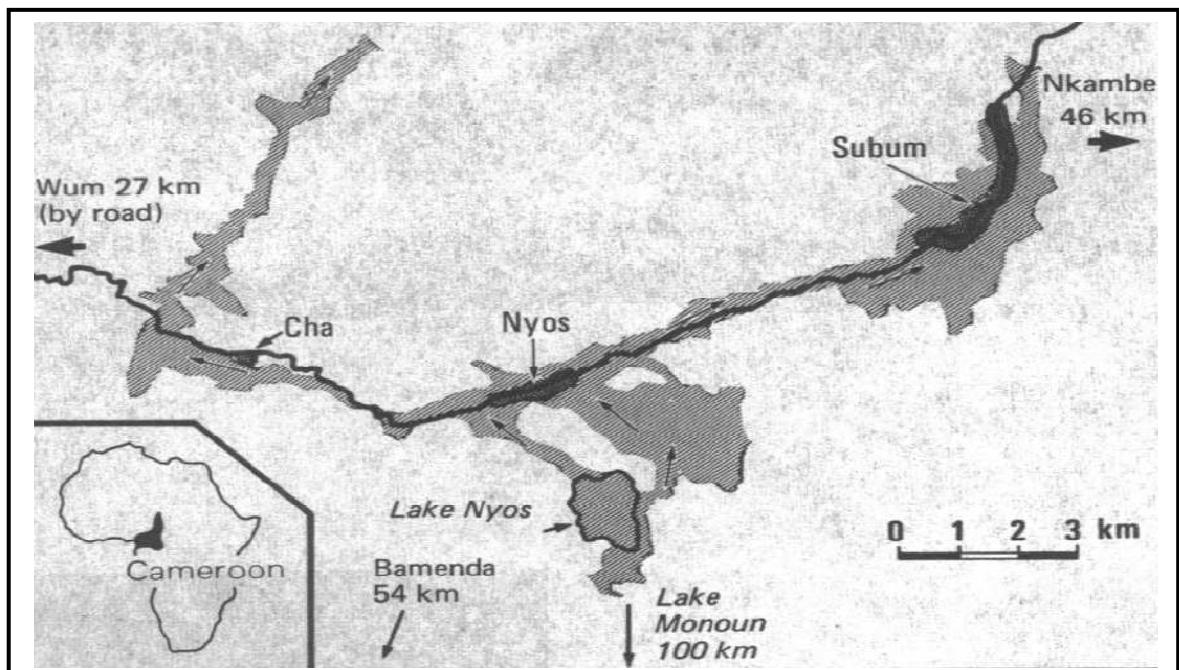


Figure 1.2: Direction of flow of gas (arrows; stippled area) from Lake Nyos into adjacent valleys showing location of Cha, Nyos and Subum villages. *Source: Baxter et al. (1989).*

Natural hazards are not a recent phenomenon in Cameroon; they have been happening even before the Carthaginian, Hanno, saw Mount Cameroon erupting in the fifth century BC and called it “Chariot of Gods”. Since this earliest recorded event, sudden onset natural hazards have become more numerous and disastrous, affecting livelihood assets in the country related to human, social, financial, natural and physical capital. Cameroon is vulnerable to many disasters, including epidemics, insect infestations, droughts and famine. However, geophysical and hydro-meteorological hazards, which include volcanic eruptions, toxic gas emissions, earthquakes or earth tremors, floods and landslides, are the most conspicuous. These hazards are concentrated in the western highlands region of Cameroon, which has the highest topographic features in the country, also known as the Cameroon Volcanic Line (CVL)<sup>2</sup> (Belinga, E., 1984). The frequency of these disasters is increasing, resulting in heavy loss of life, property and human suffering.

<sup>2</sup> The Cameroon Volcanic Line (CVL) is a geologic feature expressed externally as 1600km Y-shaped SW - NE trending chains of Volcanoes stretching from the Atlantic Island of Pagalu through the Gulf of Guinea and the massifs of Mount Cameroon, Manengouba, Bamboutus, Oku, Bamenda, into the outcrops of Adamawa plateau, the Mandara and Kapsiki mountains

While floods have the highest frequency of occurrence in the country, the largest numbers of fatalities are related to volcanic processes. More details of Cameroon's tectonic history that is largely responsible for the geologic and structural features which make the country prone to natural hazards is discussed in Appendix one (Page 271).

Even though the impact of individual disasters on the national economy is not conspicuous, they affect the local economy and their cumulative effects on the national economy can be tremendous. In Cameroon, just as in many other developing countries, the impact of small-scale disasters on the lives and livelihoods of vulnerable communities, whose economy is largely in the informal or subsistence sectors, is rarely documented. This is often not recognized because disaster statistics collected and calculated at the provincial and national levels; capture only the formal and well-defined sectors of the economy. Such statistics often do not indicate the impact on local communities and their livelihoods although they are often most vulnerable to these disasters. There is growing international recognition that proneness to natural disasters has a debilitating effect on small or local level economies. There is therefore a need to properly investigate the impact of disasters on vulnerable communities and their long lasting effects, especially considering that many developing countries like Cameroon have fragile economies that make them incapable of absorbing and spreading the burden of impacts.

While disaster events have been unfolding, several national social and economic changes have also been taking place during recent decades making life in Cameroon even more difficult for ordinary Cameroonians. These changes include: globalisation, the economic crisis of the 1980s, devaluation of the CFA Franc in January 1994, political instability due to the introduction of multi-party politics in 1990, increased social tensions due to migration and land conflicts, crime and violence and the fast spreading HIV-AIDS epidemic. Cameroon's macro-economic environment makes the people even more vulnerable to disasters, just as it limits the ability of the poor to tap into economic opportunities that can get them out of poverty. Many analyses that recognize the relationship between poverty and vulnerability to hazards attribute the vulnerability to disasters of individuals, families, or communities to their social, cultural, political and economic environment (Wisner et al., 2004; Bankoff et al., 2004:2). A more critical analysis of Cameroon's weak macroeconomic situation within the last two decades, which is exacerbated by natural disasters, is presented in Chapter seven (from Page 144).

Natural hazards are a phenomenon that will continue to affect human civilization. But their transformation into disasters depends on the extent of societal vulnerability and risk, which can be determined by the effectiveness or efficiency in disaster management

(DM). Disasters in Africa pose a major obstacle to the African continent's efforts to achieve sustainable development, especially in view of the region's insufficient capacity to predict, monitor, deal with and mitigate disasters (WCDR 2005). Factors contributing to increased vulnerability to natural disasters in developing countries comprise widespread poverty, high unemployment, distributional inequalities, high population growth, and lack of strong national and local institutions for dealing with disasters (Anderson, 1995:45; Smith, 2001). These factors also contribute to natural disaster vulnerability in Cameroon.

Despite the propensity for natural hazards in Cameroon, especially the frequent volcanic eruptions, the country is arguably still ill-prepared to cope with their management and impacts. Natural hazards/disasters in Cameroon are jointly managed together with technological hazards and biological hazards as well as those caused by human induced hazards (Bang, 2008). These risks have been placed under civil protection and managed under the auspices of the Department of Civil Protection (DCP) in the Ministry of Territorial Administration and Decentralization (MTAD). However, as this thesis will show, an implementation gap remains in many locations and circumstances around the world between the ideals of effective DM and the realization of actual policies – and Cameroon is certainly no exception.

In January 2005, the necessity to mainstream Disaster Risk Reduction (DRR) into sustainable development practices and socio-cultural values was highlighted during the World Conference in Natural Disaster Reduction in Japan (WCDR, 2005). Recommendations in Chapter 10 attempt to set a framework for mainstreaming DRR and DM programs into the development process of the country. This thesis is situated within this context.

### **1.3 RATIONALE FOR THE STUDY**

Natural hazards/disasters remain a common phenomenon around the world, and their effects tend to fall hardest on poor communities that have the least resources to cope (Amin et al., 2008). Disasters are commonly considered as stalling development (see Section 2.3.1) or setting it on a backwards trajectory for months, years or decades, but the link between disasters and development has a more fundamental basis (Collins, 2009).

It is now widely acknowledged that vulnerability to hazards is a key element of underdevelopment and a major barrier to achieving the United Nations Millennium Development Goals (see Appendix 2). Due to the reliance on economic variables and physical factors as indicators of vulnerability, most vulnerability reduction strategies tend to provide measures that improve the functioning of systems but fail to address changes to

their structure (Jessamy, 2002). As a result, emphasis has generally been placed on physical risk reduction and mitigation. The LND triggered a number of scientific articles on the disasters with recommendations that emphasized structural mitigation measures to mitigate subsequent risks. Volume 348 of the journal “Nature” devoted its 1990 edition on the causes of the LNM disasters and the strategy for reducing the risk by gas removal. Such publications, together with the influence of scientists (Geologists, Geophysicists, Geochemists etc) in Cameroon’s Universities and the National Institute of Geological and Mining Research in the country, have greatly influenced government policy on the management of the LNM disasters. It will be shown later in Chapter six that Government policy on the management of the LNM disasters has been skewed towards technical mitigation measures dominated by the Nyos and Monoum Degassing Project (NMDP).

It is now known that the degree to which populations are vulnerable to hazards is not solely dependent upon proximity to the source of the threat or the physical nature and severity of the hazard. Recent paradigm shifts during the last two decades have increasingly viewed disasters as unmanaged development risks and unresolved problems of the development process (see Section 2.2.1). This recognition has prompted a reorientation of DM thinking and a call for broader DRR strategies. One of them is the need to integrate natural disaster mitigation with development programs-a recommendation during the 1987 conference on the management of the LND, which the government is yet to implement. It is now recognized that risk management approaches should focus on reducing the vulnerability of affected people by increasing their capacity to cope, and, in theory at least, to tackling the root social, economic, institutional and political causes of vulnerability (refer to Section 2.3.2). According to Abramovitz (2001:137) “*While we cannot do away with natural hazards, we can eliminate those we cause, minimize those we exacerbate and reduce our vulnerability to most*”. Reducing the vulnerability of the African people to hazards is necessary for poverty reduction, and also to protect past development gains (WCDR, 2005). The practical application of DRR programs to improve the resilience of communities has to take account of the multi-faceted drivers of vulnerability, especially in developing countries. This has not been the case in Cameroon, where DM measures have been skewed towards technical measures while the socio-cultural and economic problems caused by the post-disaster resettlement of survivors persist. Problems with survivor resettlement and reintegration are increasing their vulnerability while the risk still persists as discussed in Section 6.3.2 of Chapter six and Chapter seven.

One of the widespread effects of disaster events is displacement and resettlement of disaster victims. However, resettlement itself can create deep-seated socio-economic

problems as experienced by the LND survivors who were resettled in seven camps (Bang et al., 2009). The vulnerability of the LND survivors is therefore one line of enquiry in this thesis (Section 1.4.1). According to the World Bank (2006), one way of coping with post-disaster social risks emanating from resettlement is relocation or return migration back to the former sites of displacement. It will be shown later in Chapter nine that the populations that have relocated back to the disaster zone in Nyos and the residents in Njindoum close to Lake Monoum (LM) are more vulnerable to subsequent risks from the Lakes. It has been a painful process for such populations to secure livelihoods in risky environments and under difficult socio-economic conditions, often through trial and error, with uncertain outcomes (Bohle, 2007:23).

Motivation for relocations of potentially affected people is still an under-researched area of disaster and is yet to be properly understood. This research seeks to fill this gap by investigating the relocation decisions (RD) of disaster survivors following the LNM disasters. The behaviour of people, which is reflected in their decisions to locate in risky areas shows that individuals and their communities are not ignorant of the existence of these threats. Choices are made and decisions taken on the benefits of occupying hazardous environments as reviewed in Section 2.5 (Page 43). This decision-making is based on risk perception, which can be expected to vary between the individual/household level and the organizational level (Smith, 2001). There is therefore an urgent need to evaluate perceptions of risk.

By unveiling the social context of risk that has evolved in the disaster areas, it is hoped that the risk management decision-making process will be revealed and the influence of hazard risk perception and motivations for relocations can be understood. It is hypothesized that the existing social knowledge on the impact of the LNM disasters is not well developed, has not been widely shared amongst disaster managers and also, has not been incorporated into mainstream development decisions in the country. Some of the possible reasons could be: a poor understanding of social risk and vulnerability in the area; a perception that risk management is the sole responsibility of the government rather than a shared responsibility involving the affected communities; low public demand for social risk management measures; a lack of understanding of the risks involved; and a lack of effective management of the risks. Therefore, this research particularly seeks to advance our theoretical and conceptual understandings of how DM practices, social vulnerability and risk perception inter-relate with relocation decisions.

The LND and its management could be viewed as a wakeup call that should give a new orientation to disaster research in Cameroon and place risk mitigation and

vulnerability assessment higher up the political agenda, especially considering that there are more than 70 crater lakes in Cameroon that possess a similar threat.

## **1.4 AIMS AND APPROACH**

The main aim of this study is to understand the social context of risk, vulnerability and relocation decisions for the populations that were affected by the LNM gas disasters. In a more general sense, the thesis also sets out to consider how social perspectives on risk can be integrated more effectively in the planning process of Cameroon.

### **1.4.1 CASE STUDY**

This case study has been chosen for various reasons. Apart from these lethal gas releases from volcanic crater lakes, the North West Province is one of the areas in Cameroon that is most subjected to natural hazards, including landslides and flash floods. Of the sudden onset disasters that have occurred in Cameroon, the LND have caused the greatest disaster fatalities and displaced the greatest number of people from their homes. It is also easy to identify and locate the disaster survivors from the Nyos incident who live in resettlement camps up to this day. Another reason for choosing these two sites is that, although the two hazards were similar, their scale of impacts and management was different. While the Nyos survivors were resettled in far-off places and some of them are already returning to the disaster site, the Monoum survivors were not displaced and in their livelihoods, they continue to interact with the deadly lake. A comparative analysis in these two situations aims to improve our understanding of people's choices whether to relocate, which is important for disaster policy especially at the local level. It is also important to note that this is one of the most widely studied disasters in Cameroon although most publications have concentrated on technical analyses and structural mitigation measures. However, some preliminary social studies in the area were conducted after the LND in February 1987 under the auspices of MESRES (Shanklin, 1988). The background information available on these disasters also contributed to the choice of this case study.

### **1.4.2 OBJECTIVES AND RESEARCH QUESTIONS**

This empirical research recognizes the causation of risk and vulnerability through social processes and seeks to adopt a technical as well as social science perspective in the research process. Following the gaps and problems mentioned earlier, the objectives logically lead to four research questions. The questions are:

1. What strategies have been adopted for the affected people to cope with and recover from the Lake Nyos and Monoum disasters? The objective is to investigate the process of DM in Cameroon following the LNM disasters.
2. How can we understand the vulnerability of individuals and their households to the present risk at Lake Nyos and Monoum? This question aims to investigate the vulnerability drivers in the Nyos and Monoum areas.
3. How do people perceive and respond to the risk that still exists in the disaster areas? This question seeks to explore how risk perception, knowledge and communication influence disaster mitigation and preparedness, and attitudes to risk.
4. What makes people settle or move away from the risky areas? The objective is to explore and gain an understanding of the reasons behind the choice of where people decide to settle and/or resettle after the disasters.

How these research questions relate to specific research tasks and study populations is explained in Section 4.4 (also see Table 4.2) from Page 66.

More than two decades after these disasters occurred, research into social vulnerability and risk perception will provide a better insight into their level of societal reintegration. It is also envisaged that an analysis of the experiences from the LNM disasters will provide an understanding of the enabling mechanisms and procedures, which are necessary to meet the challenges of DM and DRR in Cameroon.

## **1.5 MAJOR THEORETICAL INFLUENCES ON THE RESEARCH APPROACH**

### **1.5.1 THE RELATIONSHIP BETWEEN SOCIETY-NATURE**

The relationship between society-nature is relevant to understand the occurrence of disasters as revealed by the mutuality paradigm (see Section 2.2.1). This relationship is important to answer research question two, which concerns the interaction between the affected population and a physical event (the LNM disasters), or potential physical risks in the disaster area. Oliver-Smith (2004:16) explains this relationship as “*one of the fundamental if often unexamined pillars of any ideological system*”. Former constructions of the relationship between society and nature reveal society’s domination over and control of nature. Some discourses on disasters emphasized the social construction of nature (Ingold, 1992); while others explain that the enlightenment ideal of human emancipation and self-realisation was closely linked to the idea of control and use of nature (Harvey, 1996). Oliver-Smith (2004) reveals that in the west, nature has been constructed as a fund of resources into which human beings, regardless of social context, have not only a right to

dip, but to dominate in a way they deem fit. The implications of these assertions in disaster studies express the dominance of human rationality over nature and summarized that humans are: “*Capable of manipulating, domesticating, remolding, reconstructing and harvesting nature*” (Murphy, 1994:5)

However, Oliver-Smith (2004) argues that these positions are flawed in that they are constructed from a perspective in which the environment has been reduced to the status of ensuring human well-being. Such a conceptualisation will not contribute to our understanding of the causes of disasters, and can therefore not fit into the conceptual realm of this research. It has been shown that many cultures do not construct a clear dichotomy between nature and culture as western societies do (Escobar, 2001:151). Scientific and philosophical discourses that had seen humans as ontologically distinct from nature have provided a contrasting category against which human identity could be defined as cultural rather than natural (Horigan, 1988). The epistemological position of this thesis is therefore similar to that of Oliver-Smith (2004), that a proper understanding of both vulnerability and disasters must include the mutual interaction of the agencies of nature and society, recognizing that the society can express itself through influence on the environment with positive and negative consequences. This position is central to the alternative conceptual framework adopted for this research (see Section 3.2 on Page 55).

### 1.5.2 POLITICAL ECOLOGY

Political ecology is a terminology that cuts across a number of established disciplines from the natural and social sciences and also brings with them their dominant epistemologies and methodologies (Blaikie, 1999:143). Political ecology blends a focus on the relationship that people have with their environment with close attention to the political economic forces characteristic of the society in which they live, that shape and condition that relationship (Oliver-Smith, 2004:10). While the human ecology which determines settlement patterns is influenced by physical and environmental factors, the political economy considered as historical and socio-cultural patterns, economic and political factors (such as social status, access to resources and power relations) also influences location choices. This means that political and economic forces equally place people at risk and limit adjustments to natural hazards, thus making some people more vulnerable to disasters than others (Hewitt, 1983; Palm, 1990; Blaikie et al., 1994). The effect of the political economy in the creation of natural disasters are clearly explained through the disaster-pressure-release model (Blaikie et al, 1994) presented in Section 2.2.3. Hewitt (1997:205) also links low socioeconomic status and losses due to earthquakes to the human

ecology of earthquake risk and argues that this should be the main focus of risk mitigation and disaster reduction measures. This is the premise in which DM is considered in the conceptual framework adopted for this thesis as explained in Section 3.2.

The implications of the political ecology are relevant to our understanding of this research because government DM strategies (research question 1) and practices can mitigate social vulnerability, or vulnerability to physical risks. The political ecology that influences human society is assumed to be affecting the meso and micro levels within Cameroon society, and also has implications for research question two. This is because as will be seen in Chapter six, the poor social management of the LND is responsible for the dire social conditions of the survivors (analysed in Chapter seven). The context of this research adopts the position that social characteristics that structure people's role in a society and influences their understanding and interpretation of disasters are determined by the political ecology. These social-structuralist interpretations hold the assumption that political economy directs location decisions and therefore, influences social vulnerability (analysed in Chapter seven). Political and economic structure limits societal coping strategies and adjustments to environmental hazards. It establishes risk as a social construct and influences the adoption of mitigation measures by decision makers and individuals at the meso-and micro-levels. Thus the combination of the features of a hazard event, political ecology and mitigation measures results in the construction of risk. These attributes, which have been built into the conceptual framework of this research (see Section 3.2) determines the vulnerability of a population to the impacts from a natural hazard and/or the severity of a disaster.

### 1.5.3 SUSTAINABLE LIVELIHOOD APPROACHES

The livelihoods approach underpins this contemporary disaster research because the primary and secondary effects of the LNM disasters impacted the livelihoods of the affected populations. All the research questions have implications for the livelihood of the affected populations. The concept of 'a livelihood' seeks to bring together the critical factors that affect the vulnerability or strength of individual or family survival strategies. These are thought to comprise, chiefly, the assets possessed by people, the activities in which they engage in order to generate an adequate standard of living and to satisfy other goals such as risk reduction, and the factors that facilitate or inhibit different people from gaining access to assets and activities (Ellis, 2000). According to DFID (1999/2000):

*"A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses*

*and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base” (DFID 1999/2000).*

Sustainable Livelihood Approaches (SLAs) consider vulnerability of all kinds as part of the context in which livelihoods are shaped. The theory brings the thinking and practice of poverty reduction strategies, sustainable development and participation, and empowerment processes into a framework for policy analysis and programming (Twig, 2001). Livelihoods are relevant in this study because the impacts of the LNM disasters have limited or changed the way the affected populations gained access to assets, causing socio-economic problems. This is examined in greater details in Chapter seven.

SLAs have been employed by researchers and development professionals. Some of the prominent donor agencies that have utilized SLAs include UNDP (Wanmali, 1999; Hoon et al., 1997), GTZ (Albert, 2000; AusAID (AusAID, 2000), Oxfam (Neefjes, 2000), CARE (Sanderson, 1999) and USAID (USAID, 2001). Most of the SLAs and theories developed are broadly similar and draw upon each other (Twigg, 2001). SLAs start from a developmental standpoint and put livelihoods at the centre of the discussion. Two approaches that relate to disasters and are relevant to this research will be mentioned here. These are the Sustainable Livelihood Framework (SLF) (Ashley and Carney, 1999) and UNDP Sustainable Livelihoods and Vulnerability (Hoon et al., 1997). CARE’s application of the approach to the disaster context (Sanderson, 1999) is mentioned on Page 37.

### **Sustainable Livelihood Frameworks**

The sustainable livelihoods framework (SLF) is designed to help understand and analyse poor people’s livelihoods (Ashley and Carney, 1999). This framework has been explained by a series of “sustainable livelihood guidance sheets” (DFID 1999/2000). This framework (see Appendix 3 on Page 276) is relevant to this research because the main themes relate to the research objectives and questions. The concept of vulnerability context and livelihood assets have implications for research questions two and four while the transforming structures and processes, and livelihood strategies have implications in question one that seeks to address DM strategies in Cameroon.

The livelihoods approach centers on the links between individual or household assets, the activities in which households can engage with a given asset profile, and the mediating processes (institutions, regulations etc.) that govern access to assets and to alternative activities. The framework starts with the vulnerability context in which people live their lives and livelihood assets that they posses. It then looks at how transforming

structures and processes generate livelihood strategies that lead to livelihood outcomes. The applications of the SLF in disaster research have been recognised (Twigg, 2001).

The SLF divides livelihood outcomes into five broad categories to make the framework more manageable. These include more income and more economically sustainable livelihoods; increased well-being (non-material goods such as self esteem, sense of control and inclusion, physical security, health, access to services, political enfranchisement and maintenance of culture heritage); reduced vulnerability to external trends, shocks and seasonality; improved food security and more sustainable use of the natural resource base. Within the context of this research, the Nyos disaster victims have resorted to various livelihood strategies that do involve not only alternative livelihood activities, but also some relocation back to the disaster site to benefit from the fertile soils that are not available at the resettlement camps.

### **UNDP Sustainable Livelihoods and Vulnerability**

This approach is relevant to understand the response measures necessary to sustain or maintain the livelihoods of the study populations that were affected by the LNM disasters. This is addressed in Chapter six, which tackles the social and technical management aspects of the LNM disasters. The analytical framework used by the UNDP consists of a livelihood system that comprises three distinct processes. This conceptual framework is described by Hoon et al. (1997), and can be represented by a triangle as shown and explained in Appendix three. The triangle represents UNDP's conclusion after considering different theories and models. In the context of livelihoods, this sees vulnerability and sustainability as two ends of a continuum. The properties of a vulnerable livelihood system are contrary to those of a sustainable livelihood system, notably in terms of the risk of exposure to crises, stresses and shocks and capacity to cope. Livelihoods systems can be located at certain points on the continuum. However, sustainability and vulnerability are processes and not events and livelihood systems and groups on the vulnerability-sustainability continuum are dynamic in nature (Twigg, 2001). The vulnerability assessment model recognizes that not everybody is equally at risk and therefore takes coping and adaptive strategies as the entry points for developing strategies. The sustainable livelihood response is to reduce exposure, enhance coping capacity, strengthen recovery potential and finally create, maintain and enhance an enabling environment within which people can realize their livelihood aspirations. The existence of such response measures is crucial in shaping the recovery process of disaster victims, as will be revealed in later Chapters of this thesis.

#### 1.5.4 VULNERABILITY

‘Vulnerability’ is the key to an understanding of risk and is one of the terms that seem to defy a consensus on its usage as it is used very differently throughout the literature (Hewitt, 1983; Few, 2003). Vulnerability links social, economic structures, cultural norms and values and environmental hazards and disasters. It is also relevant to the formulation of a coherent theoretical framework for disaster causation, which encompasses both natural and social scientific perspectives (Cutter, 1996; Downing et al., 1999; Pelling, 2003; Bankoff and Hilhorst, 2004).

There is no simplistic notion in understanding vulnerability, just as its complex nature may defy simple solutions. The definition of vulnerability has been conceptualized along disciplinary approaches. Some schools of thought of vulnerability definitions can be differentiated:

- One, referred to as physical vulnerability focuses on exposure to bio/geophysical hazards or risk/hazard exposure, including the analysis of distribution of hazardous conditions, human occupancy of hazardous zones, degree of loss due to hazardous events and the analysis of characteristics and impacts of hazardous events. This approach tends to be concerned with the features of the hazard event; degree of loss (life and property), with emphasis on forecasting, warning systems and vulnerability reduction of the built environment (Heyman et al., 1991; Alexander 1993; Burton et al., 1993). Part of question one seeks to investigate measures to mitigate physical vulnerability. This is analysed in Chapter six when strategies to mitigate subsequent physical risks in the disaster zone are discussed (see Section 6.3.1)
- The second school of thought views the social context of hazards and relates ‘social’ vulnerability to coping responses of communities, including societal resistance and resilience to hazards (Berke et al., 1993; Watts, 1993; Bohle et al., 1994; Blaikie et al., 1994; Adger, 1996; Adger, 2000; Wisner et al., 2004). Sociological and development studies approaches are used to study the nature of the hazard event where the focus is placed on people’s access to resources, equity, poverty and power. Social vulnerability analyses are central to the investigations in this thesis. Part of question two probes into measures to mitigate social vulnerability while Chapter seven fully investigates the social vulnerability drivers.
- The third school combines both approaches and defines vulnerability as a hazard of place which encompasses biophysical risks as well as social response and action (Tavakoli and Tavakoli, 1993; Cutter, 1996, 2001). This is applicable in the case of disaster survivors who have relocated to the disaster site in Nyos or living very close to

LM, thus being vulnerable to the new risks in these regions as will be shown in Chapter nine.

- Vulnerability of state or nations is distinguished from vulnerability of individuals and applies to the entire region or country based on change in the flow of goods and services before and after disasters usually measured as Gross Domestic Product (GDP). Economics is often used to assess the vulnerability of states in terms of their economic vulnerability to external shock, expressed as output volatility index, trade diversification and per capita GDP (UN-DRO, 1982; Bender, 1994; World Bank, 1998; Crowards, 2000). This does not have any application in this research.
- Vulnerability of ecosystems is ascribed to the integrity of ecosystems and their response to environmental fluctuations or disturbance regulation and expressed as the length of relaxation time, which increases with increased degradation. Ecological studies focus on storm protection, flood control, drought recovery and other aspects of habitat response to environmental variability (Lugo, 1995, 2000; Dale et al., 2000). This research does not also consider the vulnerability of the ecosystem.

Despite the different conceptualizations of vulnerability and its application, one of the most widely recognized definitions is that of the (United Nations International Strategy for Disaster Reduction (UNISDR) which defines Vulnerability as: “*The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards*” (UN-ISDR, 2004a). This definition partially embraces the conceptualization of vulnerability in this research, with the first three vulnerability approaches having a strong application in this research. Vulnerability is further examined within different disaster models in Chapter two (refer to Section 2.2.3).

### 1.5.5 POST MODERNISM AND THE ENVIRONMENT

This research challenges the privileged status of scientific claims to knowledge because different people, scientist and non-scientist alike, including local people claim different truths about the environment. This is important in understanding the findings of question three on risk perception, as analysed in Chapter eight because indigenous knowledge as revealed by the LND survivors, plays a crucial role in their interpretation and understanding of the LND.

How society influences the environment is now examined within the contemporary post- modern era. Blaikie (1996:81) affirms that post-modernism has not only invaded the social sciences, but is now engaged in the foundations of the natural sciences, policy

making and development studies. The teleological positions on the environment that used to be transmitted in the form of ‘meta-narratives’ and embraced worldwide is now being challenged:

*“The role of environmental scientists in policy making as talking truth to power and as the only rational and legitimate brokers between the real environment and the rest of us is rejected”* (Blaikie, 1996:81).

The teleological scientific stance does not consider the knowledge of less powerful groups (also see Section 2.4) such as the local and indigenous people in whose context this research is situated. Some survivors of the LND used indigenous knowledge to survive the release of poisonous gasses during the LND. Risk and its perceptions, including mitigation measures against subsequent gas risks in Nyos village is still influenced by local knowledge in the area as will be shown in Chapter eight. An approach that neglects indigenous local knowledge will therefore not provide a suitable conceptual and epistemological stance for this study.

## **1.6 THESIS STRUCTURE**

Chapter one briefly introduces the thesis, presents the LNM disaster events and their context, explains the rationale for the study or research problematic, aims and approach of the study including case study, working objectives and research questions. It further examines the major theoretical influences on the research approach, which include Society-Nature relationship, Political Ecology, Sustainable Livelihood Frameworks and Post modernism and the Environment.

Chapter two then provides a review of the main research themes that underpin this study. The main themes reviewed are disasters studies (paradigms in disaster studies, key disaster terms like hazards, disaster, risk and vulnerability); disasters and development (hazards/disasters and development, disaster management); risk perception and migration and environmental hazards.

The third Chapter draws on the review to explore the basic principles, possible practical applications and the key elements that have guided this research. It presents the elements used to frame the conceptual framework which guides the research process.

Chapter four outlines the research design, approach, techniques and data processing for this study. It explains how a case study research approach is employed to understand the questions under enquiry, using mixed qualitative and quantitative data gathering methods, and discusses aspects of field logistics and ethical considerations.

The fifth and sixth Chapters address the first research question: what strategies have been adopted to cope with and recover from the LNM disasters? Chapter five

provides a comprehensive analysis of the legislative, administrative and institutional framework of natural DM in Cameroon, to show how the process has been designed to function in the country.

Chapter six completes the answers to the first research question by analysing how the LNM disasters were managed. More detailed analysis of the management of the LND has been provided, since it drew national and international attention due to the huge logistical operations involved in the emergency response and the high death toll. This Chapter examines the disaster impact, the DM during the immediate aftermaths of the disaster, over the long term and some contemporary DM issues. The physical risk that exists in the disaster site is also examined in this Chapter, thereby providing answers to part of question two that seeks to understand vulnerability in the study populations.

Chapter seven seeks to answer part of the second research question: how can we understand the vulnerability of individuals and their households to the present risk at Lake Nyos and Monoum? The main thrust of this Chapter is analysis of the socio-economic and socio-cultural conditions in the study area and the study populations. Initially, a brief analysis of Cameroon's increasingly weak economy from the 1980s is presented to complement government arguments for having limited funds to assist disaster victims. The ramification of the post-disaster resettlement in the LN survivors is based on Cernea's (1997) Impoverishment Risk and Reconstruction Model. This addresses social vulnerability while the technical vulnerability based on the present physical threat in Lake Nyos is addressed in Chapter six.

Chapter eight discusses risk and its perceptions and answers the third question: how do people perceive and respond to the risk that still exists in the disaster areas? This Chapter analysis the risk perception of disaster affected case study populations and the main actors in DM through revealed and expressed perception of risk. An analysis of revealed perception of risk is also performed by examining the DM framework of the country and the management of the LNM disasters. The disaster survivor's revealed perception of risk is also analysed based on factors affecting their decisions to relocate back to the disaster zone or settle in close proximity with the risk source.

Chapter nine provides answers to the fourth research question: what makes people settle or move away from risky areas? It brings together findings from previous Chapters to form the analytical core of this thesis. It explores the reasons behind the post-disaster relocation decisions of the survivors. The analysis on relocation decisions is based on four themes generated from empirical information obtained from disaster survivors. The four themes addressed are motives for relocation back to the disaster zone, motives for non-

relocation to the disaster zone, intention to relocate from present location and preferred relocation area. Findings from these four themes provide a major contribution to the knowledge and understanding of post-disaster relocation decisions, which is still an under researched area of disaster research.

Chapter ten presents a summary and the main findings from the analytical Chapters. The results from Chapters Five to Nine are presented along with a new disaster model based on the main research themes in this thesis. This model, known as the Disaster Management, Risk Perception and Vulnerability (DRV) model for RD establishes the linkages and relationships between the central research theme (RD) and the other themes. This Chapter sums up the thesis by presenting some policy recommendations based on the major themes and theoretical expositions generated from the key findings.

## **CHAPTER TWO**

### **DISASTER, MIGRATION AND DEVELOPMENT**

#### **2.1 INTRODUCTION**

This Chapter reviews four themes relevant to this research. It begins by providing an overview of contemporary understanding on disaster by examining paradigms and key terminologies in disaster studies and disaster models. It then tackles disasters and development by examining the relationship between hazards/disaster and development, including an examination of contemporary approaches to DM. Risk perception and migration with emphasis on displacement/resettlement/population movement constitute the last two themes examined in this review. These review themes are important not only because they provide a better understanding of the subject under study but also because they provide the basis of a theoretical/conceptual framework that will be used to underpin the overall study.

#### **2.2 DISASTER STUDIES**

##### **2.2.1 PARADIGMS IN DISASTER STUDIES**

Knowledge of the various paradigms in disaster studies is relevant to understand the right approach in tackling the research questions outlined in Section 1.4.2. Disaster studies have been characterized in terms of their underlying paradigms. A technocratic paradigm dominated early disaster studies. This approach was pioneered by natural and physical scientists including geologists, seismologists, meteorologists and other scientists who can monitor and predict hazards. Emphasis was placed on the geophysical processes that caused disasters, and on predicting and forecasting natural hazard events and reducing their impacts on infrastructural development. This resulted in an increase in technology and engineering science, with the aim of strengthening physical infrastructure development in areas known for the recurrence of extreme natural phenomena. However, these approaches gave no consideration to the structure of systems, particularly human systems and the role of human behavior in modifying the environment and creating conditions that lead to natural disasters (Kates, 1971; Smith, 1999; Oliver-Smith, 1996).

Towards the 1980s, social scientists increasingly began to challenge the technocratic hazard-centered approach to disasters. A series of disasters that occurred in the 1980s, and at the end of the 1990s led to the realization that mitigating losses through technological and engineering solutions dealt with the symptoms rather than the actual causes of disasters. Social scientists then began to interpret disasters from the viewpoint of human and political ecology. They argued that disasters were not primarily the outcome of

geophysical or technocratic processes, but as a result of socio-economic processes that accounted for people and societies' vulnerability to disasters. The emergence of the anthropological and sociological approaches began to probe into human behaviour and focused on the role of human systems in creating natural disasters. They began to explain people's behaviour in response to risk and disaster, and sought to explain how individuals and their actions and decision-making create vulnerable social and environmental conditions, the precursors of disasters (Kates, 1971; Blaikie et al., 1994). This is the main approach adopted in this research as flaws in the LNM DM could be linked to the Human Use System as will be shown in the conceptual framework for this thesis (see Section 3.2 on Page 56).

A new paradigm, known as the 'Mutuality' paradigm emerged in the 1990s due to increased attention to environmental processes and human-induced climate change. This paradigm emphasizes the mutuality of hazard and vulnerability to disasters due to complex interactions between nature and society. While structural theory largely turned to society to explain people's vulnerability to disasters, the mutuality paradigm looks at the mutual constitution of society and environment. People in this view are not just vulnerable to hazards; but hazards are increasingly the result of human activity<sup>3</sup>. This has the important implication that vulnerability might not just be understood as how people are susceptible to hazards, but can also be considered as a measure of the impact of society on the environment (Oliver-Smith and Hoffman 1999; Bankoff and Hilhorst, 2004). This paradigm does not have any application in this research because the affected communities were not responsible for the discharge of the poisonous gases from the lakes that caused the disasters.

## 2.2.2 KEY TERMS AND THEIR MEANINGS: HAZARDS, DISASTER AND RISKS

### **Natural Hazards**

Natural hazards are threatening events to humans and their welfare, capable of producing damage to the physical and social space where they take place not only at the moment of their occurrence, but on a long-term basis due to their associated consequences (Ayala, 2002; Keith 2001). The United Nations International Strategy for Natural Disaster Reduction (ISDR) defines natural hazards as:

*“Natural processes or phenomena (geological, hydro-meteorological or biological) occurring in the biosphere that may constitute a damaging event.”* (UN-ISDR, 2004a)

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<sup>3</sup> An example is how environmental degradation and human-induced climate change can alter meteorological and hydrological processes, leading to more frequent and more devastating hazards.

Despite different conceptualizations, the concept of ‘hazard’ is now generally used to refer to a latent danger or an external risk factor of a system or exposed subject, which can be expressed in mathematical form as the probability of the occurrence of an event of certain intensity in a specific site and during a determined period of exposure (Cardona, 2004:38).

In this research, the principal focus is on geophysical, hydrologic and atmospheric phenomena that have the potential to affect human society. Other hazards that are not directly related to physical processes like disease, epidemics, and contamination by chemicals are not discussed in detail. Some important defining characteristics of natural hazards regardless of their source or origin include their intensity; the suddenness of the onset and duration; the frequency of occurrence; and the space or area in which the event occur (Kates, 1962, 1971; Burton, et al., 1993; Alexander, 1993, 1995; Smith, 2001).

### **‘Natural’ Disasters**

Disasters have been defined in several ways but a more detailed definition considers both the natural and socio-economic factors that lead to disasters. Not all natural bio/geophysical phenomenon give rise to disasters. Natural disasters occur when the threshold of the natural phenomenon combined with the status of human-ecological systems is such that their ability to respond and recover from the direct and indirect impacts is overwhelmed and often rendered inadequate (Westgate and O’keefe, 1976; IDNDR, 1992; Alexander, 1993; Quarantelli, 1998; Keith, 2001).

Cannon (1994) argues that while hazards are ‘natural’, disasters are not because social processes generate unequal exposure to risk by making some people more prone to disasters than others. He argues that the term ‘natural’ in disasters is inappropriate. In compliance with his argument, I will refer subsequently to disasters and not ‘natural’ disasters. Tobin and Montz (1997) argue that disasters may not lead to death, but may disrupt the workings of society and have severe economic impacts. This view is supported by Alexander (1995; 1997) who suggests that disasters are often reflected as a change in the flow of energy/mass, goods and services between human and ecological systems and consequent transitory or long-term changes in the functions and structure of systems. The conceptualisation of disasters in this thesis reflects the definition by the United Nations ISDR:

*“A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources” (UN-ISDR, 2004a).*

A disaster therefore results from the combinations of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk. Two common elements of disasters are their high degree of loss and damage and the incapacity of affected people, regions or countries to cope with the impacts (Rettberg and Ungthum, 2003).

Disasters usually comprise a set of crises resulting from the disruption of socio-economic activities, damage to the environment, property and natural resources, injury and deaths. The impacts caused by natural hazards are varied and often classified into direct and indirect impacts (Ward, 1978; Tobin and Montz, 1997; Mileti, 1999; Tierney et al., 2001). While the 'direct' impacts are caused by physical contact of the hazard event with humans and/or with property, the 'indirect' impacts are caused by the ramifications of such physical contact. The direct and indirect impacts have been further divided into 'tangible' or 'intangible' impacts (Figure 2.1). Tangible impacts are usually described as those that can be measured in monetary terms while intangible impacts are those that cannot be measured in monetary terms or impact in such a way that monetary estimates are considered undesirable and unacceptable (Tobin and Montz, 1997). Tangible and intangible impacts have also been further subdivided into primary and secondary impact<sup>4</sup> categories as shown in Figure 2.1 (Parker et al., 1997; Smith and Ward, 1998). Some of these terminologies have been used to describe the disaster impacts in the thesis.

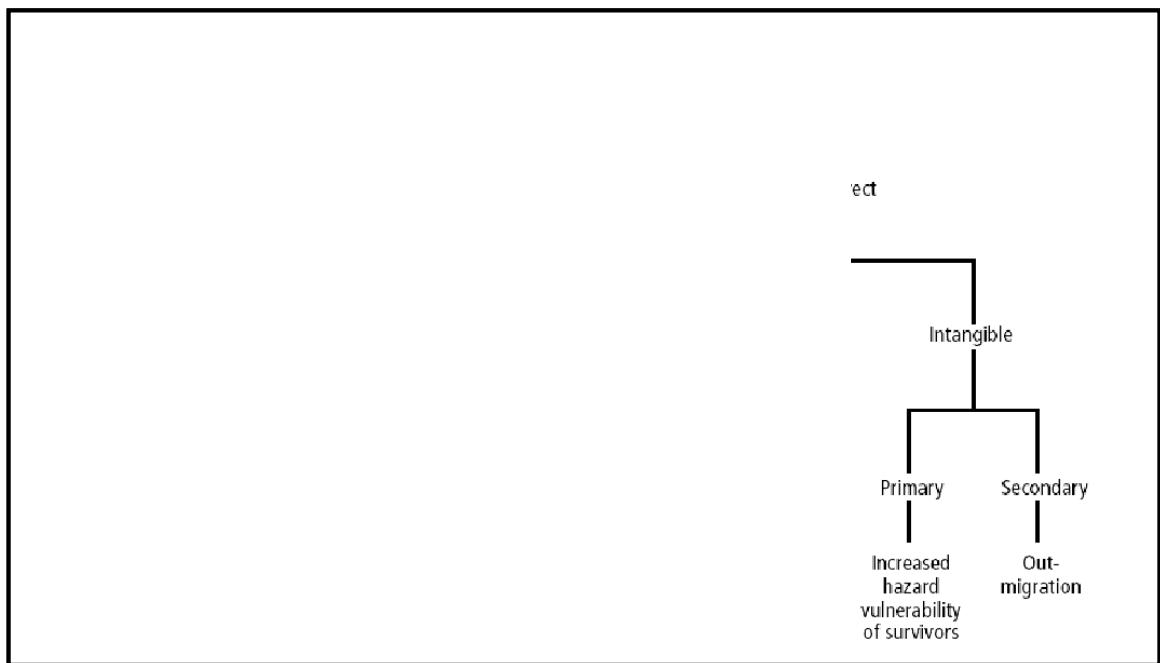


Figure 2.1: The impact of natural disasters. *Source: Smith and Ward (1998:35)*

<sup>4</sup> Primary impacts are considered to be the immediate impacts associated with a disaster and constitute the losses resulting from the event itself. These impacts usually lead to further impacts, termed secondary impacts. E.g. crop damage is a primary impact, whereas the food shortage that may follow is a secondary impact.

## **Risk**

Risk has different conceptualizations, at times often inter-changed with hazards. Risk has been defined as the ‘probability of an adverse event and the magnitude of its consequences’ (Rayner and Cantor, 1987). Crichton (1999) developed a risk triangle, which he used to describe risk as the probability of a loss that depends on three elements, hazard, vulnerability and exposure. If any of these three elements in risk increases or decreases, then risk increases or decreases respectively. Sarewitz et al. (2003) divides risk into ‘event risk’ (the probability of an event happening) and ‘outcome risk’ (the probability of a particular outcome). The UN-ISDR (2004a) defines risk as:

*“The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity, disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions”.*

This implies that risk is both a descriptive and normative concept which includes the analysis of cause-effect relationships, which may be scientific, anecdotal, religious or magical (Renn, 1992). Recent definitions of risk have shifted from explicitly mentioning probability. Rosa (2003:56) considers risk as a situation or an event where things valued by humans including humans themselves are at stake and where the outcome is uncertain. The focus here is on uncertainty but has the limitation that the emphasis is on the outcome and not the event itself. The Royal Society questioned the distinction between objective and perceived risk and although they accepted that the outcomes of risk were objective, they asserted that assessments of risk, whether they are based upon individual attitudes, the wider beliefs within a culture, or on models of mathematical risk assessment, depends upon human judgments (Royal Society, 1992).

The conceptualisation of risk in the social sciences has a common principle that the causes and consequences of risk are mediated through social processes (Renn, 1992:61). These risk concepts include psychological, sociological, economic and cultural perspectives. Thus social risk focuses on the evaluation of risk and tries to link objective and socially constructed risk. In this research, risk is viewed as both a physical and social attribute.

### **2.2.3 DISASTER MODELS**

This section looks in more detail at a series of models that attempt to represent the interaction of human/social systems with natural hazards to produce disasters. Four models presented here that adopt integrated approaches are:

- Human Adjustment to Natural Hazards (Kates, 1971)

- Disaster and Pressure Release (Blaikie et al., 1994)
- Hazard of Place (Cutter, 1996)
- BBC framework for measuring vulnerability

### **Human Adjustment to Natural Hazards: a general systems model**

This model was developed by Kates (1971) and employs a general systems mode with subsystems within the model that show its internal process-response system (Figure 2.2). It was the first to bring in the social dimension of hazards/disasters and recognizes that humanity and nature, in the form of a human use system and a natural system, interact to produce natural hazards. A model which utilizes principles of control systems is employed. This model greatly informs the final conceptual framework for this research and the diagrammatic representation of the Human Use System and the Bio-geophysical system, which explains it (see Page 56-60). It also incorporates key concepts and hypotheses on human behaviour in response to natural hazards such as perception, preferences, evaluation and adoption choice, which are explored in more detail in Chapters eight and nine. This model represents the most comprehensive approach to modeling the human-natural hazard interaction.

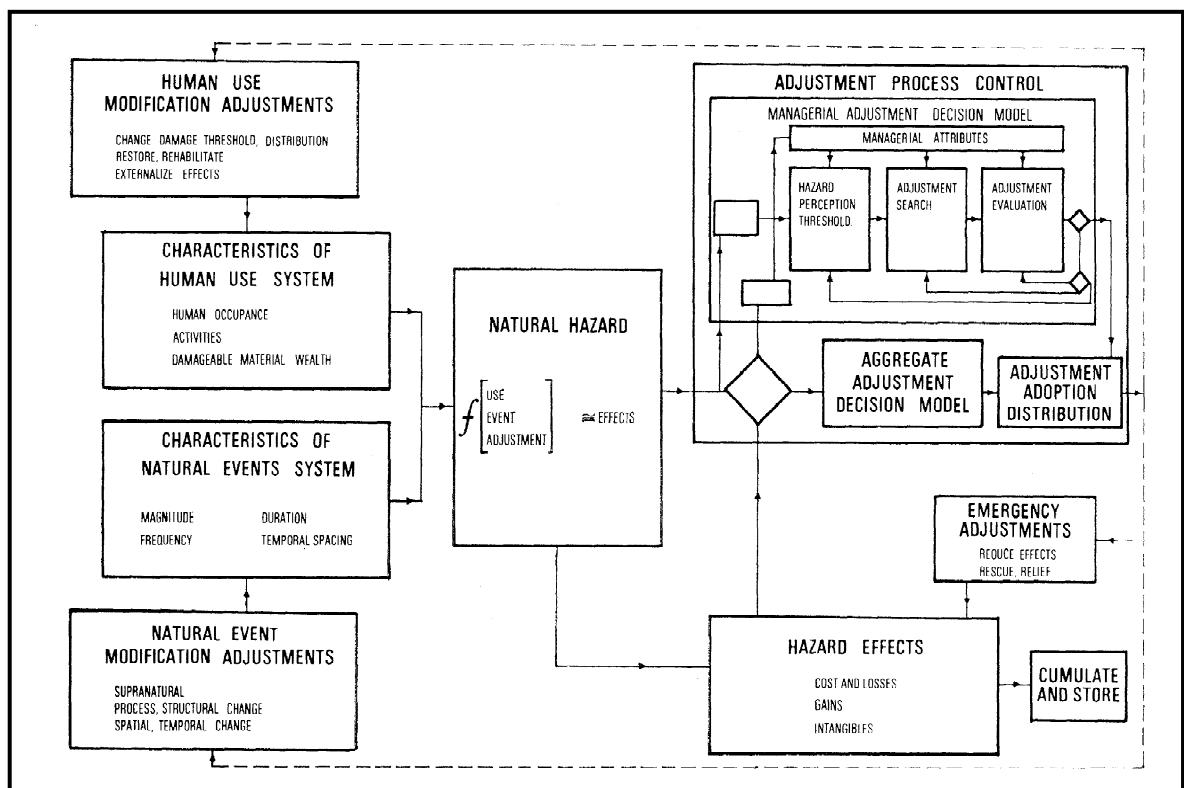


Figure 2.2: Human adjustment to natural hazards. *Source: Kates (1971)*

## **Disaster and Pressure Release Model**

This model is useful in this thesis to understand the social vulnerability of the LND survivors resettled in camps that is analysed in Chapter seven. It further enlightens some of the livelihood problems acting as push factors for relocation from the resettlement camps, which is discussed in Chapter nine. This model expresses the cause of disasters as related to socio-economic and political factors that determine societies' access to resources and power, inequity due to race, class, and poverty and gender roles. In this model, Blaikie et al. (1994) explain the progression of vulnerability (see Section 1.5.4; Page 14) from root causes, through dynamic pressures, resulting in local unsafe conditions that combine with natural hazards to produce disasters (Figure 2.3). Government policies and programs are considered the result of unequal power relations that create vulnerability and unsafe conditions at the local level. This model is useful in this thesis because of its focus on political ecological factors considered to be responsible for the socio-economic problems of the LND survivors. This approach suggests that disasters are more likely to occur in societies where there is lack of resources, basic needs and freedom, oppressive ideologies, rapid population growth and/or a fragile economy. The main limitation of the model for this research is that it does not have any feedback mechanism and therefore does not attempt to represent adjustments that are made to reduce vulnerability and increase the adaptive capacity of humans to learn and improve their situation.

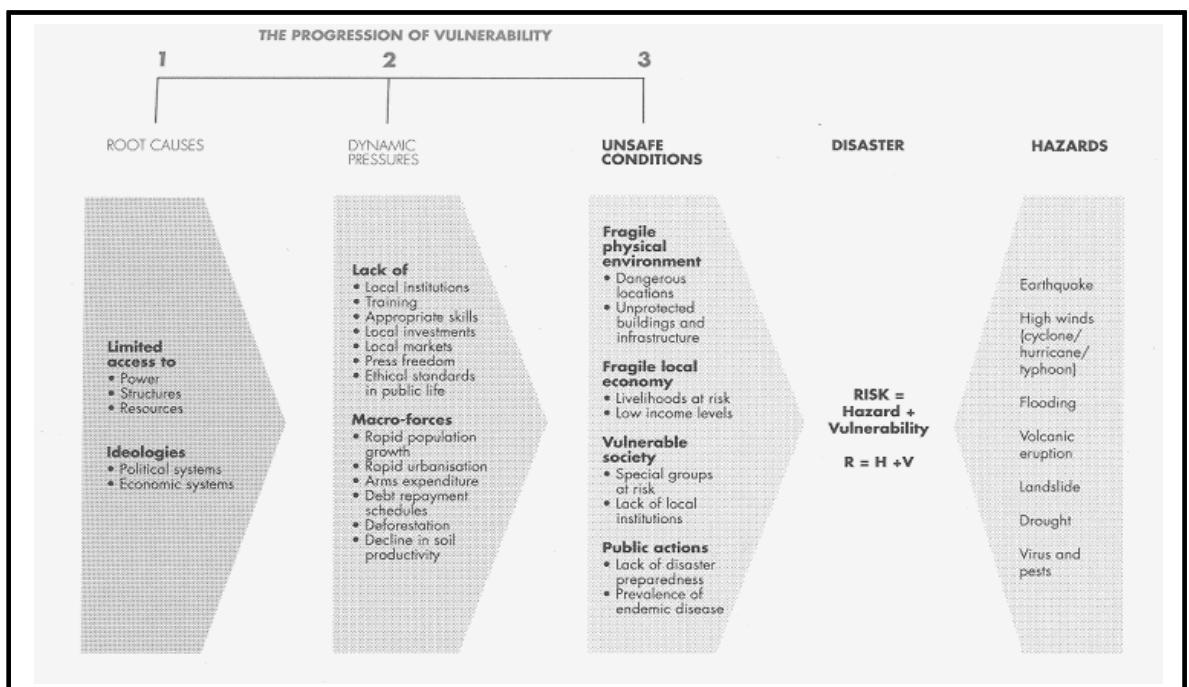


Figure 2.3: Disaster and Pressure Release Model. *Source: Blaikie et al. (1994)*

### **Hazard of Place Model of Vulnerability**

The Hazard of Place vulnerability model developed by Cutter (1996) combines the traditional view of biophysical risk of vulnerability with the recent ideas of social vulnerability (Figure 2.4). This model seeks to integrate the underlying social and biophysical elements that contribute to vulnerability into the vulnerability of place. Risk and mitigation interact to produce the hazard potential. The hazard potential is filtered through a geographic context to produce biophysical vulnerability and through the social fabric to create social vulnerability. The biophysical and social vulnerability then interacts to create the place vulnerability. The interactions and feedback loops in the model attempts to link the major components of disasters in a cause-effect chain. This model is applied in this research to understand the vulnerability of the LND survivors who have relocated to the disaster site in Nyos in defiance of government orders, or the Njindoum residents living in close proximity to Lake Monoum (detail analysis in Chapter 9). These populations experience a vulnerability of place due to their new location or position, which puts them at higher risk from any subsequent impact from the Lakes. This model differs from the Disaster and Pressure Release Model in that the latter does not have any feedback loops through which disasters can be mitigated or prevented.

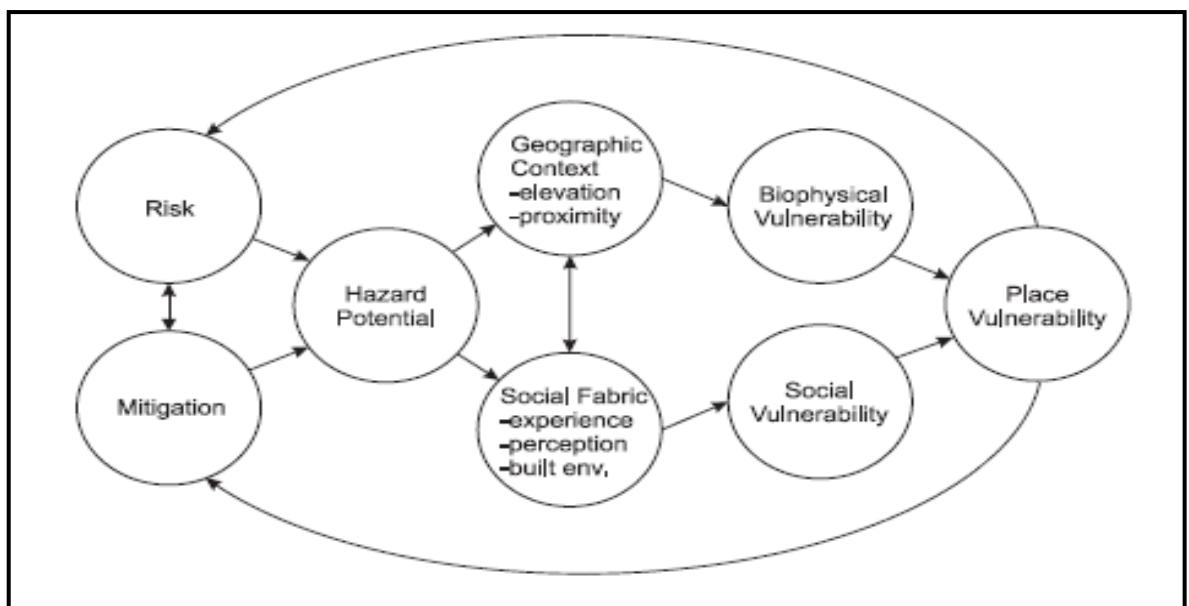


Figure 2.4: Hazard of place model of vulnerability. *Source: Cutter et al. (2000)*

### **The BBC-Framework for Measuring Vulnerability**

The BBC-framework is the work of Bogardi and Birkmann (2004) and Cardona (1999; 2001) (see Figure 2.5). This framework addresses various vulnerabilities in the social, economic and environmental sphere, which have been defined as the three main pillars of sustainable development. By linking sustainable development and vulnerability reduction,

the BBC conceptual framework stresses the importance of giving due account to environmental considerations (Birkmann, 2006). This framework encourages analyses of probable losses and deficiencies of various elements at risk as well as the coping capacities and potential intervention measures incorporating the three thematic spheres. It stresses that vulnerability should be considered within a dynamic process involving focusing simultaneously on vulnerabilities, coping capacities, and a potential feedback system which intervenes to reduce vulnerabilities. It is therefore more proactive and promotes a problem solving perspective in order to reduce vulnerability before a hazard occurs (Birkmann, 2006; Birkmann et al., 2007), which does not exist in the Disaster and Pressure Release Model. This is relevant in this contemporary disaster research, which considers vulnerability within the social sphere and DM strategies (used as control mechanisms in the Human Use System in Section 3.2) that can mitigate the social vulnerability of the LND survivors resettled in camps as will be seen in Chapter seven. The need to mainstream DRR reduction within the development process in Cameroon underpins the long term strategy for vulnerability reduction that can also be drawn from this framework.

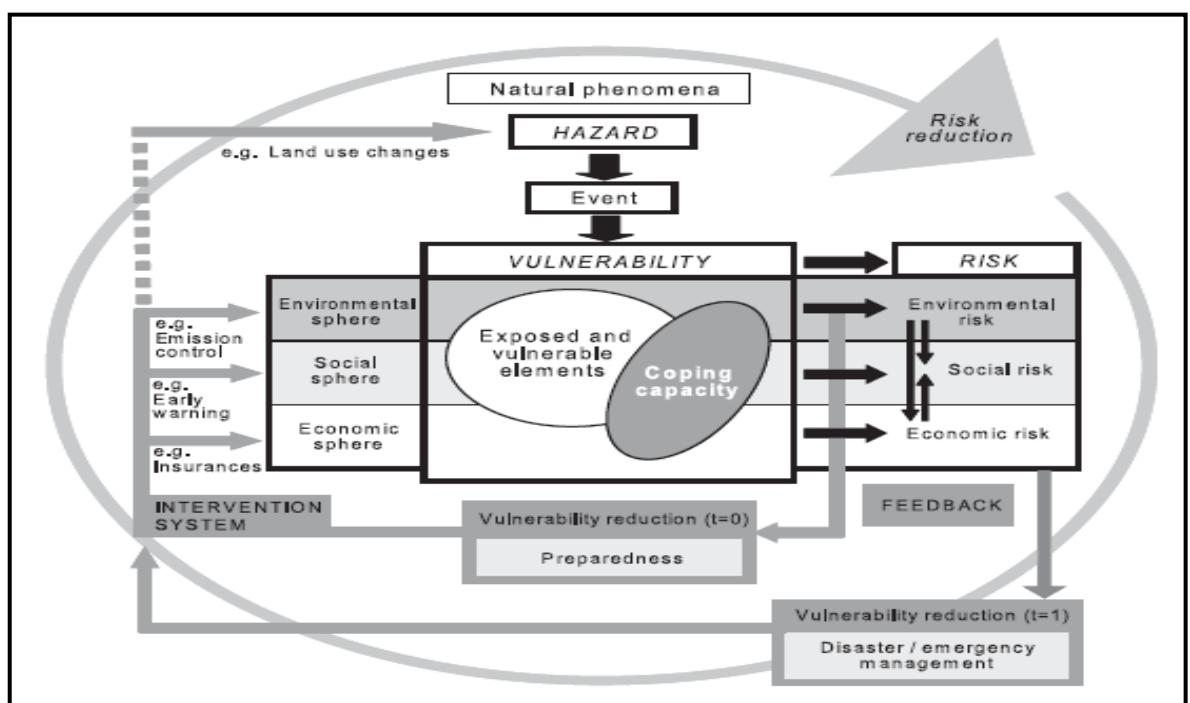


Figure 2.5: The BBC conceptual framework. *Source: Birkmann et al. (2007)*

The objectives and setting of this study do not suit an approach that relies on any single research method or model. In Chapter three, insights that have been obtained from the models will be integrated to build an alternative conceptual framework for this research. In particular, the Human Use System in the systems model of Kates (1971), the processes in the generation of vulnerability and risk in the Disaster Pressure and Release Model, the social and biophysical factors that interact to contribute to the vulnerability of

place in the Hazards of Place model, and the BBC framework for measuring vulnerability are used to build an alternative model for this thesis. The models can be visualized as operating within a development framework. It suffices therefore, to examine the relationship between disasters and development.

## 2.3 DISASTERS AND DEVELOPMENT

### 2.3.1 HAZARD/DISASTERS-DEVELOPMENT LINKAGES

This research is being conducted in the School of International Development because disaster risk is intimately connected to processes of development. The Human Development Index (HDI)<sup>5</sup> has been used to predict the number of deaths due to extreme natural events (IFRC, 2001a). It shows high deaths for low HDI countries with the lowest cost per disaster, and low deaths for high HDI countries with high cost of material damages (Table 2.1). Although there has been a general increase in the frequency and intensity of natural disasters worldwide, disaster risk and losses vary disproportionately in different regions of the world (IFRC, 2003; UNDP, 2004a). According to White et al. (2004:8), only one in every hundred people affected by natural disasters lives in high human development countries.

A recent UNDP study found that whilst only 11 percent of people exposed to natural hazards live in countries with low human development, they account for 53 percent of disaster deaths (UNDP, 2004a:1). This shows that natural disaster risk is intimately connected to the process of human development, and that development processes intervene in the translation of physical exposure into disaster events (UNDP, 2004b; White et al., 2004). Cameroon has a low HDI of 0.505 and is ranked 125<sup>th</sup> out of 162 countries. This implies that the death toll from disasters is likely to be higher.

Table 2.1: Level of human development and disaster impacts

	Deaths per disaster	Cost per disaster (US\$m)
Low HDI	1,051	79
Medium HDI	145	209
High HDI	23	636

*Source: IFRC (2001a: 162,164)*

<sup>5</sup> The HDI is a summary composite index that measures a country's average achievements in three basic aspects of human development: longevity, knowledge, and a decent standard of living. Longevity is measured by life expectancy at birth; knowledge is measured by a combination of the adult literacy rate and the combined primary, secondary, and tertiary gross enrolment ratio; and standard of living by GDP per capita (PPP US\$).

Development has been viewed as an economic, social and political process, which results in a cumulative rise in the perceived standard of living for an increasing proportion of the population (UNDP, 2004a; UN-ISDR, 2004a). Although the link between disaster and development has been recognized (Dickens, 1996; Escobar, 1996, Anderson and Woodrow, 1999; World Bank 2001, White et al., 2004), it is not well understood (UNDP, 1994; Pelling, 2003:201). There are negative and positive aspects to the relationship (refer to Figure 2.6). Disasters do not only impact negatively on development, but development failures can create risk by increasing societal susceptibility to natural hazards and reducing coping strategies. Some forms of development can also generate new hazards. Conversely, well planned risk reduction programs can lead to development (Sirleaf, 1993; UNDP, 1994; White et al., 2004; UNDP, 2004). An understanding of these relationships is crucial for this research, which is development oriented. This also has policy implications for disaster management, since proactive measures are recommended for mitigating disasters through their integration into the development processes of countries.

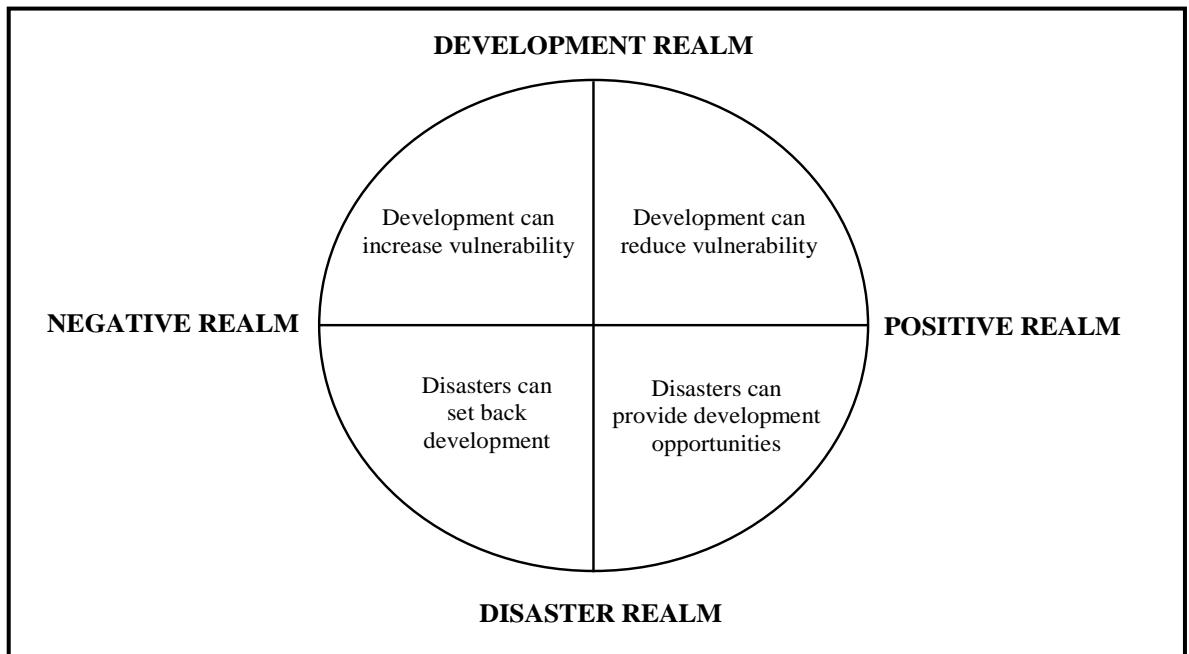


Figure 2.6: The relationship between development and vulnerability to disasters.  
Source: UNDP-DHA (1994:8)

Economic and social development work directly or indirectly to decrease or increase disaster risk (UNDP, 2004b:20). The United Nations General Assembly designated the 1990s the International Decade for Natural Disaster Reduction (IDNDR). The declaration of the IDNDR raised the profile of discussions surrounding the social and economic causes of disaster risk (IDNDR, 1999). Table 2.2 shows the ways in which social and economic development interact with disasters. Each row in the table is dealt with after.

Table 2.2: Relation between disaster and economic-social development

	ECONOMIC DEVELOPMENT	SOCIAL DEVELOPMENT
<b>DISASTER LIMITS DEVELOPMENT</b>	Destruction of fixed assets. Loss of production capacity, market access or material inputs. Damage to transport, communications or energy infrastructure. Erosion of livelihoods, savings and physical capital.	Destruction of health or education infrastructure and personnel. Death, disablement or migration of key social actors leading to an erosion of social capital.
<b>DEVELOPMENT CAUSES DISASTER RISK</b>	Unsustainable development practices that create wealth for some at the expense of unsafe working or living conditions for others or degrade the environment.	Development paths generating cultural norms that promote social isolation or political exclusion.
<b>DEVELOPMENT REDUCES DISASTER RISK</b>	Access to adequate drinking water, food, waste management and a secure dwelling increases people's resiliency. Trade and technology can reduce poverty. Investing in financial mechanisms and social security can cushion against vulnerability.	Building community cohesion, recognizing excluded individuals or social groups (such as women), and providing opportunities for greater involvement in decision-making, enhanced educational and health capacity increases resiliency

Source: UNDP, 2004:20

### **Disasters Retard Development**

Disasters exert an enormous toll on development and in doing so; pose a significant threat to prospects for achieving the Millennium Development Goals (MDGs). The MDGs (see Appendix 2) aim to reduce poverty by directing development planning towards priority goals. These interact with disaster risk. Direct disaster impacts that severely challenge the MDGs include destruction of infrastructure, erosion of livelihoods, damage to ecosystems and architectural heritage, injury, illness and death. Indirect impacts have wider effects on the economy and society through the diversion of development funds for emergency relief and reconstruction (UNDP, 2004; White et al., 2004). Economically, the burden of disasters is proportionally much higher in poorer countries (World Bank, 2006; UN-ISDR, 2004b). Between 1990 and 1998, 94 percent of the world's major natural disasters and 97 percent of all natural disaster related deaths occurred in developing countries (World Bank, 2001). Although the absolute economic loss is greater in wealthier countries, the losses as a share of gross national income affect the poorest countries most profoundly. Hurricane Katrina caused damages amounting to US\$ 125 billion in the United States, which represents only 0.1 percent of the country's GDP (Goyet, 2008), while losses in developing countries in recent decades have been between 134 and 138 percent of GDP (UN-ISDR, 2004b). Although the LNM disasters did not affect physical capital, which can be quantified in financial terms, financial resources that are used to mitigate the physical risk in the Lake (See Section 6.3.1) could have been used for other development projects in the country.

### **Development Can Lead To Disaster**

Development can create vulnerability to disasters through increase in hazard exposure and susceptibility. Technological hazards caused by industrial atmospheric pollution have been recognized as a major factor contributing to climate change, with the resulting prospect of weather-related hazards such as tropical storms and drought growing in severity and impact (White et al., 2004:26). Adams (1990) discusses how anthropogenic activities such as land degradation, and deforestation or desertification create environmental change, which in turn can increase vulnerability to natural hazards such as droughts or flooding or can even create new hazards. White et al. (2004:27-28) and UNDP, (2004:22) use examples in Turkey, Guyana and Malawi to show how patterns and policies of economic and social development have caused new vulnerabilities to hazards and undermined people's capacity to cope with hazards or recover from disasters. Appendix 4A (see Page 279) explores this subject further and shows 'vicious spirals' of failed development and disaster risk according to White et al. (2004).

In Cameroon, anthropogenic activities<sup>6</sup> in search for agrarian livelihoods exacerbate landslides and floods on the fragile slopes of the CVL. In 2001, heavy rains triggered flash floods, mudflows and landslides on the slopes of Mt. Cameroon in Limbe that resulted to 24 deaths, rendered over 1500 people homeless and left a vast trail of destruction to infrastructure. In July and August of 2003 following heavy storms, floods and landslides affected several villages in the Bamboutous plateau and destroyed 309 houses, killed 46 people and displaced more than 1700 others (IFRC 2001b; Par Bleu, 2004; Ayonghe et al., 2004; Zogning et al., 2007).

### **Development Can Reduce Disaster Risk**

The third aspect of development disaster linkage noted in Table 2.2 is that economic and social development can reduce disaster risk. Access to basic societal facilities, greater engagement in business, building community cohesion, and greater involvement in decision-making can all increase resilience. The possibility for 'virtuous spirals' of development and disaster risk reduction backed up by timely and appropriate disaster response has also been examined (see Appendix 4B). How development can reduce disaster risk has huge relevance for this interdisciplinary research, which stresses the role of political ecological processes to mitigate disaster risks during development programs and processes.

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<sup>6</sup> Houses are dug into hillside, cattle tracts terrace the hillside and poor farming techniques increase deforestation and soil erosion and assist the natural factors in destabilising slopes facilitating landslides.

The World Bank and the regional development banks have been active with issues surrounding the relationship between disaster risk and economic development. Many international humanitarian agencies have also joined in moving the agenda of managing disasters on from mitigation and preparedness towards a deeper integration with development processes (UNDP, 2004a:18).

### 2.3.2 DISASTER MANAGEMENT

Disaster management (DM) is central to disaster prevention, risk and/or vulnerability mitigation but adequate DM strategies in Cameroon are still lacking (See Section 6.3.2 that deals with the social management of the LNM disasters on Page 136). DM aims to reduce, or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery. According to UN-ISDR (2002), this usually involves five phases (prediction, warning, emergency relief, rehabilitation and reconstruction), with the essential activities being mitigation and preparedness, response and recovery (see also Moe and Pathranarakul, 2006). Box 2.1 sets these phases and activities out in detail. The DM phases do not always occur in a precise order and often, phases of the DM cycle overlap; the length of each phase greatly depends on the severity of the disaster (Warfield, 2008).

### Box 2.1: MAIN PHASES/ESSENTIAL ACTIVITIES OF DISASTER MANAGEMENT

**Prediction:** In this phase, mitigation and preparedness activities are conducted in the prediction phase. This includes structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards and non-structural measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and temporary evacuation of people and property from threatened locations.

**Warning:** This phase refers to the provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare effective response.

**Emergency relief:** The provision of assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of immediate, short-term, or protracted duration.

**Rehabilitation:** This phase includes decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk.

**Reconstruction:** This phase includes the essential activities conducted are mitigation, preparedness activities in prediction phase; response activities in warning and emergency relief phases; and recovery activities in rehabilitation and reconstruction phases.

#### Essential Activities in Disaster Management

**Mitigation** activities include structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards.

**Preparedness** include activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations.

**Response** includes the provision of assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of an immediate, short-term, or protracted duration.

**Recovery** includes decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk.

*Source: Adapted from UN-ISDR (2002)*

Developmental considerations play a key role in contributing to the mitigation and preparation of a community to confront a disaster effectively. Khan et al. (2008) present a slightly different view of the key stages of activities that are taken up within DM (see Figure 2.7).

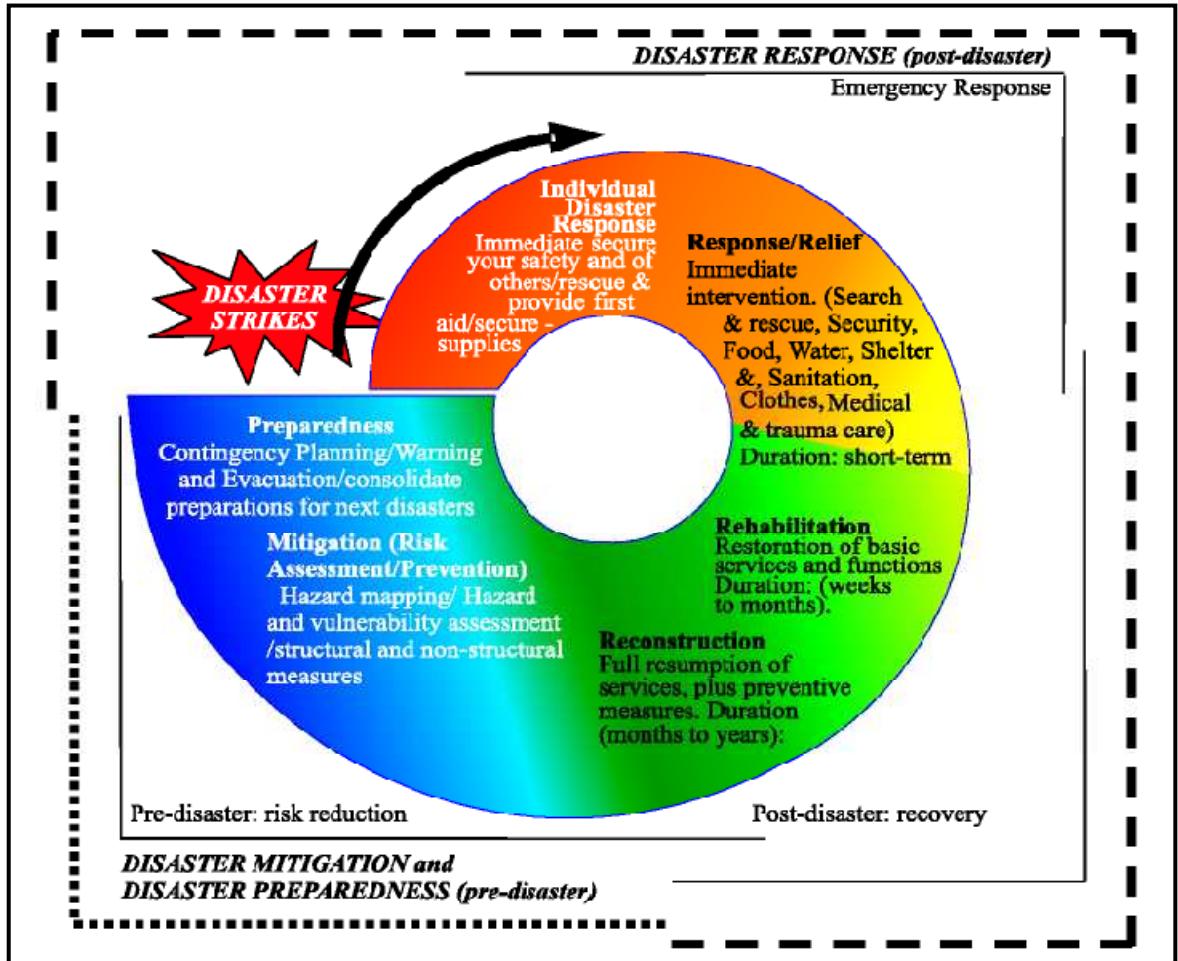


Figure 2.7: Main activities of disaster management. *Source: Khan et al. (2008)*

Managing the post-disaster crises and the long term recovery phases remains the primary task of governments, DM and humanitarian officials. However, there is no homogeneous way of designing risk-reduction strategies. They vary and take into account the particular social, economic, cultural and political conditions prevailing in different risk zones.

Former DM programs focused on pre-crisis and the immediate aftermaths of disasters. The progressive increase in loss of life, property and deleterious effect on environment due to disasters moved the international and disaster community to look at DM in a new perspective. The IDNDR was initiated during the 1990s to serve as a catalyst for disaster reduction. The IDNDR adopted a concerted strategy towards disaster reduction within a framework that places disaster reduction in the perspective of sustainable development. The UN urged countries to view development programs and projects from their potential to reduce vulnerability and hazards, in order to prevent disaster risks (IDNDR, 1999; ISNDR, 2001; WSSD, 2002).

In the disaster cycle, problems are examined as smaller entities and aid agencies usually specialize on one of the entities, independent from each other. But most communities perceive those entities as an integral part of their survival and development

process (White et al., 2004; Heijmens, 2004). The new approach to a complete DM cycle (Figure 2.8) includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure. Therefore, the DM process illustrates the ongoing process by which governments, businesses, and civil

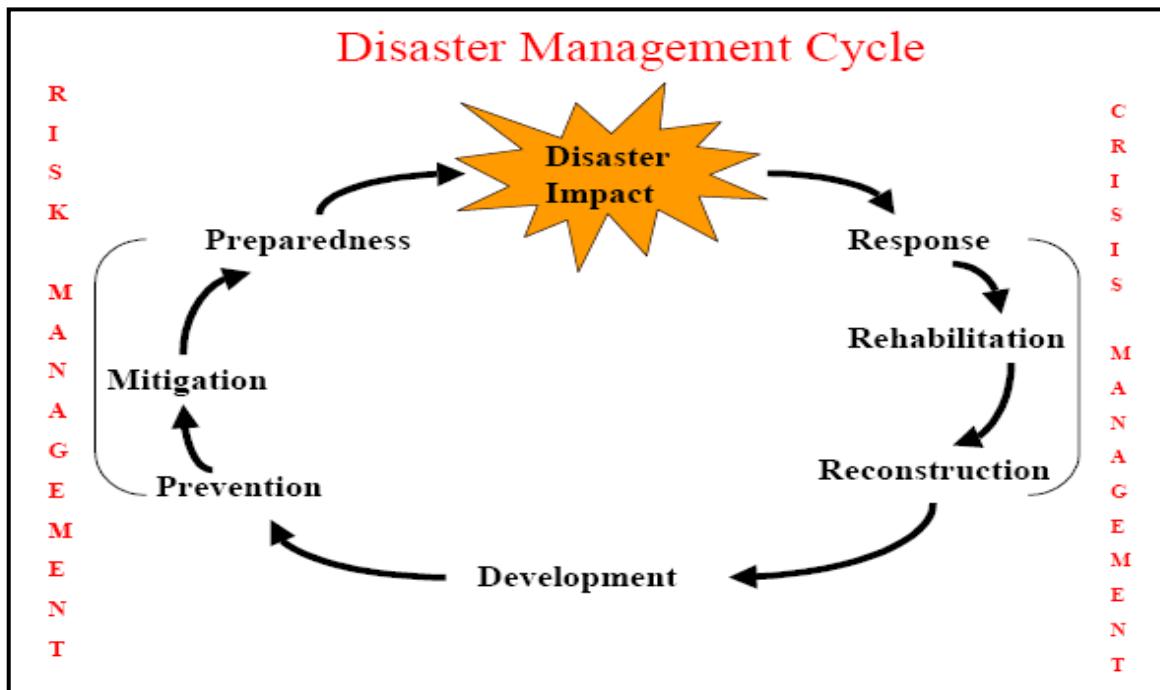


Figure 2.8: Revised disaster management cycle. *Source: Khan et al. (2008)*

society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred. Appropriate actions at all points in the cycle should lead to greater preparedness, better warnings, reduced vulnerability or the prevention of disasters during the next iteration of the cycle (Khan et al., 2008).

### **Disaster Risk Management**

It had been recommended that response should be evaluated for all stages in the disaster cycle in order to design disaster mitigation strategies that could coincide with development (UNDP, 1994; Quarantelli, 1999; Pelling, 2003). Since it has been acknowledged that disasters act as impediments to the MDG, the necessity to mainstream DRR into sustainable development practices and planning process has been acknowledged (UNDP, 2004a; WCDR, 2005). As a result, development practices that inculcate risk management are a new concept that has been incorporated into the DM cycle. DRM therefore refers to a continuous and integrated multi-sectoral, multi-disciplinary process of planning and implementation of measures aimed at (1) preventing or reducing the risk of disasters; (2) mitigating the severity or consequences of disasters; (3) emergency preparedness (4) a

rapid and effective response to disasters; and (5) post-disaster recovery and rehabilitation (National Disaster Management Act 57 of 2002: Chapter 1).

### **Disaster Risk Assessment**

An important advance in DM and risk assessment has been recognition of the link between vulnerability and coping capacity. The original equation used to describe disasters in the 1990s (Disaster (D) = Hazard (H) x Vulnerability (V)) has changed to  $D = H \times C/V$  (where C stands for capacity) (Davis, 2004:131). Preconceived intervention packages after disasters tend to be the task of risk professionals and technicians, and many times deny the social heterogeneity and capacity of populations at risk throughout the world (Maskrey, 1999).

According to Davis (2004), the vast majority of disaster managers in the risk assessment field still hold the simplistic notion that disaster risk assessment (DRA) is synonymous with scientifically generated ‘hazard mapping’. He explains that DRA still favours the physical sciences since societies still have optimistic expectations that technology is a panacea for their problems. This view grows from a technocratic and fundamentally false assumption that once hazards are mapped in terms of their location, duration, frequency, severity and impact characteristics, and then the risk assessment process is complete (Davis, 2004). Although recent debates about risk have shifted from the position that hazard analysis can give an objective measurement of risk, such analysis are still influential with regard to risk management. This is because technical risk assessments carry much weight in terms of policy implementation. Rosa (2003) points out that, although ‘risk’ is essentially a matter of social construction, to deny that risks exist is very dangerous.

Vulnerability and Capacity Assessment (VCA) is now routinely undertaken as an essential part of disaster assistance and development planning, as set out in the World Disaster Report of 2002: “*Assessing vulnerabilities and capacities during peace and war*” (IFRC, 2002b). A main limitation to VCA identified by Davis (2004) is that pre-disaster VCA are speculative, comprising projections concerning likely damage and casualties; while post-disaster needs and damage assessments are the acid test of vulnerability and capacity. He then recommends that both processes should be merged within an integrated Disaster Management Information System (Davis, 2004:130). It has also been recommended that scientists and disaster managers should recognize the value of local people’s perception while that of outsiders should be complementary. This is because if vulnerability has to be addressed efficiently, then people’s participation should be made

part of the empowerment process (also see Section 2.4.7; and best practices for a resettlement plan on Page 53). The Disaster Pressure Release model (Wisner et al., 2004) has been recognized as a very effective instrument to encourage local people as well as outsiders “co produced” risk assessment to analyse their condition, and to discover root causes of why they endure hardship (Davis, 2004; Heijmans, 2004).

### **Care International UK’s Application of Sustainable Livelihood Approach**

CARE has been a front runner in developing SLAs (see Section 1.5.3; Page 11), and also considers how the approach can be applied to the disaster context, especially in the immediate-post DM rescue and relief phase (Sanderson, 1999). It does this by linking sustainable livelihood perspectives to different stages in the relief to development continuum. In the relief stage, the emphasis is on livelihood provisioning. Such activities focus on meeting basic needs such as shelter, food and water. In the relief to rehabilitation stage, the aim is to prevent further erosion of productive assets or coping strategies and to help households re-establish their livelihoods. This post-disaster relief effort is essential for disaster victims to regain their livelihood and re-engage in building their social and financial capital. The next stage involves moving from medium to long term rehabilitation to development activities that aim to build up assets and improve household production, consumption and exchange activities. Livelihood promotion strategies are focused on longer-term asset building to improve access to resources and mitigate future shocks and stresses. CARE’S SLA has implications for the conceptual framework of this research, and the immediate post-disaster and long term management of the LND survivors as will be seen in Chapter six.

## **2.4 PERCEPTIONS OF RISK**

Risk perception (RP) could be defined as cognition, a personality trait, or behavior (Wahlberg, 2001) while Power (2004:14) describes the concept as ‘elusive, contested and inherently controversial.’ Slovic (1999) posits that public conceptions of risk are related to a broad range of categories, whilst ‘expert’ conceptions of risk are based on likelihood of harm. The notion of risk perception refers to the intuitive risk judgments of individuals and social groups in the context of limited and uncertain information (Slovic, 1992).

How risk is understood depends partly upon theoretical perspectives from which risk is studied and paradigms on the study of human behaviour. There is a division between approaches and conceptions to risk between the realist and constructionist continuum and also at the level of the individual or the wider social level (Renn, 1998, Renn and Klinke,

2001; Kemp et al., 2002) as shown in Figure 2.9 below (also refer to Section 1.5.5; Page 15). RP (analysed in Chapter 8) is important in this study because it influences the criteria that are appropriate for dealing with natural hazards, DM policy on risk mitigation and also influences decisions taken by disaster affected populations to relocate in risky areas.

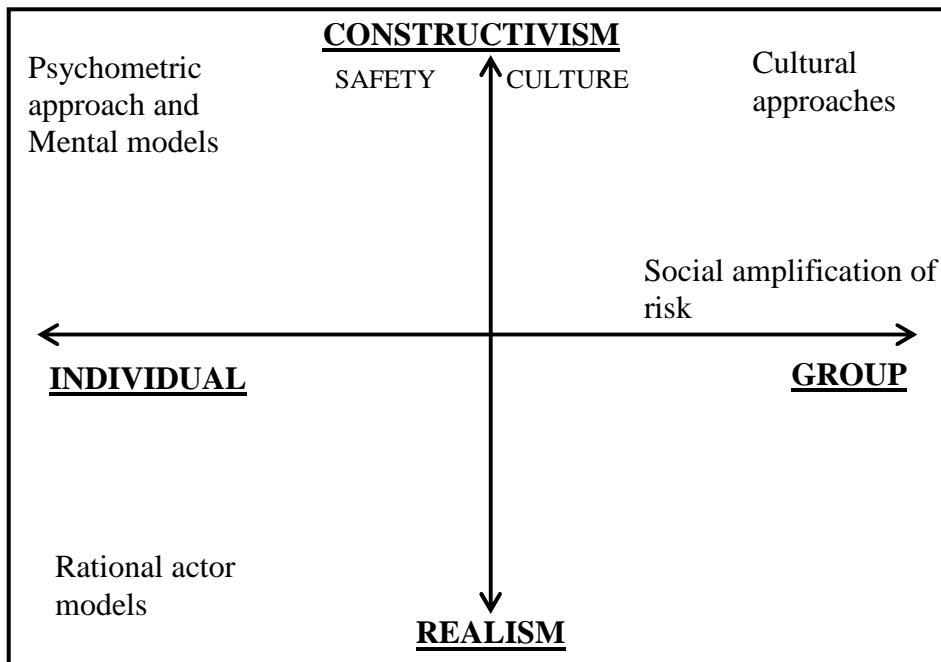


Figure 2.9: Perspectives on risk. Source: *Adapted from Renn (1998)*

#### 2.4.1 REALISM

Traditionally, engineers, health physicists, statisticians and epidemiologists defined risk probabilistically according to ‘real’ risk, determined scientifically and ‘objectively’, versus ‘perceived’ risk by the public (Liebow, 1993; Liebow and Wolfe, 1993). The premise of the realist position is that scientific knowledge is essentially rational, neutral, unproblematic and concerned with truth about the physical world as defined by experts (Weyman and Kelly, 1999). The realist perspective asserts that there is an objective reality that is knowable through empirical investigation: objective risks are seen as properties of the environment that can be identified and measured (Williamson and Weyman, 2005). Under this perspective, the nature of perceived risk has been considered a critical factor in prompting people to avoid physical threats of disasters as well as to prepare for them. The assumption is that the greater the perceived risk, the more likely preparations will be made to ameliorate the harm (Burns and Sullivan, 2000; Mamun, 1996; Epstein, 1994). This interpretation of perceived risk has been sustained and nurtured by government agencies that dominate DM (Kirshenbaum, 2003).

#### 2.4.2 CONSTRUCTIVISM

The constructionist position is underpinned by the strong recognition of the need for social explanations of RP. According to this position, judgments of risk are relative and socially constructed, arising from the culture in which they are situated, and reflect the values and social organisation of that culture. Cultural variables play an important part in how people understand risk and differences in public evaluations of risk might consider the social and cultural context in which those exposed to a risk are located (Pidgeon et al., 1992). Weyman and Kelly (1999) also concluded that in order to understand people's reactions to risk, it is necessary to consider the social and cultural contexts in which hazards arise, and the manner in which these variables shape people's attitudes, beliefs and behaviour. According to Slovic (1999) people's perception of the society and natural events like disasters is largely influenced by subjective perceptions of those objective events.

The realist and constructionist positions reflect the traditional division between 'objective' and 'subjective' approaches with the former common within governments, science and industry, while the latter is common with the public (Williamson and Weyman, 2005). Slovic (1999) argue that risk assessment may appear non-rational due to its subjective nature, particularly if contrasted against technical probabilistic analysis. These differences in the conceptualization of risk have broad implications in public risk assessment. If risks are conceived as 'objective', and assessed within an empirical framework, evidence that relates to other conceptions of risk is rejected as 'unscientific' (Gaskell and Allum, 2001).

Combining these two positions is problematic for academia and policy regulators. Some researchers have realised that there is a challenge to combine the realist and constructivist positions (in relation to different hazards) for a more comprehensive understanding of RP that can inform regulatory decision-making. Governments and regulatory bodies face the difficult task of balancing and integrating scientific evidence and public risk evaluations (Pidgeon, 1998; Ball and Boehmer-Christiansen, 2002). Although there exists little prescription, or consensus in how to combine empirical judgments with public perceptions to ascertain the acceptability of risks, there is great need to integrate these two perspectives (Fischer, 2003). These positions are important to this research because the government or scientists perception of the cause of the LND and solutions to any subsequent treats from the Lakes based on technical knowledge (see Section 6.3.1), differs from that of the affected population whose opinion seems to be influenced more by the culture of the affected areas and public opinion (see analyses in Chapter 8).

## **Social Amplification of Risk**

The framework for the social amplification of risk (SAR) focuses on integrating multi-disciplinary approaches to risk, especially how characteristics of a hazard interact with social, cultural and psychological processes that strengthen or weaken RP. This approach conceptualizes risk both as a social construct and an objective property of the hazard. The level of enquiry is usually at the collective, rather than individual level and focuses both on the direct experience of risk and how it is interpreted. Research in this area is especially concerned with the social processes (the mass media and sources of risk information) that increase public concern and socio-political activity over some hazards (Kasperson et al, 2003; Williamson and Weyman, 2005). Box 2.2 is an overview of the social amplification of risk after Kasperson et al. (2003). SAR is relevant to this research because risk is conceptualised in this thesis both as a physical and social attribute (Sections 5.6 and 6.3.1 analyses technical risk while Section 6.3.2 and Chapter 7 analyses social risk).

### **Box 2.2: KEY FINDINGS IN SOCIAL AMPLIFICATION OF RISK**

- Public concern regarding a hazard does not necessarily mirror media coverage, i.e. sustained media coverage does not in itself ensure amplification. The relationship between mass-media coverage and the formation of risk opinion is not unidirectional, but complex.
- Several factors may need to be present for the amplification of risk, such as, media coverage; signal potential; and perception of incompetence for risk management.
- Risk signals that are attributable to incompetent risk management are important for public concern.
- Similarly, trust and perception in institutional risk management handling of risk are important.
- Important differences between individuals who amplify risk, and individuals who attenuate risk relate to the perception of individual risk (for amplifiers), and satisfaction with institutional responses to risk (for attenuators).
- There can be a discrepancy between risk amplification on a national/regional scale, and attenuation at the local level. This can relate to such issues as economic benefits associated with the risk at a local level (see Walker et al., 1998, Social, Cultural and Institutional processes).
- Some hazards may be hidden and not subject to amplification effects. Characteristics of these 'hidden' hazards include: diffuse effects of the hazard; time lag between the hazardous event and the onset of deleterious consequences; assumptions made about the hazard obfuscate the potential for harm; the hazard affects people at the margins of society; and the fast pace of change that introduces the hazard is too quick for society to respond.
- The stigmatization of a hazard is in part due to it being perceived to have such qualitative characteristics as: dread consequences; involuntary exposure; inequitable impact; unbounded impact; and the violation of a natural standard (see Psychometric approaches).

*Source: Adapted from Kasperson et al. (2003)*

### 2.4.3 APPROACHES THAT FOCUS ON THE INDIVIDUAL

There is a complex set of psychological, social and organisational factors that have been found to affect how individuals express their risk assessments (Kirshenbaum, 2003; Sjoberg et al., 2004). Approaches to studying risk at the level of the individual that are relevant to this study include the Rational Actor Models and Mental Models.

#### **Rational Actor Models**

This model is based on the assumption of human behavior as the outcome of rational choice. Approaches under the Rational Actor Model can be further categorized as Behavioral Decision Theory and Value Expectancy Models. The Behavioral Decision Theory discusses the concept of 'revealed preferences' where the equilibrium between a risk and the benefit to society reflects the acceptability of that risk or that risk is evaluated in terms of cost and benefits (Starr, 1969). However, critics have argued that decision making is often not rational and leads to improper judgments in individuals' processing of risk information that modify perceptions of risk in recognisable ways. An example relates discrepancies between actual fatalities and lay estimation of fatalities, e.g. overestimation of low probability fatalities, and underestimation of frequent causes of death (Weyman and Kelly, 1999). Research in the USA has revealed that perception is heightened by experience (Vitek and Berta, 1982). In the study of people's perception of natural hazards, the concept of bounded rationality<sup>7</sup> is the model of decision taking most widely employed (Winchester, 1986; Smith, 2001). The concept of bounded rationality has been used to stratify people into three groups based on their RP (Smith 2001). These include:

- Determinate perception: The recognition of hazards in this group is based on their past experience and knowledge.
- Dissonant perception: This is a view that is often shared by the very powerful and rich people who have much material wealth at risk. They try to deny or minimize the threat from hazards in a way that makes the future risk from hazards more acceptable or comfortable with daily functioning of the society.
- Probabilistic perception: This view is often shared by many people who accept that disasters will always occur. However they feel no personal obligation on risk reduction and transfer the responsibility for managing the hazard to superior authorities like the government.

The Value Expectancy Approach attempts to give reasons why people are motivated to protect themselves based on their understanding of risk and perception of vulnerability. It

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<sup>7</sup> The concept of bounded rationality centres on individual choice and decision based on their knowledge and experience

draws on assumptions from Behavioural Decision Theory, principally that risk behaviour is based on a rational decision making process (Williamson and Weyman, 2005). Weyman and Kelly (1999) summarises the common characteristics of value expectancy models as:

- The desire to minimize the negative consequences of an anticipated event motivates individuals to protect themselves.
- The perceived seriousness of these consequences is judged to influence the outcome of the self-protective behaviour.
- The perceived likelihood of an event occurring influences the motivation to adopt self protective behaviour.
- The benefits of self-protective behaviour are weighed against the costs of such behaviour.

This approach is criticised for lack of attention given to social and group effects in relation to individual decision making. Also, the reliance on attitudes to perceived risk as determinants of precautionary behaviour is increasingly questioned, due to evidence that suggests the weakness of the relationship between attitude and behaviour. It has also been recognised that factors such as the costs of preventive behaviour, social pressure, and perceived self-efficacy play an important role in determining behaviour. Research posits that personal risk assesses individual vulnerability, whereas societal risk examines a person's estimate of the generalized risk to the rest of the population (Weyman and Kelly, 1999; Green, 1998; cited in Weyman et al., 1999).

### **Mental Models**

This model is fundamentally cognitive and rooted within the psychology of the individual. The cognitive model centers on the psychometric and cognitive psychology of risk. While the psychometric approach seeks to enquire about people's choice to occupy hazardous locations or invest in mitigation measures, the cognitive psychological approach asks questions on how people reason under conditions of uncertain knowledge of risk (Otway, 1992; Slovic, 1992; Mc Daniels et al., 1995). A central assumption is that people understand the world by creating internal representations of it. This approach focuses on eliciting lay understandings of hazards, without imposing expert conceptualizations. It is an essentially 'bottom up', data driven process, as opposed to a 'top down' conceptually driven one, which is reflected in many of the other approaches (Weyman and Kelly, 1999).

Perceived risk is widely acknowledged and can be characterized using certain attributes, which underpin the cognitive theory of RP (Renn, 1992; Slovic, 1992). Perceived risk is the outcome measurement (revealed or expressed) of the interaction of an

individual and the external environment mediated through cognitive structures (Krimsky and Golding, 1992:18). Revealed risk preferences or observed human behaviour can be used as a measurement of RP based on the assumption that society has arrived at an acceptable balance between the cost and benefits of occupying hazardous areas. The location of settlement patterns and development trends, including the quality and quantity of mitigation measures adopted can be viewed as determinants of perceived risk (Krimsky and Golding, 1992). Local peoples risk perception does not only take into account the possible exposure to danger and future damages (vulnerability) but also their capacities, options and the implications of their decisions. The choice of certain coping strategies over others may provide insights into perceived security and risk and may enhance understanding of levels of vulnerability (Few, 2003, Heijmans, 2004; White et al, 2004). Expressed risk is known from statements concerning people's personal preferences on risk attributes and determinants of perceived risk. Both revealed and expressed risks have been investigated in this research (see analysis in Chapter 8)

## **2.5 MIGRATION AND ENVIRONMENTAL HAZARDS**

### **2.5.1 INTRODUCTION**

Although hazards constitute an inescapable part of life (Smith 2001), vulnerability varies, as does the ability of individuals and households to engage in a range of coping strategies. Migration represents one particular strategy in the face of perceived risk associated with environmental hazards. The form of migration due to environmental hazards ranges across a continuum from forced to voluntary, and the association between migration and environmental hazards varies by context, hazard type, and household characteristics. The terminology 'Internally Displaced Persons' (IDPs) has been used to describe persons 'forced or obliged to flee or leave their homes or places of habitual residence' for reasons which include conflict and civil strife (Walter, 2005:10). However, it should also be noted that not all affected populations move away from disaster sites (Kates, 1962; Fordham, 1992 and Bimal, 2005). This review is important because the case study for this research involves IDPs and non-displaced populations from the disaster site following the Nyos and Monoum gas disasters.

### **2.5.2 THEORETICAL FRAMEWORKS OF MIGRATION**

Many classic migration frameworks have been constructed by western researchers and incorporate environmental considerations. Wolpert's theoretical "stress-threshold" model (1966) is often credited as a migration model that incorporates non-economic aspects of

residential satisfaction (Fredrickson et al., 1980). This model explains that migration is a response to stress experienced in residential location, with residential ‘stressors’ that include pollution, congestion and crime. The model suggests that these stressors bring about ‘strain’ which may lead to considerations of relocating.

This view is similar to that of Speare (1974) who outlined characteristics of individuals, households, housing unit location and social bonds that influence residential mobility, arguing that individuals experience a “threshold of dissatisfaction”, which may influence their decision to relocate. Within Speare’s framework, physical amenities or disamenities as “locational characteristics,” are of most relevance for consideration of environmental hazards. Factors related to residential context interact with individual and household characteristics to shape migratory behaviour (Speare, 1974). Research by Blackwood et al. (1978) and McAuley and Nutty (1982) suggest that people prefer to live in areas free of hazards although individual or household characteristics or other contextual factors may influence migration behaviour. Lee (1966) also noted that both origins and potential destinations are characterized by attributes that either attract or repel migrants.

Gardner’s (1981) work on the migration decision-making process highlights the place of values within residential satisfaction, and therefore represents an extension to work by Speare (1974) and DeJong and Fawcett (1981). Hunter (2004) highlights the importance of Gardner’s consideration of the individual’s formation of values with the emphasis that these values shape the perception of the local environment.

Economic frameworks have posited that migrants tend to choose destinations that offer the highest level of benefits, assuming that there are variations in utility that result from occupying alternative locations. Socio-economically disadvantaged households may be more willing to accept proximate environmental risk in order to achieve affordable housing (Graves, 1983; Hunter, 2004). Areas with high levels of environmental risk lose more socio-economically advantaged residents, as compared to socio-economically disadvantaged residents (Hunter et al., 2003). However, Chan (1995) posits that in less developed regions, hazardous areas may be settled by poor households because they have no choice in residential location.

### 2.5.3 MIGRATION AS A RESPONSE TO NATURAL HAZARDS

Societal response to environmental hazards can be through technological adjustments (engineering mechanism), cultural adjustments (norms and values), regulatory (policy) and distributional mechanisms involving the movement of people, activities and resources (Micklin, 1973; Miteti, 1980; Hugo, 1996). Migration, whether permanent or temporary,

has always been a traditional response or survival strategy of people confronting the prospect, impact or aftermath of disasters (Hugo, 1996). Several categories of environmentally-induced population movements have been identified (UNHCR, 1996). These are (i) acute onset movements, with the possibility of return; (ii) acute onset movements, without the possibility of return; (iii) slow onset movements, with the possibility of return; (iv) slow onset movements with predictability (for example, displacement caused by large-scale development projects) with no possibility of return because of human activities; (v) slow onset movements, without the possibility of return because of the natural conditions of the area. The category of movement that fits this study is the acute onset movement with the possibility of return. This kind of movement might be generated by natural disasters such as flash flooding, earthquakes, typhoons, or volcanic eruptions.

Hugo (1996:107) views population mobility as ranging from totally voluntary, to forced migration. Generally, out-migration from disaster areas occurs due to disaster impacts mentioned in section 2.1.3. Disaster victims and survivors frequently lose their livelihoods and/or income opportunities and migrate to non-affected areas in search of new livelihood opportunities. Another reason for out-migration is the fear that the impacted area may experience more natural disasters in the near future. However, Mileti (1999) explains that some migrants seem soon to forget this concern and return to their original place of residence, while others remain at their new destinations. This is the case with two of the study populations of this research. One of the study populations of this research is formerly displaced Lake Nyos survivors who have returned to the disaster site while some victims remain in their resettled locations. In some situations, out-migration from disaster areas does not occur. Bimal (2005) through empirical research in the aftermath of the 14 April 2004 tornado in Bangladesh has provided evidence that disasters do not always create out-migration. The Monoum Study Population for this research has also not moved from the disaster site around Lake Monoum.

Disaster victims forced to migrate or relocate either temporarily or permanently have been seen as a subset of the category of 'environmental refugees' (Jacobsen, 1988; Oliver-Smith, 2005a). Disaster forced migration refers to a variety of demographic movements, such as: flight, evacuation, displacement or resettlement with both economic and social dimensions (Locke et al., 2000; Oliver-Smith, 2005a). It has also been shown that many households express the desire to relocate although they may not actually do (Goldhaber et al., 1983). There is also evidence that movement from hazardous areas is

sometimes related to family composition, community ties and job status (Goldhaber et al., 1983).

#### 2.5.4 INTERNAL DISPLACEMENT

Internal displacement is commonly described as taking place within the confines of a state and those affected are known as Internally Displaced Persons (IDPs). IDPs are defined by the United Nations as:

*“persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border.”* (Perecman, 2005:11).

The LND survivors or case study populations in this research are IDPs (see Section 4.2.2, Page 65). Population displacement is caused by multiple sets of factors. The many “push factors” leading to internal displacement can be aggregated into a range of overlapping categories: natural and human-made disasters, ethnic or religious persecution, development, and conflict. “Displacement”, which is involuntary as in the case study populations, occurs where coercion is employed, where choices are restricted, and where the affected populations are facing more risks than opportunities by staying in their “place” of residence, which distinguishes it from “voluntary” or “economic” migration. Therefore, displacement is by definition, forced and involuntary and involves some form of de-territorialization (Hyndman, 2000).

Migration usually involves an element of choice, which is central to the dichotomy between forced or “involuntary” displacement and “voluntary” migration (Vernant, 1953; Zolberg et al., 1989). As Penz (2003:3) observes, “If it is voluntary, it is not displacement”. Voluntary and economic migration is more a reflection of people’s deliberate pursuit of new opportunities. Displacement and resettlement become “involuntary” when the choice to remain is not provided (Muggah, 2003). This research is exclusively concerned with disaster induced involuntary displacement. Its focus is on populations who do not cross an internationally recognized state border, and are therefore not classified as “refugees”. The international legal and institutional regime created to protect refugees did not consider IDPs because they were seen as falling under domestic jurisdiction or sovereignty of the states concerned (UNHCR, 2000). According to Lavoyer (1995), they were deliberately excluded because of state concerns with the infringements on sovereignty as outlined in Article 2 of the UN Charter.

## 2.5.5 RESETTLEMENT

The resettlement of IDPs has, until recently, been treated as a peripheral issue in the field of forced migration studies (Muggah, 2003). The reasons for this include: the absence of international attention, the marginal status of the displaced populations prior to displacement, and the limited attention devoted to the subject by social scientists (Cernea, 1997). This is the case with this research, involving the study populations of the LND, who were forcefully removed from the disaster zone and resettled in camps. The resettlement literature (Scudder and Colson, 1982; UN-Habitat, 1991; World Bank, 1994; Guggenheim, 1994) contains numerous references to involuntary resettlement caused by natural disasters (earthquakes, floods, hurricanes and storms).

Irrespective of the cause of displacement, resettlement schemes are regularly erected to deal with displaced populations. They are designed to transfer population from one area to another on a planned basis. Early scholars on resettlement in the 1960s, noted that resettlement constitutes a form of planned social change, which entails population movement, population selection and most probably population control (Chambers, 1969). Resettlement can have dire consequences, as revealed in this study in Chapter seven. Therefore, organisations associated with involuntary resettlement decisions (governments, private sector entities, NGOs) need careful planning and DM to mitigate the negative socioeconomic and environmental consequences that may arise from resettlement (World Bank, 1990; Asian Development Bank, 1991; OECD, 1991; Davidson et al., 1993; Cernea,; 1999; 2000).

It had been noted that only more vulnerable displaced people tended to move to camps and settlements. Migration researchers have also asserted IDPs as potentially dependent, and vulnerable (Chambers, 1979; Hansen, 1981). This is supported by earlier studies, some of which asset that:

*“the failures of settlement policy, while evident and largely known, are considered to lie with the displaced and symptomatic of a dependency syndrome”* (Harrell-Bond, 1986:20).

Past research has also shown that involuntary resettlement, left people no better off, and frequently even worse, than people who resettled themselves (Hansen, 1991). This is relevant in this study because one major research theme is the socio-economic problems faced by the resettled populations following the LND.

## 2.5.6 EFFECTS OF RELOCATION OR RESETTLEMENT DUE TO DISASTERS

### **Geographical Space and Identity**

Recent anthropological research places much emphasis on the place of origin of individuals and their communities (Oliver-Smith, 1982). This emphasis means that the loss or removal of a community from its location by disaster may have traumatic consequences due to loss of identity from relocating (Altman and Low, 1992). The displacement of populations whether caused by manmade or natural factors generates problems for receiving and displaced populations alike. This is relevant to this research because tension over the use of resources and farmland exist between the survivors of the LND resettled in camps and their host populations (see Page 164 in Section 7.3.1)

### **Human Rights**

In countries where migration has been triggered by disasters and by conflict, violence or insurgency, there may be serious implications for identifying the rights and guarantees to protection and assistance of affected populations. These issues were highlighted especially in the aftermath of the devastating Indian Ocean tsunami of December 2004. Hedman (2005) discusses the situation after the tsunami in Banda Aceh, Sumatra, where the IDP identity of tsunami survivors has become politically sensitive and contested due to a massive counter-insurgency campaign against separatists that has displaced over 300,000 people since 1999. In Thailand, there is evidence of *de facto* discrimination by local government authorities and Thai citizens against Burmese tsunami survivors in the affected southern provinces in which Burmese migrant workers have been excluded in the distribution of emergency relief and the implementation of Thai government aid programs by local officials. In Sri Lanka, the civil war that has gone on for almost three decades, which the Sri Lankan government recently won against the Tamil Tigers, has left about 2.5 million Tamil populations displaced. Following the defeat of the Tamil Tigers, the Sinhalese have placed thousands of Tamils in temporary camps under appalling and horrific conditions both in physical and human rights terms, pending permanent resettlement.

Authors in the July 2005 special issue of Forced Migration Review highlight a range of protection concerns in the aftermath of the 2004 tsunami, including access to assistance, enforced relocation, sexual and gender-based violence, safe and voluntary return, loss of documentation and restitution of property (Couldrey and Morris, 2005b; Walter, 2005; Harris, 2005; Scott, 2005; Age, 2005). The human rights of IDPs are not

always sufficiently addressed despite the introduction of the Guiding Principles on Internal Displacement. With reference to the Indian Ocean tsunami relief, Walter (2005) states that:

*“In the understandable rush to provide assistance to the survivors of the tsunami, insufficient attention has been devoted to protecting the human rights of those forcibly displaced by the disaster”*(Walter, 2005:10).

Making reference to natural disasters in general, Walter (2005) concludes that discrimination and violations of economic, social and cultural rights can become more entrenched the longer the displacement lasts. Problems of housing, land and property rights have also been exposed in disaster induced IDPs. Scott (2005) states that the recovery and reconstruction process of the 2004 tsunami provided a pretext for evictions, ‘land grabs’, unjustifiable land-acquisition plans and other measures designed to prevent homeless residents from returning to their original homes and lands. In a reflection on the first six months of the reconstruction effort, he notes that:

*“The tsunami has reminded us of the need for a rights based approach to post-disaster reconstruction. If housing, land and property rights are put at the heart of a post-disaster plan – rather than cast aside as too complicated or expensive – the chances are that it will succeed. If these rights are ignored or, more ominously, systematically violated, not only will rights be abused but also reconstruction will fail”*(Scott, 2005:15).

There are also reports that tsunami survivors worried that relocation away from their villages might mean loss of their land, since many had lost legal certificates, and boundaries demarcating fields had in many cases been washed away by the tsunami (Age, 2005:22).

### **Social Vulnerability**

Emergency resettlements following natural disasters are commonly characterized by undesirable long-term socio-economic changes that affect the displaced population, such as increasing poverty and malnutrition (World Bank, 1980; Mahapatra, 1991; Escudero, 1988; Downing, 2002). Resettlement can result in significant adverse impacts on the resettled population (particularly the most vulnerable members of society) due to a number of factors: loss of shelter and land; inadequate sanitation; decline in the quality of education; loss of employment opportunities; disruption in social support networks; and the loss of cultural assets (Cernea, 1996). Frequently, houses in the newly resettled location are not adequate (Mahapatra, 1999; Picciotto, Wicklin and Rice, 2001). Moreover, previous living standards are often not met and the resettlement process may destroy the existing socio-economic system, reducing income levels, which leads to a decline in living standards (Konig and Teman, 2000; Nayak, 2000). Social vulnerability (also see Section

1.5.4; Pages 25 and 27) is a core object of enquiry in question two and discussed in detail in Chapter seven.

### **Impoverishment Risks**

Cernea (1997, 2004) uses general trends and common characteristics revealed by a range of empirical data to construct a theoretical model of displacement and reconstruction. His Impoverishment Risk and Resettlement (IRR) model is a theoretical model of involuntary resettlement that highlights the intrinsic risks that cause impoverishment through forced displacement, as well as the ways to eliminate or mitigate such risks. According to Cernea (2004), the key impoverishment risks and components for reconstruction of involuntary resettlers' livelihoods are: landlessness, joblessness, homelessness, marginalisation, food insecurity, increased morbidity, loss of access to common property resources, and community disarticulation. The IRR Model is explicitly concerned with impoverishment as a multi-faceted dynamic process. Through the deconstruction of the concept of impoverishment, Cernea advances the notion of 'cumulated deprivation' (Cernea, 1997, 2002) that can only be understood from a combination of economic, social, cultural and psychological perspectives. Cernea (1997) suggests how his proposed model can be used by practitioners and researchers as a diagnostic, predictive, problem-resolution, and research-guidance tools.

During recent years, the IRR model has been increasingly discussed by researchers and practitioners and used in numerous development and research projects. A large study carried out by the Institute for Socioeconomic Development in Orissa, India, took the IRR model as its conceptual and methodological basis in exploring resettlement processes caused by development projects (Pandey, 1998; Ota and Mohanty, 1998). In Nepal (Kali Gandaki Project) the application of the model in several ongoing impact evaluation resettlement studies revealed positive experiences and produced operational recommendations (Sapkota, 1999). The IRR model can perform four distinct but interrelated functions: a diagnostic explanatory and cognitive function; a predictive warning and planning function; a problem resolution function for guiding and measuring resettlers' reestablishment; and a research function for forming hypotheses and conducting theory-led field investigations. The IRR model has been used in Chapter seven to analyze impoverishment in the displaced case study populations.

## **Public Health Concerns for Receiving Communities and IDPs**

The arrival of IDPs into another community or region strains local health systems, and the host population ends up sharing the sufferings of the internally displaced. Displacement of populations always affects health status and health care and exposes IDPs to new hazard dynamics. For the World Health Organisation (WHO) vulnerability for IDPs is a dynamic condition that involves a complex process. How and where to intervene will require the IDPs point of view on entitlement to protection and access to health (Xavier et al., 2001). According to Toole (1999) if the vital health needs of IDPs (which include security, food, water, shelter, sanitation and household items) are not satisfied, the provision of health services alone cannot save lives. This review is relevant to this research because as revealed in Chapter seven, the LND survivors resettled in camps have numerous health problems that are intimately linked to relocation and resettlement.

A number of factors compound the health hazards of IDPs (Toole, 1999; Xavier et al., 2001). Loss of assets and entitlements as well as loss of social networks and caring capacities due to the displacement of households can have a profound impact on vulnerability. Lack of knowledge and information about the new environment, decreased food security, dependence on external aid and often inadequate shelter, sanitation and access to safe water also compound their troubles. IDPs also have reduced access to health care facilities and services in their new location and are also disadvantaged in cultural, financial and functional terms, in accessing health services in areas of relocation.

In a review of health hazards in tropical Africa, Prothero (1994) describes significant interactions between disease and population mobility associated with coerced resettlement in North East Africa and refugees from environmental catastrophe (pastoralists affected by drought in West Africa). He concludes that higher levels of mortality and morbidity are experienced within these affected populations particularly from infectious and communicable diseases associated with ecological conditions, which differ from those in which they have lived previously. Statistics in some countries also show that crude mortality rates for IDPs are significantly higher than the baseline. In Somalia, crude mortality rates for IDPs were 50 times higher than the baseline (Xavier et al., 2001). In April 1999, Angola experienced the largest polio epidemic ever recorded in Africa due to 30 years of war, destruction of health infrastructure, massive population displacement and overcrowding, poor sanitation and inadequate water supply. The mortality rate for IDPs due to post disaster health problems is usually higher in women, children and the elderly. Recent research carried by Nubuyuki et al. (2006) on the mortality and health related risk factors which affected the displaced population after the 2004

tsunami in an eastern coastal district of Sri Lanka reveals that a significantly high mortality was observed in women and children.

### **Effects of Migration on Receiving Populations**

Displaced populations are often viewed as competitors for resources and employment by local populations in the receiving areas. Migration has the potential to enhance social resilience by providing new opportunities and experiences. It also has the ability to diminish resilience by weakening social structures and access to natural resources (Locke et al., 2000; Hunter et al., 2003). In some cases the migrants may strain the social and economic fabric of the areas to which they relocate. Later Chapters will reveal that this is the situation that prevails in the resettlement communities following the LND, where an increase in crime, unemployment, land conflicts or quarrels have been reported since the resettlement of displaced Nyos residents. According to a UNHCR report produced during an International Symposium held in April 1996 in Geneva, negative consequences resulting from mass migration in the receiving areas include: a reduction in migrants' well-being; damage to the natural resource base on which the local economy depends; economic and political difficulties for the areas hosting mass migrants and erosion of efforts made by governments and the international community to support sustainable development of the areas concerned. The impact of some of these consequences has also been felt in the study area.

#### **2.5.7 DISASTER RISK PERCEPTION AND MIGRATION**

RP is a crucial factor influencing and controlling people's or communities' decision to relocate (Dynes and Quarantelli, 1976; Kielcolt and Nigg, 1982; Kirschenbaum 1996). Some disadvantaged social groups (poor, disenfranchised individuals, and minority groups) make tradeoffs, whereby the perceived costs of continuing to reside in a risk area, or an area perceived as posing risk, are judged against the perceived benefits gained (Cvetkovich and Earle 1992:2; Kirschenbaum, 1996). Several reasons have been outlined as to why residents might not migrate from hazard-prone areas (Kates, 1962 and Fordham, 1992). These include that residents may: not be aware of hazard; be aware but do not expect a disaster; expect a disaster but do not anticipate loss; expect loss but not serious loss; expect serious loss and have undertaken or plan to undertake loss reduction actions; expect loss but accept it as a cost of gaining location benefits; have no choice in location (Kates 1962; expanded by Fordham 1992). Research evidence has also shown that outsiders' perceptions of environmentally hazardous residential contexts may be

fundamentally different from that of residents (also see Page 36 in Section 2.3.2), thereby suggesting the importance of not imposing risk judgment when undertaking analyses on these associations (Greenberg and Schneider 1996; Hunter, 2004). In similar findings from research among residents of a *char*, located in the middle of Jamuna River in Bangladesh, Lein (2000:126) concludes that: *“It is misleading to perceive the chars as high-risk areas filled with marginalized, poor people living on the brink of disaster.”* These studies provide support for Slovic’s (1987) contention that people respond to the hazards they perceive and suggest the importance of considering insiders’ risk perception in the examination of migration as related to environmental hazards. Risk perception is likely to be more closely related to migration than the probability of hazard occurrence (Hunter, 2004; Hunter et al., 2003)

#### 2.5.8 RESETTLEMENT PLANNING

Key barriers to successful resettlement policies and practices have been identified in a number of countries (for example, Brazil, Ethiopia, India, Indonesia, Malaysia, Nepal and Sri Lanka). These include the absence of a national resettlement policy, inadequate compensation for lost assets, and insufficient institutional capacity for resettlement planning and implementation (Badri et al., 2006). While various factors contribute to the failure of resettlement policies, inadequate planning, lack of financial resources, embezzlement and poor management often play a major role. Conversely, a well-planned and managed resettlement process can produce positive development outcomes, such as a more favourable socio-economic environment, including new jobs and better access to education and health facilities.

Over the past several decades, researchers have identified a number of successful resettlement practices in some countries around the globe, including Bangladesh, China, Nepal and Vietnam (Burbridge et al., 1988; Fernandes, 1995; Zaman, 1996; Cernea, 1997). According to these ‘best practices’, a resettlement plan should consider a number of issues:

- First, careful attention should be paid to social, economic and health issues. This involves conducting a baseline social survey to identify stakeholders and potential losses.
- Second, it is important to engage stakeholders in a meaningful participatory process and to disclose all relevant information.
- Third, it is essential to adopt an appropriate compensation policy based on the market/replacement value of acquired properties.

- Fourth, compensation should be provided to all affected persons regardless of their tenure/ownership rights.
- Fifth, the compensation policy should explicitly recognise all losses, including land, housing, business, income sources and displacement costs.
- Sixth, the compensation package should provide multiple options, such as cash, compensation, replacement land, small business grants and temporary/permanent project employment. It is vital to ensure that resettled persons are provided with basic civic amenities so that incomes and livelihoods can be restored.
- Seventh, the resettlement process should pay special attention to the needs of the socially disadvantaged and vulnerable groups, such as single mothers, the disabled and ethnic minorities in the resettlement process.
- Eighth, it is very crucial that a strong organisation exists in order to implement resettlement, with assistance from community groups and NGOs.
- Ninth, it is important that effective systems for monitoring and evaluating compensation and resettlement activities are created. Furthermore, a practical time frame should be established in the resettlement plan (Badri et al., 2006: 454). These resettlement practices have informed the recommendations for improvement in the resettlement practices/policies and reintegration plans of the LND survivor's resettlement at the end of the thesis (see Section 10.5; Appendix 14).

## 2.6 SUMMARY

This Chapter set out the theory relevant to this research. It also provides the relevant background knowledge necessary to understand contemporary issues concerning the research enquiries. Key insights that underpin this study include the understanding that disasters are now mostly interpreted from the perspective of the political ecology and the mutuality of hazard and vulnerability to disasters due to complex interactions between nature and society. Disasters do not only impact negatively on development, but development failures can create disaster risks. Contemporary disaster research adopts integrated approaches. Some disaster models, which have been instrumental in the modeling, interpretation and understanding of disasters adopt system perspective with feedback/regulatory or control mechanisms that can mitigate disaster impacts. Effective and efficient DM process should mainstream DRR into sustainable development practices and planning process. People's reactions to risk, is influenced by the social and cultural contexts in which hazards arise, and their past experience and knowledge. Migration or relocation is a traditional response or survival strategy of people confronting the prospect,

impact or aftermath of disasters. The ramifications of involuntary resettlement can have dire socio-economic and cultural consequences for resettled populations. An understanding of the main research concepts and the possible link between them has helped in building the framework that guides this research. The conceptual framework is discussed in the next Chapter.

## CHAPTER THREE

### CONCEPTUAL FRAMEWORK

#### 3.1 INTRODUCTION

The complexity of disaster studies makes it difficult to adopt a simple epistemological and conceptual framework. This is reflected in the statement by Gandy that:

*“Disasters because of their material expression, their emergence from human-environment mutuality and their cultural construction, belong to the class of phenomena that are neither purely natural, nor cultural and that are situated between the opposing epistemological points: between the natural and social sciences”* (Gandy, 1996:35).

Alexander (1995) further supports this description of the disciplinary evolution of disaster studies. The challenge is then to use an approach that will be broadly acceptable since the interpretation of theory<sup>8</sup> and concepts varies across different disciplines. Any theoretical inquiry into the nature of vulnerability and disasters inevitably involves ontological and epistemological questions that deal with the nature of cultural versus material realities (Oliver-Smith, 2004:17).

This Chapter draws on the key insights and research elements discussed in Chapter two and summarized in Section 2.5 to develop a conceptual structure for the thesis. It should be noted that the overall locus of this research is on the present risk and vulnerability in the LNM area, incorporating the effects of the past gas tragedies. The main interest is in how the disaster response and the overall DRM, through processes of risk perception and generation of long-term vulnerability, have influenced relocation decision. This was set out in the research questions 1-4 (see Section 1.4.2), which focus respectively on disaster management, vulnerability, risk perception and relocation decisions. It is envisaged that an approach that takes a more balanced evaluation of the core concepts that can be applied in this research is desired. This may be a guiding tool for analysis on how to integrate natural disaster mitigation with development planning in Cameroon.

#### 3.2 FINAL CONCEPTUAL FRAMEWORK

The framework for this research adopts a systems view, which has been popular in modeling, understanding and managing disasters. The goal of this empirical research in the LNM disaster regions of Cameroon is to understand the effects of disaster events and ongoing risk on individuals and society and how this has caused or influenced relocation decisions. This study is therefore philosophically centered on the social constructionist-social structuralist view of disasters within a political ecology framework. The approach

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<sup>8</sup> Theory consists of a set of principles (laws or empirical generalisations) and conceptualisation that provide explanatory coherence to an empirical domain (Krimsky, 1992).

adopted requires investigation of the relationships between natural hazards within the bio-geophysical system and societal factors within the human-use-system. The framework therefore conceptualizes that human systems do not only contribute to vulnerability but have the ability to reduce vulnerability and risk within the study area, through actions including disaster risk management. How the two system components (Bio-geophysical system and Human Use System) considered in the framework relate different research perspectives and to key concepts and hypotheses, is shown in Table 3.1.

The framework also seeks to integrate risk perception, relocation behaviour of disaster survivors and experiences at the personal, local and institutional levels to understand the social context of risk and vulnerability, and also to emphasise the need to shift from DM to DRR. An approach that integrates disaster risk mitigation with socio-economic development is therefore desirable in order to close the gaps and challenges exposed by both the short and long-term problems of DM in the study area. This approach therefore, underpins the need to integrate DRR within the development process. This conceptual/epistemological framework is therefore intended to direct the research process and guide analysis of the research questions.

Figure 3.1 is a diagrammatic representation of the linkages between the Human Use System and the Bio-geophysical system, which has also adopted Kates (1971) systems view of disasters to further illustrate the relationship and interactions of the system components presented in Table 3.1. An important characteristic in the diagram are feedback or control mechanisms in the Human System (Disaster Management Cycle and Disaster Risk Management Cycle) that interact with the Bio-geophysical System to regulate or mitigate disaster effects or impacts.

The research questions (red) have been located around the conceptual framework with their red arrows pointing to areas in the framework where the different questions seek answers. The Human Use System at the centre of the framework can interact with the Bio-Geophysical System, in both a positive and negative feedback mechanism as shown by the pink arrows.

Table 3.1: Conceptual elements for framing the research

SYSTEM COMPONENT		RESEARCH PERSPECTIVE S	CONCEPTS AND HYPOTHESES
HUMAN-USE SYSTEM	Human Ecology (Distribution of Populations)	Society – Environment: Risk as socially generated	<ul style="list-style-type: none"> <li>➤ Hazard and disaster affect human actions</li> <li>➤ Location choices can be influenced by past experience with hazards</li> <li>➤ Individual risk perception determines reaction to mitigation measures and decision on where to settle.</li> </ul>
	Political Economy (Political and Social Context of social structure)	Society-Natural Hazards: Risk as socially generated	<ul style="list-style-type: none"> <li>➤ Policy influences disaster management</li> <li>➤ Decision-maker risk and hazard perception influences adoption of mitigation measures</li> </ul>
BIO/GEOPHYSICAL SYSTEM	Environmental Factors (Natural Resource Base, Land Use)	Environment-Society: Risk due to ecosystem functioning.	<ul style="list-style-type: none"> <li>➤ Natural hazards disrupt the flow of goods and services from ecosystems</li> <li>➤ Human activities modify the environment and may affect ecosystem resilience</li> </ul>
	Physical Factors (Geomorphology, Natural Hazards)	Natural Hazards-Society: Risk due to physical attributes	<ul style="list-style-type: none"> <li>➤ Relief features and soil type influence location choices</li> <li>➤ Anthropogenic activity affects natural hazard frequency and may exacerbate disasters.</li> <li>➤ Risk perception is based on formal hazard events or disasters</li> <li>➤ Peoples attitude to relocate in hazard prone areas is based on weighing the advantages against the risk</li> </ul>

Figure 3.1 is a diagrammatic representation of the linkages between the Human Use

When a hazard occurs in the Bio-geophysical system, it can cause primary or secondary effects, leading to a disaster through the process shown in green colours (see Figure 3.1). A hazard may cause damage or destruction to property, deaths, disruption of services, and displacement of populations with subsequent resettlement as is the case with the LND survivors. The seriousness of the hazard impact and whether it would eventually become a disaster depends on the effectiveness of both structural and non-structural mitigation measures employed. In Figure 3.1, this is represented by the Human Use System, which comprises of the disaster cycle and risk management cycle. The interaction and similarity of activities that occur within the disaster and risk management cycles are

shown in the Human Use System. These activities are instrumental in shaping the resilience and coping capacity of a society prior to, during, or after it has been affected by a hazard or disaster. These are shown by pink arrows labeled mitigation and response in the diagram. Effective disaster risk management may increase people's resilience during the incubation phase in the disaster risk management cycle through inculcating DRR practices with development planning. Robust DM after a hazard impact in the relief, rehabilitation and reconstruction phases will greatly reduce the short and long term socio-economic problems of disaster survivors and improve their livelihoods.

The green colours in the Bio-Geophysical System that define the process of a disaster occurrence can also influence adjustments in the Human Use System as shown by the pink arrows that point towards the Human Use System. This could be through the hazard type or intensity, involuntary or forced displacement and resettlement, risk perception or through relocation into risky areas. A good Human System should be able to adjust accordingly to tackle any problems that might originate or result from the impact of a hazard. The interaction of the system components and their elements as presented in Table 3.1 and Figure 3.1 has been used to drive the research process.

## LINKAGES BETWEEN THE HUMAN SYSTEM AND THE BIO/GEOPHYSICAL SYSTEM



Figure 3.1: Diagrammatic representation of Linkages between the Human System and the Bio/Geophysical system. Source: Author

## **CHAPTER FOUR**

### **RESEARCH METHODOLOGY**

#### **4.1 INTRODUCTION**

Chapter two reviewed the main themes that underpin this research. How these themes link was presented in the conceptual framework in Chapter three, which guides the methodology presented here. This study integrates knowledge from both the social and physical sciences to study the complex phenomenon of “natural disasters”. To gain a deeper understanding of how the concepts interact, a case study research strategy has been adopted for this research. In studying specific location, the empirical part of the research allows an in-depth inquiry into the complexity of human-environment interactions.

The main methodological framework of this research employs triangulation across different types of research methods and analysis. The multiple sources of evidence include interviews, questionnaires, personal observation and analysis of documentary evidence involving both qualitative and quantitative methods (Yin, 1989; Stake, 2000; Bryman, 2004: 275).

The research approach links the data to be collected and the conclusions to be drawn to the research questions while trying to maximise four aspects of quality of the design (construct validity, internal validity, external validity, and reliability). The next section justifies the choice of the case study approach and explains how the research was designed to answer the questions under investigation.

#### **4.2 RESEARCH APPROACH**

##### **4.2.1 QUALITATIVE AND QUANTITATIVE DATA**

A mixed qualitative and quantitative research methodology, using empirical and secondary data, has been adopted in this research. Many in the research community recognise that qualitative and quantitative methods of research are equally efficient, legitimate and valuable in their own context (Denzin and Lincoln, 1994; Robson, 2002; Sarantakos, 2005). While quantitative approaches typically use random sample surveys to collect mainly quantifiable data and analyse these using statistical techniques, the qualitative approach uses purposive sampling and semi-structured or interactive interviews to collect data mainly relating to people’s judgments, attitudes, preferences, priorities, and/or perceptions about a subject and analyse these through sociological or anthropological research techniques (Kanbur, 2001:4). However, Booth et al. (1998) cautions that this does not mean qualitative methods do not

collect quantitative data or that qualitative methods collect quantitative data. The integration of the two in research practice is favoured in recent research undertakings with the argument that a continuum of levels of investigations exist and that the oppositional categories used to explain the differences in social thought are fluid and open (Giddens, 1984; Fay, 1996). The relevance of both methods is further captured when their epistemological significance is considered.

Quantitative and qualitative research approaches draw on different ontological standpoints and their epistemological derivations. Ontology (what is considered acceptable knowledge of the world) precedes Epistemology (how we came to accumulate knowledge). It is the relationship between them that shapes how and why data are collected and theory generated. Any theoretical inquiry into the nature of vulnerability and disasters inevitably involves ontological and epistemological questions that deal with the nature of cultural versus material realities (Oliver-Smith, 2004:17).

The primary ontological source for the analysis of quantitative research is that of 'objectivism' (Bryman, 2004:16). This sees the world as capable of being objectively known. Social phenomena and associated meaning are independent and external of the actor, and the world exists independently of our knowledge of it (Sayer, 1995:5). As such it has a coercive force upon us, which we cannot influence (Bryman, 1994:16). However, this downplays free will and suggests that, like nature, the social world follows laws, leaving us as pre-determined beings (Guba and Lincoln 1994:109). As opposed to objectivism, qualitative research is more concerned with 'constructionism'. It is the meaning and context applied to social phenomena that is important here. This ontological position claims that the world is socially constructed and that even the categories people employ in helping them understand the natural and social world are social products. In this case, concepts are relevant and our observations determine meaning (Bryman, 2004).

The dominant epistemology in quantitative research is positivism. Positivism holds that knowledge can only be confirmed through careful observation. This epistemology is usually used to generate general statements or test hypotheses (Bryman, 2004: 50). Positivism therefore tries to predict and explain human nature and the associated social system (Guba and Lincoln, 1994:113). Interpretivism is the epistemological position for qualitative data analyses, and this approach contends that methods from the natural sciences are not applicable to the social world and its institutions (Bryman, 2004). As observers, we understand the social

world through our own interpretations (Giddens, 1976). This forms the dominant epistemology for this case study research.

The main difference between quantitative and qualitative data relationships is where theory comes in relation to the data. Deductive and inductive reasoning tend to be the respective basis for analysis. The deductive method of reasoning is considered as both experimental and manipulative, with the verification of hypotheses specifically suited to quantitative methods (Guba and Lincoln, 1994:109). Inductive analyses arise when the research is conducted with a view of building the theory from the data, with no preconceptions as to the result. Qualitative research methods therefore generate theory through an iterative analysis of data (Stauss and Corbin, 1994:273). The theory comes in at a different point in the research and knowledge comes from the data. This is the case with the empirical research in this thesis, which tries to understand the phenomena of risk, vulnerability, DM and relocation decisions within a societal context based on a past event.

Table 4.1 summarises the strengths and weaknesses of qualitative and quantitative research approaches, according to DFID (2000).

Table 4.1: Strengths and weaknesses of qualitative and quantitative methods

RESEARCH	STRENGTHS	WEAKNESSES
QUALITATIVE	<ul style="list-style-type: none"> <li>❖ Can provide the initial basis for further quantitative work</li> <li>❖ More participatory</li> <li>❖ Can be quick and low cost</li> <li>❖ Good for social processes and context</li> <li>❖ Can explain causes of quantitative findings</li> </ul>	<ul style="list-style-type: none"> <li>❖ More prone to bias because of reliance on interpretation</li> <li>❖ Difficult to infer population characteristics from a small sample</li> <li>❖ Can be time consuming</li> </ul>
QUANTITATIVE	<ul style="list-style-type: none"> <li>❖ Can be more concrete, systematic</li> <li>❖ Can infer population characteristics from a small sample</li> <li>❖ Can test the significance of quantitative findings</li> </ul>	<ul style="list-style-type: none"> <li>❖ Its concreteness can be misleading</li> <li>❖ Can be very extractive</li> <li>❖ Has the tendency to collect much data and to produce over-complex analysis</li> </ul>

*Source: DFID Guidance Sheets (2000)*

Although both qualitative and quantitative data follow different and distinct paths for ontology and epistemology, many researchers stress the importance of triangulation and encompassing both techniques into research (Sayer, 1992; Guba, 1994:107). To understand fully the depth and breadth of vulnerability, motivations for relocations, risk perception and

DM issues requires multiple research techniques, an approach which has been adopted in this research. According to Denzin and Lincoln (2000), triangulation has the strength to combine multiple observations, theories, methods, and empirical materials and cover any concerns about using a case study. It also serves to clarify meaning and verify interpretations, generalisations and evaluative judgments (Flick, 1998).

#### 4.2.2 CASE STUDY STRATEGY

Yin (2003:13) defines case study research as ‘an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident’. Case study methods may be involved in exploratory/descriptive, evaluation and hypothesis testing (Stake, 1995; Yin, 2003). Contemporary social science research advocates for appropriate levels of funding for both multiple and comparative case studies. Case studies provide an account of social life as well as the deep insights generated by ethnographic studies (Robson, 2002; Brenda, 2005). Apart from providing qualitative information, a statistical analysis to complement the qualitative analysis is also given to further clarify the results of this research. This is the preferred strategy for examining this contemporary phenomenon because the research questions are exploratory and explanatory, and the relevant responses can be investigated within real life contexts (Yin, 1984, 2003). Before explaining the research techniques, it is relevant to first situate the case study and research area.

#### **Research Area**

As mentioned earlier in Section 1.4.1, the North West and West Provinces of Cameroon (also see Figure 1.1 in Chapter 1) where the Lake Nyos and Lake Monoum gas disasters occurred are the areas chosen for this case study. A description of the disaster zone is presented in Box 4.1. The LND occurred in 1986 and caused close to 2000 fatalities, with the subsequent displacement and resettlement of the affected populations in seven camps within the region. The LMD occurred two years earlier in 1984 but the affected population were not displaced from the vicinity of the incident in Njindoum village. The consequence of the sudden and unpredictable release of poisonous gases from crater lakes in both instances is described in more detail in Chapter six.

#### **Box 4.1: DESCRIPTION OF THE DISASTER ZONE**

The disaster zone comprises an area of about 300km<sup>2</sup> (see Figure 6.2) involving three villages (Baxter and Kapila, 1989). This region is inhabited by the *Bum* and *Mmen* people (Melinda, 2002) who belong to four ethnic groups; Nyos/Cha, SuBum, Aku and Bororos (Shanklin, 1988). The languages spoken in this region are Nyos, Mmen and Fulani languages, which reflect the different ethnic groups of the region (Griffen, 1994; Troyer, et al., 1995). This area is located about 25kms ESE of Wum town in Fungom sub-division of Menchum Division in the NWP. A survey carried out in 1994 to assess the languages of the region (Troyer et al., 1995) states that 150 people were present in Nyos village. However, field research findings indicate that at the time of the fieldwork, about 330 were living in Nyos village in a scattered settlement with houses and hamlets located within farms. The respondents also indicated that about 90 people were living in Upper Cha, which is also part of the disaster zone. The disaster zone is about 45kms from Wum town on a road that is impassable by cars. A motorcycle ride along the narrow road passes through a beautify terrain (see Figure 9.1) characterized by an undulating topography and usually takes about five hours from Wum town.

*Source: Author*

#### **The Study Populations**

The study populations associated with both events are: (1) the displaced victims of the LND, presently living in resettlement camps; (2) former displaced victims of the LND who have moved back to the disaster zone within the vicinity of the deadly lake; and (3) the residents in and around LM who were not resettled and have not moved from the disaster area. The fourth study population is the major stakeholders in DM in the country. These include government officials or administrators at the national, regional and local levels, local council members and scientists whose influence has shaped the DM style and policies of the country. A more detailed description of the demographic profiles of the study populations and the impact of the disaster managers on the overall DM of the country is provided in the analytical Chapters that follow.

#### **4.3 FIELDWORK IN CAMEROON**

Prior to the main data collection in 2007, a preliminary scoping visit was carried out at the Ukpwa Waindo resettlement camp (URC) in December 2005/January 2006. During this visit, the researcher held informal discussions with local authorities, and members of the public in the area hosting the LND survivors. These discussions further enlightened and strengthened the conceptual research ideas and helped in designing the research questions. The fieldwork was conducted in Cameroon for seven months from March to September 2007.

### 4.3.1 FIELDWORK LOGISTICS

#### **The Political Climate in Cameroon**

While planning for the fieldwork the impact of the political climate on the fieldwork activities in the country was not anticipated. 2007 was a politically important year in Cameroon as municipal and legislative elections were scheduled to take place on the 22<sup>nd</sup> of July 2007. After establishing initial contacts, it became clear that the fieldwork plan had to be slightly altered because of the forthcoming twin municipal and legislative elections on 22<sup>nd</sup> July. The researcher was advised that many disaster managers within the government sector would be very busy with political campaigns. Every opportunity was therefore utilised to interview disaster managers from the government sector; effort was made to meet them in their villages or provinces where they were out campaigning, and this was where most of the interviews were conducted. Interview experiences outdoors in an informal environment and atmosphere proved to be more relaxing and friendly than those conducted in offices.

#### **Research Assistants**

The data collection process was facilitated by research assistants who came from the affected communities and had some knowledge of field research. Using research assistants from within the study population or region heightens insights, provides potential cultural contextual information, and opens doors normally closed to outsiders (Brenda, 2005). Gottfried (1996) highlights the importance of involving the population in research projects and asserts that research with or from the perspectives of those most affected continues to be rare. “Insider-outsider” approaches to sampling and research that has been debated by field researchers (BacaZinn, 1979); the fact that the researchers were all from the affected areas in which they worked proved to be very valuable.

Two research assistants referred to hereafter as senior research assistants (government teachers) helped the researcher to choose other two junior research assistants from within the Nyos study area. The research assistants helped the researcher in his logistic arrangements while working in the area and also in making contacts and arranging interviews with local administrators and others within the area.

Two French speaking research assistants from the West Province of Cameroon, helped with the fieldwork in the French speaking Njindoum area within the LM vicinity. Both assistants were familiar with the local language and culture and had worked in the area. In a

few circumstances they were involved in administering research questionnaires to respondents who indicated that they would not be available for pre-planned visits. They also served as translators in many instances where the locals could not communicate with English language or “pidgin English”.

#### **4.4 RESEARCH TECHNIQUE AND DATA SOURCES**

The techniques and data sources were determined by the research questions. The link between the study populations in the case study, the research questions and related tasks is shown in Table 4.2.

CASE STUDY GROUP	RESEARCH QUESTIONS AND RELATED TASKS			
	<u>Question 1</u> What strategies have been adopted to cope with and recover from the Lake Nyos and Monoum disasters?	<u>Question 2</u> How can we understand the vulnerability of individuals and their households to the present risk at Lake Nyos and Monoum	<u>Question 3</u> How do people perceive and respond to the risk that still exists in the disaster areas?	<u>Question 4</u> What makes people settle or move away from the risky areas?
<b>Displaced disaster survivors still living in resettlement camps</b>	<ul style="list-style-type: none"> <li>-To perform an analysis of the responses, institutional arrangements and mechanisms for disaster and risk management for the displaced victims of the Nyos disaster.</li> <li>- To conduct an assessment of structural and non-structural mitigation measures</li> </ul>	<p><i>To perform a qualitative and quantitative analysis of the socio-economic condition of disaster survivors (social vulnerability) in the resettlement camps.</i></p>	<ul style="list-style-type: none"> <li>-To analyse how the population within the displaced communities have responded and will respond to any disaster mitigation and preparedness measures.</li> </ul>	<ul style="list-style-type: none"> <li>-To analyse why they have decided to settle where they are although some of their colleagues have relocated to the Nyos area</li> <li>-To analyse why they think others are returning to Nyos.</li> </ul>
<b>Former displaced Nyos victims now resettled within the disaster zone</b>	<ul style="list-style-type: none"> <li>-To perform an analysis of the responses, institutional arrangements and mechanisms for disaster and risk management</li> <li>- To conduct an assessment of structural and non-structural mitigation measures</li> </ul>	<p><i>To perform a qualitative and quantitative analysis of the physical risks (physical vulnerability) to the population in the disaster zone.</i></p>	<ul style="list-style-type: none"> <li>- To analyse how the returnees perceive and understand natural hazards</li> <li>- To analyse the level of threat that returnees perceive Lake Nyos still poses</li> <li>-To analyse how they have responded and intend to respond to any disaster mitigation measures</li> </ul>	<p><i>-To analyse what motivated these displaced people to return and resettle within the Lake Nyos area</i></p>
<b>Residents in Njindoum village close to Lake Monoum</b>	<ul style="list-style-type: none"> <li>-To perform an analysis of the responses, institutional arrangements and mechanisms for disaster and risk management</li> <li>- To conduct an assessment of structural and non-structural mitigation measures</li> </ul>	<p><i>To perform a qualitative and quantitative analysis of physical and social vulnerability of the population in the lake Monoum area</i></p>	<ul style="list-style-type: none"> <li>- To analyse how the non-displaced monoum residents perceive and understand natural hazards</li> <li>- To analyse how they perceive the magnitude of the threat that Lake Monoum poses.</li> <li>-To analyse how they intend to respond to any disaster mitigation measure</li> </ul>	<p><i>-To make an analysis of reasons why the residents still live within the lake vicinity and have not relocated despite the known risk</i></p>

Table 4.2: Matrix of link between the case study populations, research questions and related tasks

Data were generated through the following steps in the fieldwork.

- 1) Establishment of contact with community leaders, key officials and NGOs working in the study areas
- 2) Short fieldwork entrance briefing meetings with Senior Divisional Officer and mayors in disaster area
- 3) Preliminary visit of the study communities to gain a better contextual understanding.
- 4) Gathering of documents required for the study (reports, media articles, plans, project reports, policies, maps, and demographic, poverty and ecological reports etc)
- 5) Administration of questionnaires to the study populations
- 6) Survey of risky areas determined by physical features and geology.
- 7) Interviews with key officials (government sector, private sector, NGO and others in the civil society involved in DM) and the study populations.

The procedure as listed above guided the methodology. While 1-3 served as the preliminary information gathering tools, 4-7 were the main data collection techniques administered to the study populations that were sampled.

#### 4.4.1 SAMPLING

Tables 4.3 and 4.4 on the next page show the sample sizes for the various study populations for both surveys and interviews and the various sample locations. 225 and 108 survey questionnaires were administered to 5 resettlement camps and 3 villages respectively within the Nyos disaster zone. In Njindoum village, 130 questionnaires were also administered. A total of 90 interviews were also conducted, comprising 25 interviews each with the displaced disaster victims and Njindoum residents, while 20 interviews with returnees to the disaster zone. A further 20 interviews were conducted with disaster managers. Not all survey questionnaires administered (face to face with researcher and later administering by research assistants) was collected by the researcher. Although only 64.1 percent of administered questionnaires were collected, the total of responses from questionnaires (295) exceeded the minimum anticipated.

Table 4.3: Surveys conducted

Study Population	Place	Questionnaires Administered	Questionnaires Collected
Displaced Nyos Victims	Ukpwa Camp	100	74
	Buabua Camp	40	27
	Kimbi Camp	25	16
	Wum Camp	40	14
	Kumfutu	20	4
<b>Total</b>		<b>225</b>	<b>135</b>
Returnees to Disaster Zone	Nyos	65	48
	Cha	25	16
	Subum	18	11
<b>Total</b>		<b>108</b>	<b>75</b>
Non-displaced Njindoum Residents		130	85
<b>Total Number of questionnaires</b>		<b>463</b>	<b>295</b>

*Source: Author*

Table 4.4: Interviews conducted

STUDY POPULATION	INTERVIEWS
Returnees to Nyos	20
Displaced Nyos Victims (Ukpwa Camp)	25
Residents around Lake Monoum ( Njindoum)	25
Key disaster management officials	20
<b>Total</b>	
	<b>90</b>

*Source: Author*

Simple random sampling was carried out for the three study populations for the administering of survey questionnaires. Every effort was made to cover most of the resettlement camps to administer survey questionnaires and a total of five camps were sampled for the displaced disaster victims. The survey was also done in the three villages of Cha, Subum and Nyos within the disaster zone (that had suffered the effects of the disaster) because people had returned to these villages. 77.9 percent, 87.8 percent and 90.6 percent of those who answered the survey questions were household heads in the displaced Nyos survivors, returnees to the disaster zone and the non-displaced Njindoum residents respectively. The number of questionnaires administered in the Nyos study populations is in proportion to the population size in the various locations.

For the interviews, the URC was chosen for cluster sampling for the displaced survivors. This camp was chosen because it is the closest to Wum, the largest town and capital of Menchum division and also the most accessible of all the resettlement camps.

Furthermore, more information about the social situation of the survivors of this camp was provided to the researcher by the mayor of Wum during a preliminary visit to the area prior to the fieldwork, and one of the research assistants, a disaster survivor who lived in the camp.

The criteria for choosing interviewees within the disaster zone were based on availability at home due to the relatively smaller population. Most of these interviews were conducted in Nyos village, and only a few in Cha and Subum villages because of their small populations and because some of the respondents did not honour the rendezvous for the interviews. Few trips could be made to the disaster site due to its remote location and very poor accessibility. After travelling for several hours to get there, every effort was made to interview any resident that was found especially if pre-programmed interviews could not be undertaken because the respondents were not available.

In Njindoum village, many people were available for interview but most of them refused to talk without having proof that the chief knew of our presence and had accepted that they could disclose information about our enquiry. However, this issue was solved after more people became aware of our presence in the field and got information that we have had some meetings with the chief and some of his notables in his palace concerning our mission in the area. Interviewees were selected based on information that was collected during the earlier surveys. The category of people chosen for interviews were those who lost a relative during the gas incident in the lake, those who were displaced from the lakeside settlements, those whose livelihood activities like fishing and farming close to the lake had been affected and some local traditional authorities in the village. Group interviews were also held with some traditional leaders in the village, in the presence of the Chief of Njindoum village.

#### 4.4.2 SURVEYS

Survey questionnaire administration sampling in the three study populations (displaced Ukpwa camp survivors, returnees to the disaster zone and Njindoum residents) was conducted through random sampling but in a manner to be representative of the populations concerned. Prior to the fieldwork, the plan was to conduct 75 questionnaires in each of the study populations. But during the fieldwork, the researcher wanted to maximise every opportunity available to get survey data especially when it was realised that the political atmosphere could be a hindrance to conducting interviews. The idea was that the questionnaire survey could make-up for any deficiencies in conducting interviews. Hence in some study populations more surveys were carried out.

The survey questionnaires were structured to have both closed and open-ended questions, with open-ended questions used in instances where the respondents' personal view on an issue was needed. Generally, the questionnaires were designed to yield data, which could give a better understanding of the issues under investigation. Some question themes in the surveys include: indicators of socio-economic and demographic profile of households; an infrastructural asset profile and determinants of perception to natural hazards. The survey questionnaire instrument is provided in full in Appendix five. Most of the surveys were conducted through face to face administration in order to be certain that all those to be sampled have been contacted. In some instances where the respondents were not available at home, some questionnaires were kept with the research assistant to administer them at a later date and time. Box 4.2 explains the questionnaire administration process.

#### **Box 4.2: QUESTIONNAIRE ADMINISTRATION PROCESS**

The process for administering survey questionnaires reflected the reality in the field. For the displaced populations, the number of questionnaires administered and those collected reflects the accessibility and population of the various camps. Though visits were made to all the camps mentioned above to administer questionnaires, more visits were made to the Ukpwa, Buabua and Kimbi camps because these were more accessible. Planned visits to the camps were arranged beforehand to administer the surveys and the camp residents were informed of the date and arrival time. In the camps, we went from house to house. If no one was in the house when we visited, we passed on to the next house due to the time constraint. The houses whose occupants were not available were noted and their neighbours were asked to inform them of our next visit.

The second group of questionnaires was administered to households who had relocated back to the disaster zone in Nyos, Cha and Subum, the main villages that were affected by the disaster. It was very difficult to make frequent visits to the disaster zone due to its remoteness and inaccessibility. Very few households' members were found at home when we visited, though the research assistants travelled to this region to arrange for interviews and also to administer questionnaires. Through advice from some residents; we planned a scheduled visit on a day when there was a traditional wedding in Nyos village. This is the day we were able to administer most of the questionnaires as many of the residents returned home early from their farms to attend the wedding.

Survey questionnaire administration in Njindoum village was done within a few kilometers of Lake Monoum, mostly within the linear settlement along the main road into the village. Though this study group has the largest population of the three studied and more people were available for interviews and for the survey, many of them were reluctant to talk to us because they were not very sure that we were not government officials. Many of the villagers asked for proof that we were students and many of them only began to cooperate after getting a message from the chief of Njindoum that we were not linked to the government.

*Source: Author*

The questionnaires were administered to the respondents by writing the responses directly on the question sheets that was prepared and taken to the field. Thus, all the survey data

was recorded directly on the question sheets in the field. The questionnaires were structured in a manner in which it was easy to quantify the results. How research data was generated from the survey questionnaires is explained in Section 4.5.

#### 4.4.3 INTERVIEWS

Interviews were the main method of qualitative data collection. Semi-structured interviews were undertaken in all the disaster affected study populations and with the main stakeholders in DM (see Box 4.3). Interview themes with the affected populations include history of where lived in relation to disasters and intra-household risk perception. Themes covered in interviews with disaster managers include knowledge of Cameroon's DM system, strategies/policies/plans for DM in Cameroon and past experience with the management of the LNM disasters. According to Bernard (1994), semi-structured interviews have much of the free-wheeling quality of unstructured interviewing but are based on the use of an interview guide. Semi-structured interviews allowed greater flexibility within the interview structure and process through the use of open-ended questions to allow the respondent to express their thoughts on a subject freely. Though the interviews were based on a guide (see Appendix 6) some instances that required additional understanding of pertinent issues in the various study groups or where the respondent's knowledge of certain matters was more relevant, unstructured questions were used to probe these areas further. Criteria for selection of key informants are presented in Box 4.3.

### Box 4.3: SELECTION OF KEY INFORMANTS

Key informants were chosen based on the sectors they worked in and their impact on DM in the country. Their selection was grouped into three main categories. **One group** comprised of officials working with the disaster survivors at the local level. Both the local government officials and non-government officials managing the local councils fell under this group. These groups of officials were very knowledgeable about the operational and practical measures involving DM at the local level, and deal directly with those affected by the LNM disasters within the local village communities. These are the people who implement any decisions taken from above and who are also responsible for directing any queries, concerns or problems concerning the survivors to higher quarters. This group included Divisional officers, Senior Divisional Officers and Mayors etc. The **second group** of key informants was the main policy-makers in DM in the country and those at the higher level of administration whose decisions can impact on the DM process and those affected. These people were mostly working in the government ministries at the higher ranks of government administration. This group included Directors, Provincial Delegates and Chiefs of Service. The **third group** was scientists and researchers, most of whose activities also impacted directly or indirectly on DM and the survivors. Some of these people are either involved in scientific research activities on mitigation at both lakes or act as advisers or consultants to the government. Though these categories were determined prior to the commencement of the interviews, most of the members of these groups were sampled through a snowball sampling technique (Sarantakos, 2005).

*Source: Author*

The interview times varied depending on the study populations. Interview times with disaster survivors who could not understand English language or “Pidgin English” took longer and lasted at times for three hours, and occasionally up to four hours. With key informants involved in DM actions, it took on average two hours. But there were many opportunities to talk to these people more than once and continue the process at other times to complete the interview and probe into other issues. Where some key personnel could not be met for an interview, a telephone interview was arranged where a similar format to the questions used for the semi-structured interview was adopted.

Interviews were taped and notes taken on field note books, which were later transcribed mostly in the evenings and during the weekends. Some respondents did not want their interviews to be recorded and we had to comply with their request. In such situations, the interviews took longer as we had to write down all the relevant responses in the field notebooks.

During the interview process, especially with the disaster survivors, the researcher was conscious guiding against bias. Every effort was made to triangulate in household interviews where possible. Though interviews targeted the household heads, in cases where their spouses were present or other senior members such as elderly grand fathers or mothers or grown-up children, they were also asked similar questions to maximise the

accuracy of information given with regards to some questions. This was very relevant with questions about social vulnerability that concerned coping strategies and livelihood activities, because it was realised that the respondents were keen to express their problems and could in some instances exaggerate information that was given, especially regarding living conditions, farming/grazing space and assistance from the government. Corroboration of statements sought on the basis that reliability and credibility of the data being gathered depended on the accurate presentation, interpretation and correlation of information gathered from the respondents.

#### 4.4.4 SECONDARY INFORMATION

Literature and documents concerning the issues under investigation were retrieved from various sources and searched for evidence on the issues under investigation. Documents were collected from government ministries, research institutes, newspaper publishing houses in the country, NGOs who have worked in the area (see Appendix 7 for sources of secondary information). More secondary data were collected from internet sources and via library facilities, through which the few journal articles and publications on the LND were sourced.

#### 4.4.5 PERSONAL OBSERVATION AND EXPERIENCE

The researcher is a Cameroonian from the North West Province where the LND happened. He felt the indirect impact of the disaster when shortly after the incident, the death of thousands of cattle caused the price of meat in Bamenda to rise since Menchum Division was the main supplier of meat in the North West Provincial capital of Bamenda. Apart from this early experience, when serving as an assistant lecturer in the Department of Geology (School of Education Annex Bambili) of the University of Yaounde, the researcher was concerned with the technical aspect of the LND and had made several field trips with undergraduate students to crater lakes in the region. During this period prior to embarking on further studies in the UK, the researcher had heard of the social problems the survivors of the LND were facing.

The researcher who possesses an M.Sc in Applied Geology, made a technical assessment of the new risk of flooding from Lake Nyos that had been indicated by scientists working on the lake (see Page 133 in Section 6.3.1). Aside from the technical aspects, the researcher spent much time in the URC during the fieldwork and experienced some of the social problems the camp dwellers are living with on a daily basis, many of which they have explained during the research process. Meeting the families of many of

the survivors in the camps and also in Wum town and hearing about their problems and predicaments gave further insight into areas for probing during the research process.

During the fieldwork, the researcher participated in the annual remembrance of the LND in which many of the issues under investigation were highlighted by both the disaster survivors and the government representatives to the event. Due to his presence in the area for this research, he was informed of all the activities being undertaken both by the government and the disaster survivors in preparation for the annual event. Though this occasion took place almost at the end of the fieldwork, it exposed most of the issues that were initially built into the research hypothesis and the findings that were being unveiled from the research process. It was also an opportunity to meet many of the key personnel involved in DM in the country since some top government officials came to the region for the event. Box 7.1 (Page 175) in Chapter seven has a details account of the event.

#### **4.4.6 TECHNIQUES USED FOR EACH RESEARCH QUESTION**

The data collection methods were used to answer multiple research questions. How each of the research questions draws from the techniques mentioned above is presented in Appendix 9 (Page 294). Table 4.5 summarizes the mix of methodology used to probe into the main themes for inquiry in the research which include disaster management, vulnerability drivers, risk perception and motivations for relocation.

Table 4.5: Summary of methodology for main research themes

RESEARCH QUESTION	DATA COLLECTION	TECHNIQUES/ TOOLS	DATA SOURCES AND METHOD OF ANALYSIS.
<b>Risk Management</b> <i>(Question 1)</i>	Primary Data	➤ Semi-structured interviews	➤ Thematic coding of semi-structured interviews with key decision-makers and managers
	Secondary Data	➤ Documentary Evidence.	➤ Analysis of documentary evidence from UNDP, government institutions, reports and news paper articles ➤ Analysis of projects and plans for disaster mitigation
<b>Vulnerability Drivers</b> <i>(Question 2)</i>	Primary data	➤ Semi-structured interviews ➤ Questionnaire survey ➤ Personal observation	➤ Quantitative and qualitative analysis ➤ Thematic coding of questionnaire survey, and semi-structured interviews with key decision-makers, household heads and managers
	Secondary data,	➤ Documentary evidence	➤ Analysis of policy documents and reports ➤ Historical documentary evidence allows analysis to be conducted on the root causes of vulnerability in Cameroon.
<b>Risk Perception</b> <i>(Question 3)</i>	Primary Data	➤ Questionnaire survey ➤ Semi-structured interviews	➤ Thematic coding of questionnaire survey, and semi-structured interviews with key decision-makers, and household heads and managers
	Secondary Data	➤ Documentary evidence	➤ Analysis of secondary data.
<b>Motives for Relocation decision</b> <i>(Question 4)</i>	Primary Data	➤ Questionnaire survey, ➤ Semi-structured interviews	➤ Thematic coding of questionnaire survey involving household heads, and officials involved in response and recovery efforts.

Source: Author

#### 4.5 DATA PROCESSING AND ANALYSIS

The main analytical work was done after the fieldwork had been completed and mainly at the University of East Anglia. Initial data processing and analytical work was undertaken during the fieldwork as more data were being collected to provide initial findings, which helped fine-tune the study (Crang, 1997). Qualitative hypotheses and theories emerged from the data-set while the data collection was in progress, and after data analysis started (Morse and Field, 1995).

The hundreds of questionnaire surveys administered to the study populations were transported to the UK to be processed. The questionnaire surveys were entered into SPSS software to produce data that can be used for quantitative analysis, and the other data sources including transcribed interviews and notes went through a coding scheme.

#### 4.5.1 CODING

The process of coding and categorising was more complicated than anticipated. As has been pointed out by some researchers, segmenting and coding data are often taken for granted though this forms the core of any qualitative research. The ability to organise, manage and filter out the most relevant information are skills, which researchers involved in qualitative research must possess (Coffey and Atkinson, 1996).

The development of a coding strategy was based on breaking down, conceptualizing and reconstructing data (Yin, 1993:62). Gordon (1992) describes the basic steps in any reliable coding process, which comprise definition of the coding categories, assigning code labels to the categories and classifying the relevant information into the categories. The first stage is an initial annotation of materials in which topics are noted neutrally, rather than a search for significant themes, though Cook and Crang (1995:78) note that in practice “no researcher can confront such a text quite so innocently”. In the second stage, codes are developed that are used to label similar topics. The codes are then used to collate data items relating to each code, which is useful to identify analytical themes and underlying relations. According to Bryman and Burgess (1994) coding should be a flexible, interactive process throughout, in which materials are repeatedly re-read and previous steps re-evaluated as queries, contradictions, omissions and inconsistencies inevitably arise.

Having in mind the relevance of coding and the various coding methods, the design of the coding process took into consideration how the data generated would facilitate the analysis. The interview transcripts and notes for the three study populations and the disaster managers were coded separately. This painstaking process began by reading interview transcripts several times while examining the data for descriptions, patterns, and relationships between categories. The relevant data segments or phrases that conveyed similar information were highlighted and underlined. Main categories were identified and given generic names and codes of capital letters. To assist with identification and analysis, the various interview responses were separated under the main categories. Within the main categories, sub-categories were also identified and given code names. A complete coding consisted of the interviewee’s group or study population (coded with the 1<sup>st</sup> capital letter of

the groups), interviewee identity (coded as two digit numbers), main category (coded as capital letters of the category initials) and sub-category (coded as small letters). Table 4.6 below shows the codes and their meanings.

Table 4.6: Codes and their meanings

<b>CODES</b>	<b>MEANING</b>
U	Displaced Upkwa camp study population
M	Non-displaced lake Monoum study population
N	Returnees to Nyos study population
D	Disaster Managers
Numbers e.g. 01,02	Interviewee identity
Initials of Main Category e.g. (PRS)	Preferred relocation site
Sub-category e.g. fer or cul	Fertility and culture
U02PRcul	Example of sorted transcript reference

An attempt was made to group responses for the study populations under similar main categories in order to facilitate comparative analysis between the study populations. A total of 13 and 16 main categories for the study populations and disaster managers were identified respectively with more than 40 subcategories in each study group. To facilitate topical breakdown, all the coded subcategories of transcript references for all the study groups were sorted and separated against the corresponding main categories to which they fit in a table format as illustrated in table 4.7 below (see appendix 10 for sorted transcript codes placed against their matching categories). It was such a table format that was used to do the analysis by studying the coded transcript subcategories and referring back to examine the corresponding coded transcript references for the original information.

Table 4.7: Example of sorted transcript codes placed against their matching categories.

<b>CODES FOR MAIN CATEGORIES</b>	<b>MAIN CATEGORIES</b>	<b>SUB CATEGORIES</b>	<b>CODED SORTED TRANSCRIP FOR SUB- CATEGORIES</b>
RL	Effects or Impact due to Relocation	Income “loss of income”	U01RLinc; U02RLhous; U20RLhous;
		Community Cohesion	U03RLcomcoh; U04RLcomcoh; U04RLcomcoh;
		Education “education of children”	U01RLedu; U03RLedu; U04RLedu; U04RLedu; U09RLedu; U13RLedu; U19RLedu; U20 RLedu;

It was realised that the ideas in the coded transcript references could not be completely separated to match specific categories since in most cases many ideas or opinions were conveyed by the respondents. As such many coded interview transcripts could be used for more than one sub-category especially in cases where the ideas overlap or many issues are mentioned in a response as was commonly the case. The transcript extract in Box 4.4 below is an example.

**Box 4.4: CODED EXTRACTS FROM INTERVIEW TRANSCRIPTS**

Strange	<i>U15MRL: I don't like being here because this place is strange to me. Although the government says this is our land, we are not free here. I always feel like a stranger here and have discussed with my wife the</i>
Relocation	<i>possibility of us going back to Nyos. But the problem is that our two children are going to primary school here and we cannot take them to Nyos because there is no school there. We want them to have some education because we did not go to school. If we went to school, maybe we would not be suffering here so we don't want them to suffer like us. Even if they don't go to secondary school because there is none here, it is good for them to have at least the First School Living Certificate. If not of our children, we should have gone back to Nyos to farm there because the crops don't do well here.</i>
School	
Fertility	

*Source: Interview U15MRL*

In the example above, the transcript extract is coded as U15MRL and falls under the main category MRL (Motivation for relocation). The four sub-categories identified are indicated on the margin against the areas where they are found in the text. The codes for the sorted subcategories can be added to the transcript code to refer to those categories when segregating the data for analysis as shown in the last column of Table 4.7. This is relevant for checking the data in the transcripts as well as for referencing within the text in the analytical Chapters. Box 4.4 explains how referencing is done in this thesis.

#### **Box 4.5: REFERENCING OF ORIGINAL AND SECONDARY INFORMATION IN THE THESIS**

In this thesis, referencing of secondary materials follows the conventional method for published sources and includes the authors, dates of publication, title of article or material and the publisher. Empirical data from interviews and notes from group interviews and personal observations is referenced by protecting the identity of the respondents using the codes of their names, study group and category under which the response falls (e.g. U15MRLfer or U03DIedu). These references are used to substantiate or support the arguments presented in those sections of the thesis. In some sections also direct quotes from transcripts are reproduced verbatim in the text to show the words of the speaker. However only those words that were used by most of the speakers in “Pidgin English” or Creole, a common language understood by most Cameroonians and the local indigenes are presented and mostly in cases where the interview was done without a translator.

*Source: Author*

#### **4.5.2 ANALYSIS**

The search for analytical themes started during the fieldwork as the data collection process painted a clearer picture of the issues under investigation. This initial analytical framework, which emerged during the fieldwork was vague and patchy but provided initial feedback which helped to polish the study (Bryman and Burgess, 1994; Crang, 1997).

A series of analytical themes for the disaster affected study populations and disaster managers emerged from the processed data. These analytical themes were derived from the coded transcripts that had been sorted into main and sub-categories (Appendix 10). After sorting and categorizing the analytical themes, their source materials were searched for in the coded references and transcripts. The original transcripts and notes were read thoroughly to complement the categories in searching for the main themes. All relevant analytical source materials were then selected and classified under various major themes that were then fed into the relevant analytical Chapters of the thesis.

The analysis was oriented more towards an inductive than deductive approach (Kitchen and Tate, 2000), following an orientation “in which generalisations are developed from information presented in the case studies using refinement, typification and categorisation” (Eyles, 1988). Therefore, explanatory concepts were underpinned mainly by the fieldwork experience though it would be naïve to suggest that the data collection process was wholly rooted in empirical reality and not to some extent theory-driven (May, 2001).

Overall, the main field techniques, data processing and analyses could be situated within the “grounded theory” research method. A grounded theory approach attempts to prevent the temptation of applying premature theoretical categories and themes to

qualitative data based on previous background knowledge of issues under investigation. It instead favours the identification of categories emerging from empirical data generated during the field research process (Bryman and Burgess, 1994; Bailey et al., 1999). This implies that in this thesis, there are no clear cut distinctions or segregation between the analysis and results. The result Chapters double as the analytical chapters since discussions inevitably evolve into preliminary analysis as findings from the issues under investigations are revealed.

## **4.6 REFLECTION ON THE RESEARCH PROCESS**

Before moving on to the results and analytical Chapters where the case study findings are discussed, reflection on the field research process is necessary.

### **4.6.1 BIASES, CREDIBILITY AND SUBJECTIVITY**

Irrespective of the research methods chosen, social scientists bring their own beliefs, biases and assumptions to research being undertaken. The design of the study and how the research questions were formulated are influenced by the researcher's personal background, knowledge and experiences (Madge et al., 1997). Researchers' attitudes and behaviour is the product of their cultures, genders, experiences, up-bringing and training. Their decisions, actions, perception and approaches to issues, which influence research at all the stages are shaped by their social relations (Cook and Crang, 1995; May, 2001; Strauss and Corbin, 1998). The analysis was influenced by main and sub-themes that emerged because of the way data were coded. Biased transcription and interpretations, generalisations and too much attention to some emerging patterns more than others of equal significance are possible threats to the credibility of the research (Gibbs, 2002).

The quality of the research could also be undermined by those facilitating the research or the case study populations. Most top government officials in order to protect their positions did not want to criticise the government's management of the LNM Disasters and therefore did not always give an objective response to questions. Secondly, the interview environment and atmosphere of most government officials in their respective home towns during the campaign for last municipal and legislative elections also influenced their objectivity. These people were out campaigning for the government and found it difficult to paint any negative picture of the government even in a one-to-one discussion. However, disaster managers from the opposition parties interviewed during this political atmosphere were also keen to expose the flaws of the government. This created some sort of balance, though the responses were treated with caution.

Since most of the interviews with the disaster affected populations were conducted in their houses, the presence of others influenced their responses. In some situations, like interviews with those who have returned to the disaster zone, the tradition does not permit a stranger to be alone with someone's wife so the spouse always insists upon staying in the same room or not far away. Since it was impossible to keep others away from interview scenes, they eavesdropped the conversations and in many cases uttered remarks that influenced the respondents' responses.

From knowledge of the culture of the disaster affected communities prior to the fieldwork and the initial fieldwork entrance meetings in the disaster areas, it was clear that focus group discussions would not be a credible way of generating useful data as the communities in this part of Cameroon have great respect for elders and would not give contrary views in public. In most focus group discussions, participants are likely to conform to majority opinion or those of a very dominant or opinionated member (Morgan and Krueger, 1993). This was clearly the experience in a group meeting held at the end of the fieldwork in the palace of the Fon of Njindoum.

Another source of possible distortion arises from the use of field assistants who hail from the study populations as translators in cases where the respondents could not speak or understand English or Pidgin English. Passing on information through someone from the same community may influence the responses and the interpreters may not pass on the exact message from the respondents. For the LM case study populations, the translation of the questionnaires and interview question into French (Appendix 5 and 6) by a professional translator may have slightly altered the initial questions written in English. The responses from this community were in French and the translations into English by research assistants may also have created avenues for distortion of information.

From a retrospective look at the entire research process from the initial conception of the research proposal, the procedural stages leading up to the fieldwork and the writing up stages, it is practically impossible to deny influences from my subjectivity on the end result. I have my own perceptions of how the Lake Nyos Survivors have been treated. By belonging to the English-speaking or Anglophone community in a dominantly French-speaking bilingual Cameroon accused of marginalising the minority English speaking sector, it is very easy to have biased feelings about the issues under investigation, which are influenced by politics. Disaster survivors' stories of corruption, embezzlement, negligence and poverty in the camps reminded me of the general feelings among Anglophones of the way they are treated by the central government. By interacting with the respondents, listening to responses, trying to put their responses in the perspective of

what I was observing in their community, and in attempting to represent their views as accurately as possible, I did my best to minimise my subjectivity in the analysis.

#### **4.7 ETHICAL CONSIDERATIONS**

The main ethical issues considered for this research included the following: informed consent and voluntary participation; confidentiality and anonymity; access to people (ethnic diversity); dissemination of result and reciprocity based on tradition of the area.

The participants in this research did so with their freewill and on a voluntary basis. An information sheet that described the purpose of the research was prepared prior to the fieldwork and given to all literate participants in advance to seek their consent in the research. In cases where the participants were illiterate, what was written in the forms was explained to them verbally. Consent forms that had also been prepared were handed over to the participants to sign and indicate their willingness to participate in the research. In cases where the participants could not sign the forms, their consent was taken orally and the researcher only indicated this on the forms. Although some participants approached refused to participate in the research, in most instances participants were willing to participate in the research but were not willing to sign the consent forms. It was even noticed that in some cases, mention of the consent forms even scared some participants as many did not want their signatures on the forms.

Confidentiality was taken with high regard since the researcher was entrusted with private information and this was also made known to the participants. The participants were ensured that any data would be used for the purpose of the research and not shared with others against their will. They were also told that they had the right to withdraw any information or material given to the researcher at any time. In photographs taken for interviewees during the fieldwork, they were told that such photographs could be published on the thesis or on the web. Those who did not wish their pictures to be published were told to indicate this. This was particularly true for close-up pictures of participants. They were also told that their identity would be kept private and informed of circumstances when anonymity may not be maintained especially in cases when someone could be identified by his position. It was however noticed that the non-government local administrators and disaster survivors were not worried of their identity being known or the role they played in the research. On the contrary, most of the government personnel were concerned about their anonymity and some only promised to cooperate with the research provided their identity was not revealed. To protect the information gathered during the field research process, field notes, questionnaires and tapes were stored in a safe place where no other person had access to them.

As mentioned earlier, the study populations consist of different ethnic groups. In the pursuit for information, the researcher was careful not to override the social, religious and cultural values in the study populations. Some of these cultural values that were respected during the fieldwork included: avoidance of any discussions with female respondents in the study sites without the presence or knowledge of their spouses and no scheduling of interviews or questionnaire administration on Friday afternoons (the prayer period for the Fulani and Muslim people who predominated in the research community).

The participants were also well informed about the dissemination of the results from the research, which will be used for a PhD thesis and also for publications. They were also told that if they require the result of particular aspects of the research for their communities then it has to be provided to them after the research has been completed. The researcher also ensured that he appreciated the help of participants and reciprocated the assistance in such a way that it did not influence or alter their genuine attitude or participation in the research. In many instances after interviews or questionnaire administration, the researcher thanked the participants for their time and for providing the information required. He also gave some bread and sweets to children in the household, a gesture which many appreciated.

#### **4.8 SUMMARY**

This case study research has adopted a mixed methodology comprising qualitative and quantitative data. Constructivism and interpretivism are the dominant epistemological positions adopted, with the argument that it is the meaning and context applied to social phenomena that is important and that we understand the social world best through our own interpretations. There is the consciousness that the disaster affected case study populations and disaster managers have different interests concerning the research enquiries and might misrepresent certain facts. This challenge was resolved by employing the triangulation technique, which uses multiple sources of evidence to enhance analysis. For example, if the researcher thought the interviewee was exaggerating some issues, such issues were cross-checked with his peers in subsequent interviews. This worked well for the government and non-government disaster managers who seemed to have different perspectives on many similar issues. While empirical information from the study groups via questionnaire surveys and semi-structured interviews plays a central role in the mainly inductive analysis, documentary information and in some instances personal observations provides essential background information for the interpretation and explanation of risks, vulnerability drivers, disaster management and relocation decisions. Since it is inevitable

that researchers may influence the research process through their past experiences, cultural and social values, every attempt was made to minimise biases and subjectivity on the part of the researcher and the research participants in order to enhance the credibility of the research.

## CHAPTER FIVE

### GENERAL OVERVIEW OF THE DISASTER MANAGEMENT FRAMEWORK IN CAMEROON

#### 5.1 INTRODUCTION

Although it may not be feasible to stop hazardous events from happening, efficient and effective DM will prevent many hazardous events from becoming disasters. As mentioned earlier in Section 2.3.2 (from Page 32), DM usually involves prediction, warning, emergency relief, rehabilitation and reconstruction. The main approach of DRR is to be proactive in all the phases of the disaster cycle (mitigation, preparedness, response and recovery as well as prevention). The UN-ISDR (2005) recognizes that effective DM is a key element in good governance and governments have been urged to place disaster mitigation as a key element of their governance programs.

Each government of a country has the primary responsibility for taking effective measures to reduce disaster risk for the protection of its population, infrastructure and other national assets from the impact of natural disasters (UNCED, 1992; UNESC, 1994; WCDR, 2005). It is now internationally acknowledged that efforts to reduce disaster risks must be built into legislation and systematically integrated into policies, plans and programs for sustainable development and poverty reduction at the highest decision making level for implementation at the national and community levels. To meet the national and international challenges of DM, concerted action through bilateral, regional and international cooperation and partnerships are needed. International organisations have been urged to mobilize adequate resources, including financial, human and technological means to assist nations in the field of natural disaster reduction with particular focus in helping developing nations that are most vulnerable to the impacts of these hazards (UNESC, 1994; WCDR, 2005).

In view of Cameroon's high exposure to natural hazards and disasters, the government has taken the primary responsibilities for DM activities by creating and directing all the various state institutions and administrative bodies involved in the process. It will be shown in the course of the analysis that the DM process generally adopts a top-down hierarchical approach for the administration and implementation of activities, with more emphasis on disaster response rather than risk prevention and mitigation. Although government policy regarding civil protection in the country recognizes other actors like councils, populations and Non Governmental Organisations (NGOs), their role in DM is not very clear.

The degree of success of DM in Cameroon depends hugely on the structures and institutions that have been put in place to guide the process. This Chapter seeks to review

critically, DM in Cameroon by examining the various legislative, institutional and administrative frameworks and the external agencies and key stakeholders that help to facilitate the process. It reveals the DM structure in the country and provides the basis for answering research question one (What strategies have been adopted for the affected people to cope with and recover from the Lake Nyos and Monoum disasters). A critique of the DM process is also performed to expose flaws in the system and highlight areas for improvement. Triangulation of information sources has been used to complement secondary information sources in the analysis to enhance credibility. This Chapter represents the first comprehensive document that has been produced on DM in Cameroon.

## **5.2 CIVIL PROTECTION IN CAMEROON**

Civil Protection (CP) is a common umbrella term that covers the risks posed by natural hazards/disasters, technological hazards, and biological hazards as well as those caused by human induced hazards in Cameroon. It is a concept, mission and service, which consist of permanently protecting people and property against environmental risks, disasters and their impacts ([www.onr.cm](http://www.onr.cm)). According to the Cameroon government, CP is the shared responsibility of the State, municipalities, non-governmental and humanitarian organizations and the people who are beneficiaries of the CP services. To counter the risks and threats faced by the country from the various hazards, the government has drawn up a National Disaster Prevention and Management Program. Government policy that emphasises disaster prevention and mitigation of disaster risks as priority areas of action with the assistance of the UNDP, within the framework of the National Disaster Prevention and Management Program. This program enables the putting in place of a legal framework for-the prevention and management of emergencies; national and sectoral plans on disaster prevention; and programs for the prevention, education and sensitisation of populations in emergency situations at the divisional or local levels. Government policy states that for CP to succeed, all the various stakeholders involved in the process need to cooperate and support government actions in risk reduction and management.

Though the emphasis here is on natural hazards and disasters, it should be noted that the overall government DM strategy covers all hazards under the auspices of the DCP in the MTAD. Many laws have been developed over the years to regulate CP in Cameroon but the management of risk and disasters has been built into the overall government administrative machinery and governance structure. By generally addressing all risks and hazards in the country (Box 5.1), peculiar problems of natural hazards/disasters have not been properly addressed.

### Box 5.1: DIFFERENT RISKS AND DISASTERS IN CAMEROON FROM 1980-2000

- 3 gas disasters: Two gas emissions from crater Lakes-Lake Monoum (1984), Lake Nyos (1986) and industrial gas accident-Nsimalen (1996)
- 3 volcanic eruptions: Mount Cameroon (1982, March/April 1999 and May 2000)
- 16 tornadoes/storms/thunder strikes in South, Far North, Adamawa and North provinces.
- 7 major floods: Kribi (1998), Lagdo, Maga (1998), Far North (Diamare, 1996, 1998, 1999) and Limbe (2001)
- 9 major landslides: South West (Bafaka Balue, 1997), Centre (Yaounde, 1998)
- 20 fire disasters: Nsam (1998), Bafoussam market (1999), Mokolo (1998), Limbe market (2000), Sangmelima market (1998), Essos market, military headquarters ammunition depot (2001)
- 5 armed conflicts and acts of vandalism: Boyo (1998), Kotoko-Arab Choas (1993), Meiganga, Bakassi, East, Moloundu (1997).
- 3 cases of destruction by elephants: Far North (Diamare, 1996, 1998 and 1999)
- 7 epidemics: cholera (North and Far North, 1996, 1998; 1999); Meningitis (Far North, 1998-695 cases); Red diarrhea (East, 1997; Messock, 1998 and Mbalmayo, 1999)
- More than 1000 total road accidents per year
- 3 plane crashes
- Famine/Drought/Locust invasion: Far North 1998-1999 with loss of 140 tons of cereals per year.

*Source: Adapted from document on civil protection in Cameroon ([www.onr.cm](http://www.onr.cm))*

### 5.3 LEGISLATION AND POLICIES

The Government of Cameroon has adopted a multi-agency and multi-disciplinary approach through policies, practices and programs for DRR and management that target both natural, technological and human-induced hazards. These programs are managed by several ministerial departments under the auspices of the MTAD. The process to provide a more comprehensive legal framework for CP in Cameroon began shortly after independence and various laws, decrees, presidential instructions and prime ministerial instructions existed on the subject (MTAD/DCP and UNDP, 2006; MTAD /DCP, 2007). Although the policies and programs has been revised and modified since 1967, the several ordinances and acts do not provide a framework which shows a clear linkage between disaster mitigation and development planning in the country. The several modified policies and laws on disaster risks are masked within the general regulation on CP in Cameroon and are not very explicit. The various legislations on DM are shown in Appendix 11. The legislation need to be updated to clearly identify and isolate the rising risks from natural hazards and their potentially devastating consequences. The findings from this research could help inform plans to perform a legislative review in the design of a new natural hazard mitigation policy. Such a policy could provide the regulatory structure for linking all the existing policies and programs that are relevant for vulnerability reduction and development planning.

## 5.4 INSTITUTIONS ENGAGED IN DISASTER MANAGEMENT

Government policy on DM in Cameroon published by the DCP in the MTAD recognises a multi-agency effort in DRR. However, not all government agencies and NGOs involved in DM are mentioned and their roles are not defined. The agencies that collaborate with the DCP include government ministries, municipalities, the civil society and NGOs. At the national level, there is no evidence of a strong horizontal integration and collaboration between ministries. Linkages between all agencies involved in DM need to be fostered and strengthened.

### 5.4.1 GOVERNMENT SECTOR

#### **Department of Civil Protection**

The DCP in the MTAD is the nodal agency responsible for coordinating and managing disaster activities in Cameroon. The influence of the DCP covers the entire territory and its actions also cover all the main aspects of DRR including prevention, mitigation, response and rehabilitation for natural and human induced disasters. Decree N°2004/320 of 8 December 2004 concerning the organization of the Government placed CP as the second most important function of MTAD (MTAD/DCP, 2006) including territorial administration and decentralization. Decree N° 2005/104 of 13 April 2005 on the organization of this ministerial department, gave the DCP the responsibility to organize and coordinate CP activities throughout the country. This department has an annual plan of action in which they set activities and targets for preceding years and work towards realising them. Important features of these annual programs are risk prevention activities; training and education programs and the production of an annual report on the state of CP in Cameroon (MTAD/DCP, 2005). As revealed in Section 5.6, these activities have limited successes and impact on DM in the country.

In 2002, the DCP commenced a yearly publication of the state of CP in Cameroon in French with title “*Rapport sur L'état de la protection civile au Cameroun*” with different themes on varied aspects of natural, human-induced and technological hazards and disasters that affect the country. The reason is to regularly update disaster managers on the state of CP and on government action regarding the mitigation of hazards/disasters. Five editions (2002, 2003/2004, 2005, 2006 and 2007/2008 editions) of this publication have been produced with different themes. The most recent publication is the 2007/2008 edition with the theme “*Securiser le milier professionnel*” translated as “Security at Work”. This fifth 2007/2008 edition focuses on risk and security at work and has four main sections with 24 chapters and 305 pages. It highlights government assistance to victims of

diverse catastrophes in the country such as floods, accidents and ethnic conflicts. It also gives an account of government strategy in tackling natural and technological hazards and civil conflicts within the national territory. Since the booklet addresses all issues about CP, topical matters concerning natural hazards and disaster risks are not properly addressed.

During the fieldwork, the researcher was given a copy of the 2005 and 2006 editions by a senior administrator in the DCP. The most recent edition was also obtained by the researcher from the Director of CP in Cameroon during the August 2008 International Disaster and Risk Conference in Davos Switzerland. It is interesting to note that though the Cameroonian delegation brought copies of this to show to the international community, those who are really in need of the documents in Cameroon have never seen them as mentioned in section 5.3.3. Field observations and empirical information shows that most government and non-government institutions, expected to cooperate with the DCP in DRM do not have the booklets. The main responsibilities of the DCP are described in Box 5.2. However, field evidence as revealed in Section 5.6 and the management of the LNM disasters (analysed in the next Chapter) indicates that these responsibilities are not

#### **BOX 5.2: MAIN RESPONSIBILITIES OF THE DEPARTMENT OF CIVIL PROTECTION**

- General organisation of civil protection in the whole country
- Initiate cooperation between national and international organisations on civil protection issues
- Coordinating all the institutional structures concern with Civil Protection
- Develop studies and research on civil protection issues in times of war and of peace in partnership with relevant organisations
- Training and capacity building of all personnel involved in Civil Protection with the partnership of the Human Resources Department
- Control of transfer of corpses
- The assessment of requests for compensation and financial assistance made by disaster victims
- Control of financial and material aid meant for disaster victims
- Coordinate disaster relief and rescue operations
- Coordinate the deployment of back-up and auxiliary services
- Coordinate logistic operations

*Source: Adapted from Nana (2005) and MTAD/DCP (2005)*

always translated into the desired actions. Government policy and documents produced by the DCP shows an organisation chart of the DCP, the organs that facilitate DM in Cameroon at the national level and the various agencies that work with the DCP in mitigating disaster risks in Cameroon (see Appendix 12). These organisational charts as presented by the government are not explicit. They do not explain the relationship and linkages between the various agencies involved in DM in the country. A summary of all

the local, national and international organisations and bodies that cooperate and are coordinated by the DCP are shown in Box 5.3.

**Box 5.3: LOCAL, NATIONAL AND INTERNATIONAL ORGANS AND BODIES THAT COOPERATE WITH THE DCP**

- National Civil Defence Council (NCDC)
- National Risks Observatory (NRO)
- National Disaster Prevention and Management Programme (NDPMP)
- National Fires Service (NFS)
- Emergency Medical Services (EMS)
- National Institute of Geological and Mining Research (NIGMR)
- National Institute of Cartography (NIC)
- Cameroon Red Cross (CRC)
- Local representative of the United Nations Development Program (UNDP)
- Local representative of the International Federation of Red Cross (IFRC)
- Local representative of the United Nations High commission of Refugees (UNHCR)
- Local representative of the World Health Organisation (WHO)
- Local representative of the United Nations Cultural and Education Foundation (UNICEF), UNDP, UNICEF, WHO, and ICRC

*Source: Author*

According to MTAD/DCP (2005) the government requires an estimated annual budget of 46.7 billion CFA francs (£467 million) to deal with the problems of CP in the country. This amount is to be divided between the different ministerial departments concerned with CP. Because of lack of financial resources, this estimate cannot be met. The budget of the DCP is about 500 million CFA francs (£500,000) annually and is used for interventions during disasters, relief operations and for its functioning. Compared to the estimated amount of 46.7 billion CFA francs required to carry out this responsibility, the amount available for the DCP is very small (MTAD/DCP, 2005).

**Government Ministries**

Although public protection and disaster reduction and management is solely under the jurisdiction of the DCP, the functions of other ministries that play a supportive role are not very explicit in legislation guiding CP that is produced by MTAD. All the ministries involved include:

- The MTAD that is responsible for coordinating DM activities in the country.
- The Ministry of Scientific and Technical Research that is responsible for carrying out scientific research on natural hazards in the country through the NIGMR and the NIC
- The Ministry of Town Planning and Housing that is responsible for the implementation of town planning, land use regulations and building codes.

- The Ministry of Defense that is called in emergency situations to provide forces and the necessary logistics for search and rescue operations.
- The Ministry of Public Health, through the EMS that is responsible for providing medical assistance to disaster victims in the case of any emergency.
- The Ministry of Transport, that takes charge of implementing safety measures in the various transportation sectors in the country.
- The Ministry of Social Affairs that is responsible for reintegrating and the rehabilitation of disaster victims.
- The Ministry of Posts and Telecommunications, which has a telecommunication service that is responsible for ensuring that telecommunication resources are available for disaster prevention and mitigation.

### **Local Government**

Local councils and municipalities have the responsibility to improve the living conditions of the people in their locality. Although councils are important players in DM within the local areas, their specific role in carrying out this function is not mentioned in government legislation. Councils are the smallest local authorities within the Divisions and Sub-Divisions of the country and are divided into City Councils<sup>9</sup> and Divisional councils. While Government Delegates (appointed by the government) and elected Mayors are the head of City councils, only Mayors control the Divisional Councils. The main missions of the councils as specified in the law<sup>10</sup> relating to their functions include the improvement of the living conditions of its inhabitants and promoting local development. In performing these key roles they have the right to request assistance from the population, civil society organizations, other local and regional authorities, the State and international partners. The powers devolved to councils to carry out their social welfare functions gives them the right to participate in upkeep and management, where necessary, of social advancement and reintegration centers and also in organizing and coordinating relief operations for needy persons. Though given these responsibilities, many councils are constrained by the DM power structure and limited resources (see Section 5.5.2). Some affected municipalities play key roles in DM especially in assisting their local affected populations. The Wum Divisional Council has faced serious challenges with the LND victims, many of whom were resettled in camps within the council's jurisdiction. According to a local

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<sup>9</sup> Certain urban centers, because of their special nature, may be granted a special status, to have City Councils.

<sup>10</sup> Sections 1-8 under general provisions in Law No 2004/018 of July 22, 2004 that lay down rules applicable to councils

administrator, “*the council has been providing the Ukpwa resettlement camp survivors of the Lake Nyos disaster with financial and material assistance, with minimal external help*” (D01CMV)

#### 5.4.2 NON-GOVERNMENT SECTOR

Civil society actors including volunteers, community-based organizations, the scientific community and the private sector, are vital stakeholders in supporting the implementation of DRR at all levels (WCDR, 2005). The government recognizes that CP is a shared responsibility between the various government departments; the local governments or municipalities; the media; the general population; NGOs and humanitarian organizations that complement government action in vulnerable communities. However, how this responsibility is shared, and the level and/or degree of linkages and interaction between these different agencies is not mentioned in government policy. Government policy also requests civilians and citizens including parliamentarians, mayors, traditional chiefs and civil society leaders to support the action for CP in all its dimensions (MTAD/DCP 2005). But how the government intends to facilitate this process is not also mentioned in government legislation. Empirical information revealed later in this Chapter shows that the DM process is politicised with huge implications for disaster victims and also that some mayors take personal initiatives to assist disaster victims with limited assistance from the government (see interview D01CMV in previous Section). The different non-government bodies and their role in DM are further explored.

##### **National NGOs and Development Agencies**

Not all the National NGOs and development agencies involved in DM in Cameroon are recognized in government policy or documents as major players in the DM field of the country. However, these NGOs have a small resource base to perform their routine functions in post-disaster relief and humanitarian assistance.

Although only the CRC is recognized within the operational structure in DM (see Appendix 12), other national development agencies such as Plan International and Helvetas have been providing humanitarian assistance especially to disaster victims in different parts of the country. The Red Cross played a significant role in assisting victims of the August 2000 floods in Douala and the floods and landslides that hit Magha in August 2003, both of which resulted in loss of property, life and displacement of hundreds of people (IFRC, 2001b; Par Bleu, 2004). Both Helvetas and Plan International have been

involved in helping the displaced victims of the LND presently residing in resettlement camps.

### **Local NGOs**

Local<sup>11</sup> NGOs are also important players in the DM field in Cameroon. Local NGOs like the Movement for Democracy, Development and Transparency (MDDT), Research and Development Association (RDA) and the Global Centre for Compliance, Hazard and Disaster Management (GLOCECOHADIM) are engaged in lobbying, advocacy and disaster mitigation actions. Mrs. Tadzong Esther Mofor founder of GLOCECOHADIM was the Laureate of the 2003 UN Sasakawa Award for disaster reduction. Apart from providing support to victims of technological accidents in the country like the NSAM petroleum fire disaster in Yaounde, her NGO has also provided disaster reduction services and support to local communities in the North-West Province of Cameroon.

### **Research**

The research community has not been indifferent to the risk and vulnerability situation of the country to natural hazards and has been engaged in research, which has led to the publication of many articles. Some include Dumort (1968); Hedberg (1968) Nni (1984); Freeth and Kay (1987); Kling (1987); Sigurdsson (1987); Zogning (1988); Lambi (1989, 1991); Fairhead and Green, (1989); Kusakabe (1989); Sigvaldason (1989); Freeth et al. (1990); Binks and Fairhead (1992); Neba, (1999); Coulon et al. (1996); Deruelle et al. (2000); Suh et al. (2003); Ayonghe et al. (1999, 2004); Zogning et al. (2007). The majority of these publications are in the physical and natural sciences, dominated by extensive publication on the technical aspects of landslides, volcanic eruptions and the physical state and chemistry of LNM. Most of the research publications have been produced by academics and scientists in the NIGMR, which is under the Ministry of Scientific and Technical Research. Their findings provide policy makers with key information that is supposed to guide decision making in DRR. While considerable scientific academic work has been done on natural disasters, social and anthropological research is still lagging behind, with very sparse information on these aspects in relation to natural hazards in the country.

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<sup>11</sup> The local NGOs are formed by Cameroonians and mostly involved in community development programs.

## **Social Groups**

Many civil society groupings have been formed by members of local communities that have been affected by disasters. In the North West Province, the Mr. Bamenda Organisation (MBO) and the Buabua-Kimbi Lake Nyos Cultural and Development Association (BUKILSDA) were formed to highlight the plight of the LND victims. The MBO have been working with BUKILSDA in recent years to help articulate the problems of the LND victims to the government and international community. From March to August, 2007, these social groups, together with local NGOs like MDDT and RDA, embarked on a crusade to collect 5,000 signatures to be used to petition the government over the neglect of the Lake Nyos (LN) survivors. They also took an unprecedented action to lobby parliamentarians to reject the 2008 budget if some allocation was not made for investments in the LN resettlement camps. They also urged the mayors of Boyo and Menchum division where the resettlement camps are located to devote part of their budgets to helping disaster victims and other development projects in the resettlement camps. These actions are meant to continuously highlight the plight of disaster victims and to force the government to implement decisions taken to assist victims, which are not often respected. Interviews with some members of affected populations suggest that the social groups understand the problems of the affected populations more than anyone else, and can play a very key role in the DM process to properly articulate the problems of the victims and suggest priority areas for assistance. Community experiences from hazard prone areas around the world have demonstrated that community-based organisations are key actors in disaster reduction. Their efforts have improved development outcomes and increased the capacities of high-risk communities to cope with disasters (UN-ISDR, 2007).

### **5.4.3 PARTNERSHIPS**

Ratification of multi-lateral agreements means commitment on the part of the Cameroon government to undertake DM projects. The government can also benefit from financial and technical resource assistance from international agencies and other countries.

## **International Development Organisations**

The key International Development Organisations (IDOs) involved in DM in Cameroon are UNDP, UNICEF, and WHO. The United Nations Development Program (UNDP) plays a crucial role in influencing DM in the country through education, awareness, training and provision of technical expertise through various ways. In its website, the UNDP has published a document on the State of CP in Cameroon that is updated regularly. For the

years 1997-2002, the UNDP embarked on a project in Cameron on 'Natural Disaster Management and Prevention' in partnership with other agencies. The main aim of the project was to reinforce the managerial, material and infrastructure capacities of the Government for the management and prevention of catastrophes. According to UNDP (2003), major achievements include: successful training activities, greater awareness and sensitization of disaster reduction, emergency relief for victims of floods and volcanoes and the elaboration of a UN Inter-agency contingency plan.

Proposed activities for the years 2003-2007 were to organise and coordinate response to emergency situations as indicated in the contingency plan prepared by the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA) experts. This includes a preventive approach oriented towards the reinforcement of national capacities for the prevention of disasters and its integration into development processes. The plan was also to implement a sub-regional dimension of catastrophes and crisis management oriented towards the identification of ways and means to create a cooperation mechanism for Central African countries with the support of UNDP, other UN agencies and development partners. Part of the plan is also to create a fiduciary fund aimed at mobilizing emergency humanitarian intervention funds from various development partners and those of the UN system (UNDP, 2003).

Through its local office in Yaounde, the UNDP regularly liaises with the relevant government departments to organize workshops and seminars on DRR and management in Cameroon. The UNDP organised a series of workshops that laid the foundation for the creation of a National Observatory for Disaster Risk Prevention in the DCP in 2003. In September 2005 a team from the United Nations Environment Program/Office for the coordination of Humanitarian Affairs (UNEP/OCHA) together with local Cameroon scientists visited Lake Nyos to assess the natural dam and potential flood hazard at the lake (Kling et al; 2006). Although a complete assessment of the success of this program is yet to be made, there is no doubt that the UNDP is a major player in the DM landscape of Cameroon with a central role that involves the government and other international development agencies.

### **International Organization of Civil Protection**

Government policy documents mention that the government has an excellent relationship with the International Organisation of Civil Protection (IOCP). Under the auspices of the IOCP, the government ratified the convention on the subject of assistance and CP matters in Mali in 2002. Cameroon regularly joins the other member states of the IOCP in the

annual celebration of the International day of CP. The IOCP has given technical support to Cameroon through the realization of the National Program for the Prevention and Management of Risks in Douala in 2001 and the general forum on Mount Cameroon in Yaounde in 2001. Two pending projects that require the assistance of the IOCP include the finalization of a document on the creation of a Sub-Regional Centre for CP in Cameroon and development of an Urgent Intervention Plan (Nana, 2005; MTAD/DCP, 2005).

### **Bilateral Cooperation**

The government also engages in international cooperation involving other countries for financial assistance and technical support in risk reduction and DM. Substantial financial, material and technical support was received from the international community during the catastrophic 1986 LND and external support is still being provided by several countries to the ongoing post-disaster technical mitigation activities in the lake. The NMDP that was initiated by the Cameroonian Government have been financially supported by USA (through the Office of Foreign Disaster Assistance), France and Japan. Technical support for this project, through the provision of human resources and scientific materials, has also come from Germany, France, Japan and Belgium (Kling et al., 2006).

Government policy elaborates on the relationship or partnership that Cameroon has with France on the subject of CP. France, through her cultural action and cooperation service has signed a convention with the Cameroonian Government in several sectors for the provision of material assistance in CP worth 1.5 billion CFA francs. The main objectives fall within the areas of reinforcing CP, better enhancing the prevention of natural hazards and facilitating the management of disasters or crises (MTAD/DCP, 2005).

## **5.5 ADMINISTRATIVE FRAMEWORK AND POWER STRUCTURE**

### **5.5.1 ADMINISTRATIVE STRUCTURE**

The administrative framework of DM in Cameroon is interwoven with the governance structure of the country. It can be grouped into three levels: the national, provincial/regional and local levels. The three levels have institutions that function under the auspices of MTAD to coordinate DM activities at the various levels. At the national level, there is the DCP in MTAD. MTAD is represented at the regional level by ten provinces<sup>12</sup> governed by Governors<sup>13</sup>. At the local level, each province is divided into

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<sup>12</sup> The ten Provinces of Cameron are Centre, South, Littoral, North-West, South-West, West, Adamaua, North, Far-North and East Provinces.

divisions headed by Senior Divisional Officers<sup>14</sup> (SDOs) and the divisions are further divided into sub-divisions. Each sub-division is divided into districts placed under the authority of a District Head. The basic administrative units (subdivisions and districts) have Local Government Councils<sup>15</sup>, which also play a crucial role in DM as mentioned earlier. Altogether, MTAD is represented by 58 divisions and a network of 385 administrative structures responsible especially for implementing disaster emergency response and relief operations in the country.

One of the constraints or limitations identified is the absence of a separate coordination body or organisational framework that provides the administrative structure for a natural hazard mitigation policy. This means that DM decisions, especially during the crises phases immediately following disasters are made by presidential/ministerial/provincial decrees causing agencies to offer duplicate services. This was the case with the management of the LNM gas disasters explained in the next Chapter. The absence of a coordinating body also implies that there is no designated agency to guide and coordinate activities, or monitor the quality of post disaster services in the short and long term. This contributed to the dire socio-economic problems faced by the LND survivors examined in Chapter Six.

### 5.5.2 POWER STRUCTURE

The administration of DM in Cameroon involves a network of different administrative and institutional structures following a hierarchical top-down power structure. This framework is similar to the management of other state affairs and the intention is to decentralise its management in accordance with Article 1 (2) of the Constitution, which states that the Republic of Cameroon shall be a decentralized unitary State. The law<sup>16</sup> on decentralization<sup>17</sup> and deconcentration<sup>18</sup> of powers is applied under MTAD that is responsible for managing and coordination DM activities in Cameroon.

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<sup>13</sup> Each province is placed under the authority of a governor who resides in the headquarters of the province. He represents the Head of State in the province and is the custodian of State authority therein. He is the representative of both the Government and each minister. In this capacity, therefore, he represents the State in all civil and legal matters. The Governor is responsible for the enforcement of laws and ensures law and order by applying the laws and regulations in force

<sup>14</sup> The division is managed by a senior divisional officer placed under the direct hierarchical authority of the governor of the province. He is custodian of State authority within his administrative unit and represents the government and each minister. He is responsible for ensuring that the laws and regulations are enforced and sees to it that all government initiatives aimed at fostering development in the division are implemented.

<sup>15</sup> Cameroon currently has a total of 339 councils of all types, including the two city councils (communautés urbaines) of the two main cities Douala and Yaoundé.

<sup>16</sup> Law n° 2004/017 of 22 July 2004 on the orientation of decentralization

<sup>17</sup> Various means of more widely distributing decision-making to bring it closer to the point of service or action or transfer of power and authority from the central government to the local levels, e.g. Regional and local councils

Government policy and administrative structure for DM represents a process where power is disseminated from a central administration to a network of hierarchical structures passing down through provincial governors to local authorities. The legal framework is explicit about the power structures regarding policy in DM at the highest level, with the President of the Republic having the right to make policies relating to DRM. This is closely followed by the National Council for CP that can also define policies which are intended for endorsement by the president, in most cases through a presidential decree. The MTAD through its DCP is responsible for implementing the policies. This is all over the country through the ten provincial governors offices. The provincial governors are the main administrative heads of their provinces. Next in line from the provinces are the administrators of the divisions and sub-divisions within the provinces. At the lowest level are the government delegates and mayors of councils within the divisions. This structure implies that key DM decisions or policies can be taken at the higher levels and enforced at the lower levels progressively. However, during emergency situations, a crisis committee can be initiated at the divisional and provincial level to handle the situation pending further instructions from above. As will be shown in later sections of this Chapter (See interview *D20VPR* in section 5.6.4), the ability to take DM initiatives at the local levels with limited resources (financial and material) has a huge impact on disaster victims. This is more serious in situations where they have to wait for a very long time for resources to come from the provincial and national levels.

### 5.5.3 THE MAIN ACTORS IN DISASTER MANAGEMENT

The main players in the DM field in Cameroon are civil servants and politicians; most of whom are local government administrators trained at Cameroon's National School of Administration and Magistracy with the French acronym "Ecole National D'administration et Magistracy" (ENAM) in Yaounde. This school trains most of Cameroon's administrators at the divisional, provincial and national levels who amongst other administrative functions also act as disaster managers. These administrators, who are called Governors, Senior Divisional Officers (SDOs) and Divisional Officers (DO), govern the provinces, divisions and sub-divisions respectively. At the tail of this structure are Government Delegates (GD) and Mayors in the councils. This implies that there are at least 454 key government personalities concerned with DM in the whole country.

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<sup>18</sup> Transfer of central administration powers to its representatives in the different local areas. Delegation of powers by the central authority to the local authority (delegation of power is by the president of the Republic to Governors and Senior Divisional Officers via Ministers).

It is worth noting that the Ministers, Governors, SDOs, DOs and GD are all civil servants appointed by a presidential decree and they function as government administrators in their areas of jurisdiction with DM being one of the issues they have to tackle. Mayors are democratically elected. During the fieldwork, the researcher noted that the appointed officials were very protective of the government when discussing DM issues while the elected mayors seemed to give a more candid and frank perception of DM in the country. Interviews with disaster survivors, as revealed later, seem to suggest that government administrators politicise DM especially during election campaigns. Squabbles between opposition parties and the government have arisen in recent years about the role of GDs in opposition controlled councils as their functions seem to be complementary with that of the mayors. How these disaster managers obtain their power certainly impacts on DM and other activities of the councils as discovered during fieldwork in those areas.

Apart from the government trained and appointed administrators, the other important group of persons whose impact in DM is also significant are academics, researchers and scientists. The academics work mainly in the Universities and some serve as advisers to some ministers and directors on DM issues. Researchers in research institutes within the Ministry of Scientific and Technical Research are also instrumental in influencing the direction of DM activities in Cameroon. This is very true of the NIGMR, which is the leading institute concerned with research on natural hazards in the country. Many of the scientists in this institute have been involved in technical research on the LNM gas disasters and also in international scientific teams monitoring the gas in both lakes, as discussed in the next Chapter. Their advice to senior government officials has had a serious impact on the overall technical DM approach that the government has been adopting for the management of the LNM gas disasters.

## **5.6 CRITICAL ANALYSIS**

Empirical research through interviews was conducted with civil servants with DM responsibilities, scientists and academics researching on natural disaster risks who influence government policies directly or indirectly and politicians from opposition parties who also have DM responsibilities. They are hereafter referred to as “Disaster Managers” though they are a mixed bunch with varying levels of DM activism. These disaster managers were interviewed to get their perspectives on different issues concerning natural hazards/disasters and DM in the country.

### 5.6.1 AWARENESS OF GOVERNMENT LAWS AND REGULATIONS ON DISASTER MANAGEMENT

Most disaster managers interviewed are aware of the existence of government laws or regulations relating to DM in the country (88 percent) though very few possess in-depth knowledge of the content of the laws or regulations and how they should be enforced. Most have only superficial knowledge of the regulations and expressed lack of more detailed information regarding the application and enforcement of the laws even in their own sectors. Many responses on the subject were limited to statements liked:

*“Yes I know that the government has policies relating to hazard management in Cameroon”* (D01LDM) or *“I know Legislation exist about hazards”* (D02LDM).

When probed further, many could not give any further details of the policies or the relevant aspects to which the laws refer. The few who gave more information simply said the legislation gives guidance to DM or is a document that seeks to guide DM in the country.

Though five editions of the report on the state of CP in Cameroon have been produced by the DCP between 2002 and 2008 and aimed to regularly update and inform disaster managers and the society on the state of CP in the country, empirical research indicates that many Disaster Managers still do not know of their existence. Only 23 percent of those interviewed know of this publication and are all working in government ministries in Yaounde. The disaster managers within the provinces and divisions do not know of this document. Research results also show that the few who knew of this document do not have a good knowledge of its purpose nor the contents, since a majority lack copies of the documents that are supposed to be given free of charge to all the ministries involved in DM. Further interviews with disaster managers at the local levels confirm that most lack DM reference materials. When involved in these activities, these managers take and follow instructions and directions from above without any guidelines on which to function or base their activities. This certainly has implications for the effectiveness of DM activities since they do not possess any working documents or have guidelines on which to operate. Part of the reason is that most of these disaster managers are government administrators whose responsibilities are very wide ranging and not restricted to DM alone. Secondly many do not place DM as a priority in their numerous administrative functions.

### 5.6.2 ASSESSMENT OF CAMEROON’S HAZARD MITIGATION PROGRAM

Since DM is just one of the many issues that the government administrators are involved in, their perspective on the issue was sought during the research process. The respondents used words like poor, fair and good to express their opinion on the success of DM in the

country. Most of the disaster managers attached to government ministries stated that the program is a success, while a majority of the others rated the program between fair-poor. However, some (35 percent) said the program is improving and needs more financial, human and material resources with even more government commitment for further improvements.

Those who presented a more objective view thought the program is not working well. This set of disaster managers who do not have very strong ties with the government administration and are mainly academics and mayors of opposition-controlled councils, attributed the lack of implementation of government policies on DM as major constraints in the process. The poor enforcement of legislation on DM, shortage of skilled and trained personnel in DM and the shortage of adequate financial and material resources were also mentioned as some key constraints on the effective functioning of DM in the country. One respondent said:

*“One problem is that many people given the responsibility to manage these programs are not professionals and simply do what they are told by their superiors. Since these people cannot take initiative, their job cannot be done properly. In many instances, financial and material resources disbursed to assist victims are not always sufficient and it is very difficult to communicate such concerns to higher authorities” (D04AHM).*

Another interviewee gave the example of landslide-prone areas in the country where people were and are still living on the slopes in risky areas without land and building permits, and nothing is being done to protect them or reduce the risk. This respondent (D20AHM) said:

*“The Government is more reactive than proactive to mitigate the risk of life lost and damage to property in these areas and only waits for a disaster to happen before they rush in to assist”*

Other managers also confirmed that the entire DM process in the country is more reactive than proactive and believe this is one area that warrants urgent attention.

### 5.6.3 CAMEROON’S NATURAL HAZARD RISK ASSESSMENT

Most disaster managers rate the risk to natural hazard in Cameroon as moderate and high, with 65 percent having the belief that the risk is high. During the interview process, respondents were told to indicate from a scale of low, moderate, high and very high where they would place the country’s risk to natural hazards. It was noticed that the basis of their assessment is informed mostly by their knowledge of the geology of Cameroon and recent geophysical, geological and geomorphologically induced hazards that have affected the country. While most scientists used their technical knowledge (on the geology and tectonic

setting of Cameroon) to support their reasoning, the politicians and administrators mostly used examples of past and frequent occurrences of hazards such as landslides, the toxic gas emissions from crater lakes and volcanic eruptions as their main argument. Many responses were similar to this one:

*“..... As a geologist yourself you know why the risk is high. The frequent volcanic eruptions, the gas explosions form the lakes and the frequent landslides show that this country is at great risk to hazards....”*  
(D06HRA)

Disaster manager's perceptions of the level of natural hazard risk in the country are significant in the research because it can be expected to influence their level of disaster preparedness and contingency planning for future hazards. This is examined in the next Section.

#### 5.6.4 CAMEROON'S VULNERABILITY PREPAREDNESS AND RESILIENCE

Many disaster managers think the country is making enough progress in tackling the risk posed by gas emissions from crater lakes and volcanic eruption though the country is not yet adequately prepared to tackle the high risk of natural hazards as a whole. The researcher noted that respondents' attitudes and responses to questions on this issue varied depending on their portfolios, positions, responsibilities and the sectors they worked in. Most disaster managers within the government sector were reluctant to engage in discussions on this issue and the few did seemed to be protective of government actions on preventive measures to reduce the impact of natural hazards in the country, though no clear evidence was advanced for this.

Most disaster managers feel that Cameroon is well prepared to tackle the physical or technical risks posed by some crater lakes in the country. A majority referred to the NMDP as a major success in mitigating the risk of poisonous gases in both lakes (see Section 6.4.3). They also mentioned that a risk assessment for the gas contents of the many other crater lakes on the CVL will be carried out though no detail on this was provided (see Page 135 in Section 6.3.1). Others said the government is also taking measures to monitor the volcanic activity of Mt Cameroon by providing more scientific equipments such as seismographs in the Geology Research Institute in the South West Province at the foot of Mount Cameroon. One response which mentions these issues says:

*“I think the country is making progress towards achieving a higher level of vulnerability preparedness. The de-gassing project in Lake Nyos will soon be over and the area will be safe. We have plans to de-gas other lakes in the country, which are also dangerous. The government is also spending much money to buy scientific equipments for use in monitoring Mt. Cameroon, which as you know is very active”* (D07VPR).

Similar management strategies for natural hazards, technological and human-induced hazards within the policy of DCP are another major reason for the continuous problems posed by these hazards to the country. Some key players in DM feel that more human, financial and material attention should be deployed for proactive measures in natural hazard mitigation because, though not as frequent as other catastrophes like road accidents, their impact often cause greater death tolls and damage to property. Inadequate financial resources and insufficient scientific instruments and other materials to monitor hazards all over the country is another main constraint to the process that some respondents highlighted.

Another limitation to natural hazard preparedness that some influential personalities in DM pointed out was the non-existence of a Natural Disaster Management Plan for the country. This plan they said would prioritise hazards within the different sectors of the country and outline a plan of action to deal with them. Without this plan, there is no clear and consistent pattern or method in pre-hazard/disaster planning, and government action remains limited to post-disaster relief and rehabilitation efforts, which are often fraught with confusion and corruption. A senior government official responded that:

*“-----I think the country is well prepared to tackle other hazards like road and fire accidents than natural hazards. This is because CP in Cameroon does not have very detailed plans for natural hazard mitigation. Part of the reason is that it is very difficult and costly to do natural hazards assessment. It is even more difficult to prevent them. However, the National Institute of Geological and Mining Research will soon provide a more comprehensive plan for natural hazard mitigation in the country soon” (D01VPR).*

On an arbitrary scale of vulnerability preparedness discussed during interview processes that ranges across low, moderate, high and very high, many disaster managers without government administrative functions classified disasters or vulnerability preparedness in the country as low while those who hold government positions at the local, provincial and national levels graded the preparedness level as high. However, irrespective of the sector, most think that continuous progress is being made to improve on the government's monitoring and mitigation of the various risks facing the country including the technological, human-induced and natural hazards.

Though the disaster managers are keen to reveal efforts being made in reducing the gas risk at LNM, some acknowledge that many problems exist within the administrative process that hinder decision making and application of preventive disaster measures. Though denied by the government administrators who double as disaster managers, other key stakeholders in DM think that the complex administrative and power structure in the

country is partly to blame for the ineffective and slow implementation of DM issues. A local disaster manager said:

*“This country cannot easily resolve problems caused by natural hazards because the DM process is not clear. -----the process of obtaining financial and material assistance is not clear. Many people and committees are involved and it is difficult to know who to contact. The result is that most of the money you hear over the radio that has been given to help victims are embezzled by those given the responsibility to manage disasters” (D20VPR).*

Some argue that the civil administrators who are empowered with taking key DM decisions at all levels do not have DM knowledge and, in many cases, use such opportunities for political purposes. These respondents pointed out that in crises situation, the selections of crisis committees by civil administrators is often along party lines rather than prioritising competent human resources knowledgeable enough to handle the situation. Many disaster managers said an administrative process that is highly politicised is an impediment to efficient DM and risk reduction in the country.

#### 5.6.5 THE ADMINISTRATIVE PROCESS

Government DM guidelines to the administrative authorities briefly outline main DM activities to be considered before, during and after a disaster. The three main areas highlighted for the pre-disaster periods are knowledge of the administrative units; understanding of risks; and knowledge of the means of actions. During the disaster phase, the key considerations mentioned include: basic laws on CP and relief plans; information management; the setting up of a Joint Crisis Committee by the governor or SDO; the setting up of a command posts; and implementation of the relief organisation plan. The post-disaster management focuses on two main administrative processes-the Joint Crises Committee evaluation meeting and general report on the management of the disaster (MTAD/DCP, 2008). During a disaster or crisis, key DM actions can be initiated at the national, provincial or local levels depending on the nature and magnitude of the natural hazard in the different administrative units of the country though key decision making follows a top-down hierarchical structure. When a disaster happens, the emergency response plan can be launched at the various levels by the competent authorities. Upon the receipt of reliable information concerning a potential disaster, the competent authorities can take the following measures without any particular order based on the intensity of the disaster:

- Communicate the situation to higher authorities
- Initiate emergency relief and humanitarian activities

- Inform the public through various communication means available
- Alert or warn vulnerable populations if necessary
- Appoint and convene a crisis commission to manage the disaster

If any of the competent regional or local authorities encounters a disaster that is beyond their capacity to handle immediately given the available means and resources at their disposal, they have to inform their immediate bosses including an appraisal of the situation and what steps if any have been taken to contain the situation. Any major decisions that may involve huge relief operations, human, material and financial support will be taken by the higher authorities and then channeled downwards. Lower authorities will be responsible to implement them with supervision from the higher authorities.

This administrative process for the pre-and post disaster phase is barely outlined and does not provide any details of what is actually required or expected during this process. Even the issues mentioned are very vague. For example guideline number B (mastery of risk types) under actions during the Pre-disaster phase just mentions that disaster prone zones should be recognised without showing those zones. The vagueness of this document complements responses by some disaster managers that the policy is not very explicit and needs to be simplified and top priority areas clarified. A scientist responded that:

*“I think Cameroon’s vulnerability preparedness will improve with time. More effort is being put to reduce vulnerability to hazards unlike before. Within the geology community, a lot is being done to delineate and map risk zones that will help the government to set priority areas for natural disaster mitigation and hopefully a better policy” (D06VPR).*

The administrative process is also very complicated with powers to perform similar functions given to different administrative authorities. This often lead to duplication of functions and confusion, constraining the management of relief and rescue operations as shown in the case of the management of the LNM disasters examined in the next Chapter.

## 5.7 GENERAL GOVERNMENT STRATEGY

In a document on the prevention of risks and DM in Cameroon presented at the World WCDR in Kobe Japan in 2005, the government outlined five main complementary strategies to tackle disasters and risk. These strategies, divided into the periods before, during and after hazards or disasters are that:

- During the periods before a hazard or disaster; to “put in place a NRO”; to organise and establish a contingency plan designed to obtain, analyse and disperse information on the major risks with the aim of protecting the populations and minimising any disaster impacts on their lives and property.

- During a crisis, to “develop an emergency intervention plan” aimed at helping the affected populations and to monitor the disaster and assist victims.
- After a disaster, to “inform the affected population and public about the risky zones and to produce a map of the various risks”; to guide against subsequent dangers and reinforce the preventive action of citizens. Rehabilitation measures are also put into action.
- To create a national humanitarian fund for urgent intervention aimed at providing initial help in case of a disaster
- The government and the UNDP aim to put in place an urgent operational plan and to organise a sub-regional conference on DM and prevention within the central African sub region (MTAD/DCP, 2005).

The report also states that the government is taking measures to sensitize, inform and educate the population progressively on the basic regulations of CP, using a network of communication organs through the various media in the country. This campaign is usually undertaken during the World Day of CP on the 1<sup>st</sup> of March yearly and the International Day for the Prevention of Catastrophes on the 2<sup>nd</sup> Wednesday of October. However, the government acknowledges difficulties in engaging in these activities due to shortage of financial resources, the lack of a culture of prevention in the populations and insufficient interest on CP by the private sector.

The limited influence that natural hazards seem to exert on shaping policies and development decisions is a major constraint to achieving sustainable development. Left unchecked, Cameroon will witness increases in socio-economic loss from natural hazards as population continue to grow in hazard risk zones in search for agrarian livelihoods. It should be noted that though government policy and a plan of action exists, these are not very explicit on relevant aspects of DM in the country. A huge gap still exists in translating these policies into action. Many disaster managers believe this gap is caused by the lack of will on the part of the government to invest more on proactive risk reduction measures, the lack of adequate funds for DRR and DRM, and a complicated administrative DM process that is closely tied-up with other administrative processes and that is often politicized.

## 5.8 SUMMARY

The DM system of any country or organisation is the basis upon which its activities can be assessed through DM policies and plans are not often put into practice as this case study shows. This Chapter has examined the legislative, institutional, administrative and power structure of DM in Cameroon. It contributes to answering question one and also informs

the subsequent Chapters whose enquiries have implications for the DM process in the country. It has been shown that DM in Cameroon is under the auspices of the state, which has the responsibility of CP as enshrined in the constitution.

The DCP in MTAD is the nodal agency of DM in Cameroon. It has three basic functions of coordinating all the other organs and bodies involved in CP, facilitating their activities and assist in their operations. At the national level, together with the DCP, other organs that play a central role in CP in the country are the NRO and the NCDC, which are under the auspices of the presidency of the republic. The other principal emergency and DM intervention agencies include other government ministries, research institutions, NGOs and international organizations, which work in collaboration with the DCP (See figure 5.1).

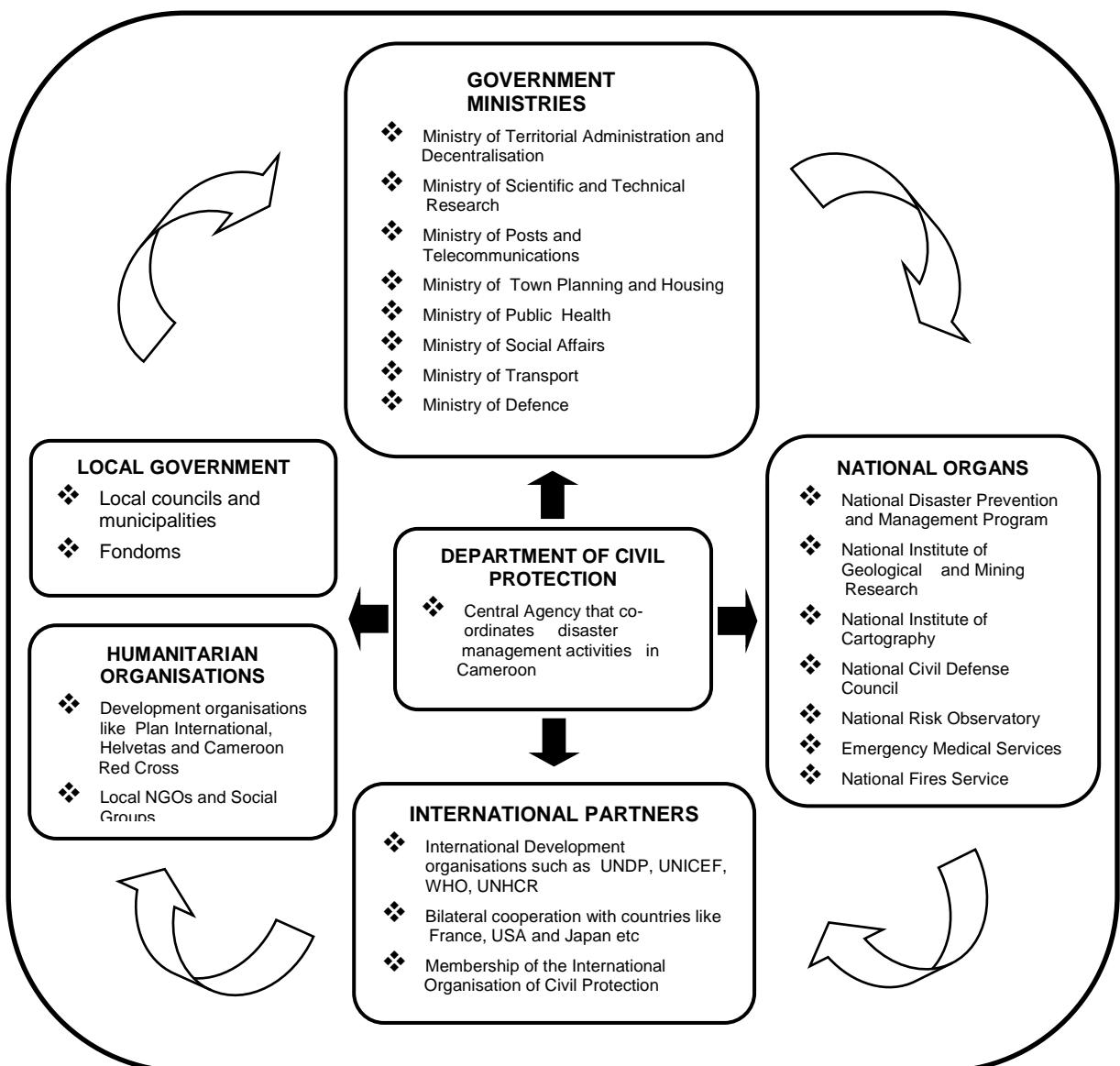


Figure 5.1: Summary of main institutions involved in DM in Cameroon. *Source: Author*

Some limitations exist in government policy on DM. No clear idea on the DM process that involves the various institutions all over the country and how the legislation should be enforced is mentioned in government policy. Not all important stakeholders in DM are recognised in government policy. Local NGOs and the private sector are yet to be sufficiently recognised as important in the DM process. There are no comprehensive and explicit laws that show how the DM policy is applicable to institutions and the managerial process for the entire territory. There are no comprehensive strategies and programs and no coherent and coordinated needs analyses have been undertaken. Little or no attention is paid to potential hazards, particularly those faced by vulnerable communities, and what can be done to mitigate their impact. From the author's experience of interacting with disaster victims, managers and others, it is apparent that the entire process is not understood by all involved and has not been properly implemented in past natural disasters involving displaced and resettled victims, as examined in the next Chapter.

This empirical research has also revealed that disaster managers are not generally conversant with the laws and regulations on DM and many more are not regularly updated on the contemporary issues of CP since many do not have access to the annual publication of the state of CP in the country. While most key government personal involved in DM think the process is successful, their peers hold a contrary view. The general opinion is that the country has a high risk from natural hazards. The general perception is that Cameroon's preparedness to tackle these risks is still very low. However there is the general agreement that progress is being made in the area of DRR and DM.

Although the DM framework in the country is still far from being robust, it provides the basic foundation for the process. The basic guidelines for the implementation of policies, strategies and programs for the three phases of DRM exist though their implementation is hampered by many factors discussed previously. A major challenge still lies in shifting from emergency response to wider risk reduction among key players and stakeholders, and to ensure that risk reduction remains a national and local priority. How this DM process has impacted on the management of the LNM Disasters is examined in the next Chapter.

## **CHAPTER SIX**

### **MANAGEMENT OF THE NYOS AND MONOUM DISASTERS**

#### **6.1 INTRODUCTION**

This Chapter examines the management of the LNM disasters. One of the objectives of this research is to investigate the process of risk management and disaster preparedness in the Nyos and Monoum areas following the disasters of 1986 and 1984. To achieve this, it is necessary to state the context of DM and DRR by looking back at how those disasters were and are still being managed. The management of the crises caused by the LND has been examined in more detail because it generated enormous interest and attention worldwide due to the death toll, the thousands of people affected and the huge relief and rescue operations that were involved. Little attention was given to the LMD when it occurred, probably because the risk of the lake to a larger population was not known then. The threat that Lake Monoum posed to the people of Njindoum only came to light after the LND two years later, especially when the causes of death in both cases was established to be similar.

The main purpose of this Chapter is to review the management of both disasters and especially how the DM process is impacting on the present risk and vulnerability in the area and the affected populations. It may not be possible to provide a very comprehensive account of the disasters because these happened more than two-decades ago.

Contemporary DM issues are also examined in the long term management context of those disasters. The perspectives of the survivors, affected populations and key stakeholders in the DM process provide rich empirical information, which can be used to understand how the disasters are being managed. Therefore, the main aspects of the LNM DM, including the main actors, the managerial and the procedural or government machinery employed are examined over short and long term time scales. The case studies aim to provide an insight to DM in Cameroon, and identify lessons, which can be learnt to improve on the current situation.

#### **6.2 IMMEDIATE POST DISASTER MANAGEMENT**

Since the LND happened more than two decades ago, it is difficult to get detailed and complete information about the various processes, actions and stakeholders that were involved in the event. This is partly because no detailed accounts and records were kept of the DM process by those who were involved. Few journal articles or publications exist on the management of that disaster and most of the records that were kept in government departments cannot be found and/or are missing. Part of the reason may be the lack of a

culture of record keeping. However, it is also possible that many of those involved in DM removed or destroyed the records for fear of being implicated in allegations of misappropriation of funds and other materials destined for the victims. During the period following the LND, the Cameroon Tribune (the state owned press) produced detailed coverage of the disaster with valuable information on some crucial aspects of the DM process. This, together with other accounts of the immediate aftermath of the disaster in foreign press reports, articles and government commissioned reports, provides a reasonable basis to reconstruct what transpired.

#### 6.2.1. ON THE NIGHT OF THE APOCALYPSE

The LND occurred at 9 p.m on Thursday August 21<sup>st</sup> 1986, and the first news about the disaster to the outside world was 15 hours later. According to the Cameroon Tribune of Wednesday August 27<sup>th</sup> 1986 (page 4):

*“Struggling survivors got to Wum, headquarters of the affected Menchum Division only on Friday August 22<sup>nd</sup> 1986 at about noon to report the tragedy.”*

The delay in the news of the disaster was due to poor communication between Nyos village and Wum, which is the closest town. There is no telephone, radio or TV network in Nyos and the road that links Nyos and Wum is impassable except by 4-wheel drive vehicles. Therefore, bearers of the tragic news had to trek for 45 km to get to Wum, the biggest town in the Division. The disaster was highly unpredictable, sudden and unexpected to everyone in the country, including scientists, even though two years earlier a similar event at LM had killed 37 people in Njindoum village. Smolowe and Philips (1986) describe the event:

*“The only warning was a nocturnal rumble that resembled distant thunder. Then a silent plume of colorless gas shot up from the turbulent depths of Lake Nyos. Within minutes, the heavy fumes of carbon dioxide burst over the rim and sank into the valley below, enveloping sleepy hamlets in a deadly bubble. Villagers who had already bedded down for the night and others just finishing their evening meal quietly suffocated in their sleep”.*

Reports from the international conference on the LND, held in Yaounde (Cameroon) from 16-20<sup>th</sup> March 1987 shows that scientists were divided into two camps on the mechanism of the eruption and the release of the toxic gas. Two hypotheses, vulcanological<sup>19</sup> and

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<sup>19</sup> CO<sub>2</sub> could have burst through the lake as the result of a sudden gas eruption

limnological<sup>20</sup>, were proposed and the latter was widely accepted within the scientific community as the mechanism responsible for the disaster (Sigdalvason, 1989).

The impact of the LND in Cameroon, as reported by the government and many reports of the incident, concentrated mostly on the mortality and death of people and livestock. The effect on the local or national economy has never been highlighted although it is well known that the area affected was the main supplier of beef in North West Province of Cameroon and the death of almost all the cattle in Nyos had a serious effect on the local economy. Many livelihood activities depended on the supply of meat to Bamenda, the capital of North West Province. Even though the impact of individual disasters on the national economy may not be easily quantifiable, they affect the local economy and their cumulative effects on the country's economy can be tremendous. In Cameroon, just as in many developing countries, the economic impact of small-scale disasters on the lives and livelihoods of vulnerable communities, whose economy is largely in the informal or subsistence sectors, is rarely documented. This is an oversight because many of these vulnerable rural communities are the poorest, as is the case in Cameroon where the incidence of poverty in rural communities is 86.5 percent (Amin and Dubois, 2001). The general lack of available information on the economic impact of natural disasters in Africa makes it difficult to get an accurate picture of the damage caused by natural disasters (CRED, 2007).

### **Survivors Experiences about the Disaster's Impact**

Information from interviews reveal that survivors of the LND complain that the death of relatives, and livestock (cattle, goats, fowl etc.), and some skin and respiratory diseases are the direct impacts from the LND. Secondary effects due to the disaster, which many also acknowledged, were their displacement from their ancestral land and relocation in camps, the loss of social networks and loss of economic livelihoods. The relocation of the LND survivors in seven resettlement camps scattered within the disaster area in Menchum Division (Figure 6.1) has disrupted their social networks and community cohesion, traditionally a very important survival strategy, especially in local communities in Cameroon.

The LMD did not result in the movement of very large populations from Njindoum village except for the relocation of a few residents living around the lake. The primary impact was the death of 37 people, while some residents also commented that they were restricted from fishing in the lake and from farming around the immediate vicinity of the

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<sup>20</sup> The limnological hypothesis is based on the fact that CO<sub>2</sub> could have accumulated slowly in the lower part of the lake, only to be released abruptly by the overturning of the bottom waters.

lake. Though this affected a few people in Njindoum village, it wasn't on the scale or scope as that suffered by the LND survivors, who were removed from their villages which were delineated as a disaster zone and restricted from returning.

### **Disaster Manager's Experiences in Disaster Impact**

Interview results show that disaster managers within the government sector and those in the non-government sector have polarised views on the management of the LND. While the former focused on the scientific and technical aspects of the disaster and its management, the latter were more concerned with the social and economic impact of the LND. This is because disaster managers in the non-government sector worked more at the local level and therefore, had a greater understanding of the problems faced by the disaster survivors. Disaster managers at the local levels were keen to express their opinion about the social welfare of the survivors, the tensions with other communities created by the resettlement in camps and the impacts to both the local and regional economy. A local disaster manager said:

*“Initially the government provided assistance to the survivors. But this was not for long. The social and economic situation of the survivors has not been addressed for many years now, leaving them in a very desperate situation...” (D20MNM)*

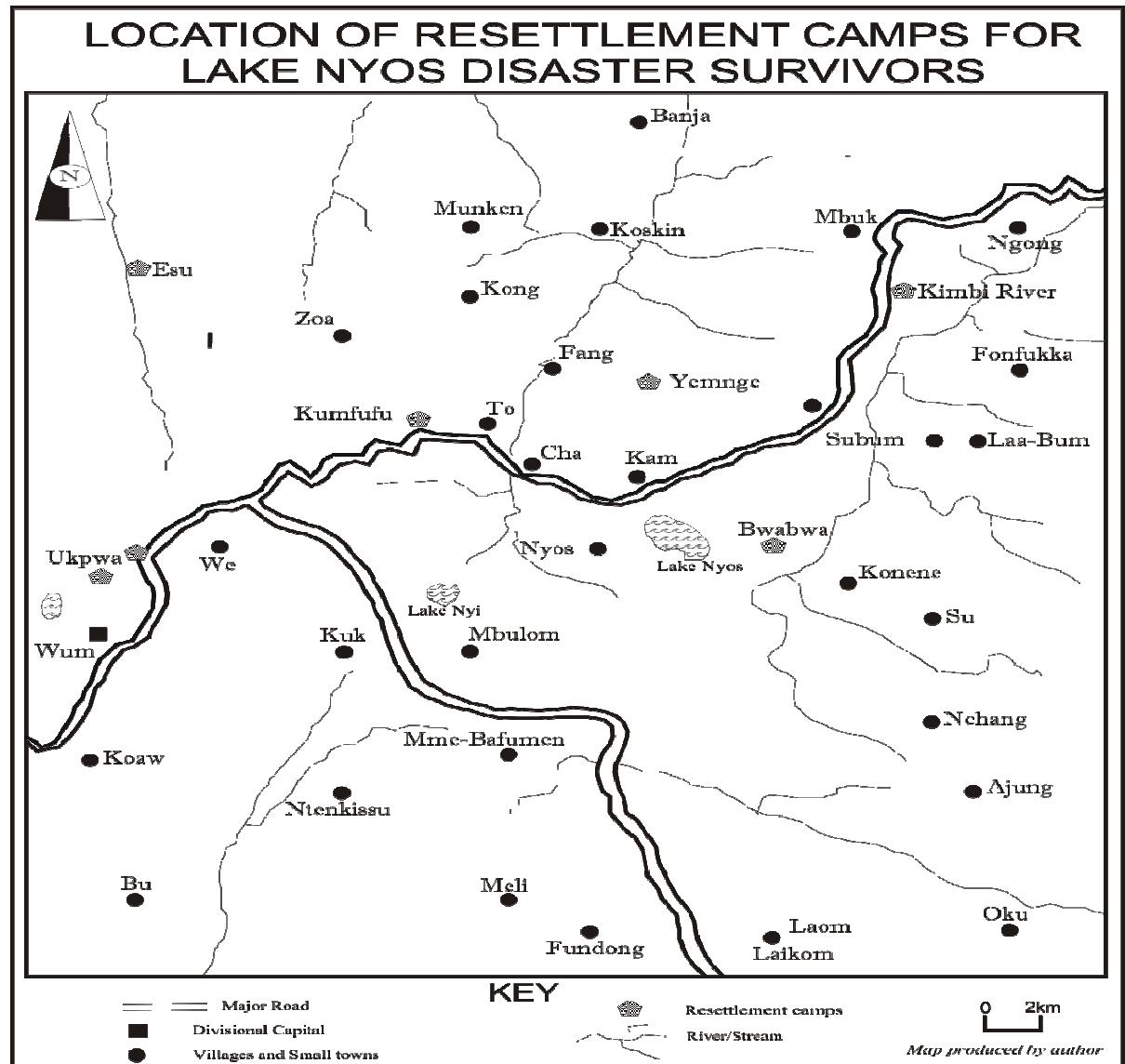


Figure 6.1: Location of the seven resettlement camps for the Lake Nyos disaster survivors.

Source: Author

Other managers expressed similar views that disaster survivors were highly traumatized and have been living in poorer conditions than in their original Nyos settlement. They also mentioned the destruction of many family structures and social ties that existed prior to the disaster. The resettlement of survivors in camps far from their ancestral lands on smaller pieces of land has been creating tensions over farming space with their new hosts and is another main concern voiced by some influential personalities in DM in Cameroon. This is taken up in later Chapters in more detail.

The death of thousands of cattle, goats, sheep and wildlife also impacted the local and regional economy. The death of livestock during the disaster led to an increase in the price of meat and these prices have remained fairly high since the incident. This did not only affect the cattle trade but also many livelihoods that depended directly or indirectly on cattle rearing, thus creating more unemployment and hardship in the region.

## 6.2.2 MANAGEMENT OF RELIEF OPERATIONS

The management of the LND took place at National, Provincial and Divisional Levels. At the national level, the government created committees to manage the disaster; organized an international conference to seek the causes of the disaster and also sent medical experts to the disaster zone. A National Committee for the Reception and Management of Relief Aid (NCRMA), created by a presidential decree, had representatives from the Ministries of Health, Defense, Mines, Energy and Information, and the Cameroon Red Cross (Othman-Chande, 1987). Another decree (ministerial decree No 86/1069 of 27<sup>th</sup> August 1986) created provincial committees for the reception of the disaster aid in Douala and Bamenda, the capitals of the Littoral and North West Provinces respectively without any of the UN agencies locally represented such as UNDP, World Food Program, international or local NGOs (Othman-Chande, 1987). The committee in Douala received international aid coming into the country through Douala Airport while that in Bamenda received local aid coming into the province (Ngwa, 1992). The non-involvement of international relief organisations and NGOs in these committees facilitated corruption by government officials as will be revealed later in this Chapter (see Section 6.2.9). Creating the head-quarters of the NCRMA in the then Ministry of Territorial Administration in Yaounde (the Capital), about 520kms from the disaster zone was also considered another major flaw in the management of relief operations (Othman-Chande, 1987). The long distance, and very poor communication and road infrastructure between the head-quarters of the NCRMA and the disaster area is partly to be blamed for some of the problems experienced by the relief operations (refer to Section 6.2.5).

The government organized an International Conference on LND<sup>21</sup> (held from 16<sup>th</sup>-20<sup>th</sup> March 1987) to seek the cause of the poisonous gas discharge from Lakes Nyos and Monoum (Sigvaldason, 1989). Most of the recommendations from this conference concerning the social welfare of the disaster survivors have not been implemented for more than two decades (see Table 6.2 on Page 126) now, making the survivors very destitute (see Chapter seven). More progress has been made in areas of the conference recommendations relating to physical risk mitigation through gas removal (discussed in Section 6.3.1).

The management of relief operations at the provincial/regional level was done by a committee of senior government officials (Commander of the Gendarmerie Legion; the Provincial Chief of Internal Security; and the Provincial Delegate of Information and Culture) under the auspices of the Governor of the North West Province. The committee

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<sup>21</sup>The International Conference on the Lake Nyos Disaster was jointly sponsored by the then Ministry of Higher Education and Scientific Research and UNESCO

had the responsibility to put together all the local and international food, money, and other material resources for onward distribution to the camps and hospitals in the disaster region (Ngwa, 1992). The exemption of NGOs and members of the civil society from the provincial committee also facilitated embezzlement in the committee due to lack of proper accountability and monitoring of the material and financial aid delivered by third or private parties.

The third committee at the divisional level (established under the authority of the SDO of Menchum), was responsible for the rescue and evacuation operations from the disaster zone; the temporal resettlement of the disaster survivors and also for the reception and delivery of aid to the survivors (Fonte, 1986:4; Nkemngu, 1986:4). The authorities faced enormous challenges to provide the required needs to the disaster victims because as explained later in Section 6.2.4, a lot of unsolicited items were donated to the survivors, which did not meet their immediate needs.

### 6.2.3 RESCUE MISSION

As mentioned in the last paragraph above, the rescue mission from the disaster zone was conducted under the auspices of the SDO of Menchum. This was done through prefectural orders and evacuation operations from the disaster area. A series of radio communiqués from the Governor and SDO of Menchum restricted all movements, including anxious relatives, into the affected area. Logistical problems and uncertainty in the disaster area (fear of the unknown or what had happened) in the immediate post-disaster period, hampered the rescue efforts.

Due to uncertainty in the cause of death during the disaster, many people, including government officials were afraid to enter the disaster zone and rescue survivors for fear that their lives may be at risk. The SDO of Wum traveled to Nyos on August 22<sup>nd</sup> 1986 to assess the situation but was afraid to enter the disaster zone. The Governor of the North West Province also visited the region but ended in Wum and did not proceed to Nyos (The Cameroon Tribune of Wednesday August 27th 1986). This uncertainty is described by Shanklin that:

*“.....they drove to the border of the affected area but stopped when they saw the littered corpses. Was what-ever killed all these people, all these animals, still in the area? Would they die, too, if they went in to investigate?”*(Shanklin, 1988:12)

A Roman Catholic priest (Father Ten Horn), played a very significant role in the rescue operations. He was the first non-native in the area who was bold enough to enter the affected area. He rescued many survivors who had inhaled the gas and were unconscious.

The priest transported several sick survivors to the hospital out of the region in his truck and initiated the burial process (gave orders for the dead to be buried immediately in mass graves) because no government official were there (Shanklin, 1988). This single initiative saved some lives but the overall delay in evacuating the several sick survivors, placed more lives at risk.

When the authorities realized later that the area posed no immediate risks to life, the divisional administration initially used beer trucks within the vicinity of Wum (due to lack of appropriate vehicles to use on the bad road to Nyos) to convey survivors to the hospital and carry the police into the affected zone before they received assistance from the military. This implies that no proper assessment was done in the disaster zone prior to the initiation of rescue operations. Although a huge rescue operation went underway a few days later, if it had started earlier, more lives could have been saved. The army later entered the affected zone and carried out the bulk of the rescue operation. The army had appropriate vehicles for the poor condition of the road, which was a major handicap in the evacuation process (Othman-Chande, 1987). Krajick (2003:2) who visited the area described the road to Nyos as: *“a washed-out dirt track winding through forested hills and passable only in a four-wheel drive vehicle”*. The poor road condition to Wum and the disaster region also prevented top government officials from visiting the disaster survivors. The president (Paul Biya) came to the NWP on the 24<sup>th</sup> of August three days after the incident and stopped in Bamenda. The Cameroon Tribune (Wednesday August 27<sup>th</sup> 1986) reports that:

*“The head of state regretted that he could not personally visit the scene of the calamity during his abrupt visit because of the inaccessibility of the area and promised that steps would be taken to improve the road network.”*

Even during the distribution of aid to the disaster victims in December 1986, members of the National Relief Commission did not go to some resettlement areas due to their inaccessibility and kept the aid at the Divisional Offices in Wum and Nkambe for onwards transmission (Cameroon Tribune of Friday December 5<sup>th</sup> 1986:1). This clearly shows that the road to Nyos was so bad that it prevented key government officials who came to assess the disaster from travelling to the actual disaster site. During the fieldwork for this research, the road was still in poor condition and the researcher could only travel to Nyos by motorbike. The poor roads had been a major development concern in the region. Since the LND, suggestions for the road to be graded (see Table 6.2 and Page 125 in Section 6.2.8) and government promises to grade the road (refer to Section 6.2.6) have not been met close to a quarter century after the disaster occurred.

Due to lack of medical facilities (hospital, health center, medical personnel) in Nyos and environs, the sick (survivors who had inhaled the toxic gas) were transported about 45kms to Wum (divisional head-quarters of Menchum) for treatment. Early reports on the LND also suggest that due to lack of enough medical staff in the Wum government hospital-only two medical doctors at the time (Nkemngu, 1986; Shanklin, 1988), health practitioners were mobilized nationally and internationally to treat the sick survivors. Health practitioners who entered the region two days after the LND (from Yaounde and military doctors from Bafoussam) advised that: all persons moving into the affected areas should wear oxygen masks; non corrosive clothing with long sleeves; and also that those who died should be quickly buried in massive graves to avoid the possible outbreak of an epidemic in the area (Nkemngu, 1986). External medical experts greatly improved the health situation of the survivors. According to Cameroon Tribune (12<sup>th</sup> September, 1986), three weeks after the disaster, only 94 victims were still left in hospital out of the 478 people admitted.

Many problems that hampered the rescue and relief operations following the LND such as the poor road to Nyos, lack of health amenities in the region such as hospitals/health clinics/medical personnel etc (Othman-Chanda, 1987) still persist more than two decades after the tragic incident as would been seen in Section 7.3.1 on Page 162 (also see interview D19NMM on page 135). Integrating natural disaster mitigation with development planning would ameliorate or prevent similar problems in the future as recommended in Chapter 10 (See Section 10.5 and Appendix 14).

#### 6.2.4 FINANCIAL AND MATERIAL ASSISTANCE

Much financial and material assistance was received after the LND. The government's appeal for help in solving the crisis was met with enthusiastic local, national and international response. Private and public companies, corporations, co-operatives, associations and individuals made significant material and cash contributions to the NCRMRA. Some of the material aid received was in excess (22,000 blankets, 1,430 tents, more than 5,000 gas masks, over 1,000,000kg of air-freighted food aid valued at approximately US\$800,000, 5 tons of medicaments and 25 tons of vaccines) and did not meet the immediate needs of the survivors. Reports on the international relief aid also suggest that governments and organisations sent relief supplies without any prior information or coordination and that the relief was not only far in excess of needs but also inappropriate. Among the unsolicited food aid were large qualities of canned sardines, corned beef, beans, instant and packet soup, cakes, war rations and protein biscuits and

11,000 frozen chickens (Cameroon Tribune of Wednesday 12<sup>th</sup> September, 1986; Othman-Chande, 1987). The lack of proper assessment of the needs of the disaster survivors and non-cooperation with donor agencies was responsible for the donation of the unsolicited materials and those that were in excess. This facilitated corruption as some of the goods destined for survivors ended up being sold in the streets and shops around the country (mentioned in Section 6.2.9 as reported in Cameroon Post of Tuesday 30<sup>th</sup> August, 2005). The sources of the major contributions received 18 days after the disaster, including the material and foodstuffs donated are shown in Appendix 13. Overall, even without including the unpublicized contributions, the Cameroon Government received cash donations amounting to more than 1.5 billion FCFA (approximately US\$ 3,000,000) from both local and foreign donors (Cameroon Tribune of Wednesday 12<sup>th</sup> September, 1986).

Though the negative consequences of inappropriate aid have long been recognized, it remains a feature of many recent disaster responses such as a wide range of goods in the tsunami response (Telford et al. 2006); culturally inappropriate hygiene kits in the Pakistan earthquake (Crawford et al., 2006); expired medicines in Yogyakarta (IFRC, 2007) or unneeded high-energy biscuits in Pakistan (Reed et al., 2007). Following the 1997 earthquake in Iran, it was noted that:

*“Most of the foreign help with approximate value of 11 million dollars, even though it was appreciated, was more political than toward the immediate need of the affected people”* (Ghafory-Ashiany, 1999: 17).

Aid is appropriate only if it meets the needs of the affected population. A review of humanitarian action highlights the need for agencies to consult with beneficiaries, and relief and recovery plans should be based on profound knowledge of the context of the community (ALNAP, 2008). Agency performance can only be known if the affected people are satisfied with the assistance provided. Beneficiary surveys are now a feature of humanitarian relief and reconstruction operations with recent ones undertaken to evaluate response to the 2004 tsunami (IOM, 2005; Lindgren et al., 2005; UNORC, 2006). Many agencies have started using complaints and feedback mechanisms as a tool for improving their program quality and ensuring that relief operations and aid are appropriate. MedAir changed its non-food-item package in Sri Lanka after the 2004 tsunami on the basis of beneficiary feedback while in the Yogyakarta earthquake, the mobile phone numbers of senior officials were given to the affected population to as a channel for complaints (Wilson et al., 2007). Though there have been many complaints by survivors of the LND for more than two decades, empirical evidence suggests that no formal means of complaint has been set up by the government or officials managing the disaster. This is not surprising since no contingency planning was done for the long term social management of the LND.

## 6.2.5 MANAGEMENT OF RELIEF AID

Just like the management of many disasters, the LN disaster had shortcomings in the overall management of the relief aid. Initial problems involved the donation of relief materials and foodstuffs by local and international donations were provided spontaneously without any consideration of the short and long term needs of the survivors. Other administrative problems beset the transportation, distribution and preparation of food for survivors. Ngwa (1992) and Othman-Chande (1987) describe problems faced by the management of the Nyos relief operation, which included uncoordinated aid donation and distribution, poor storage and transportation of aid materials, inconsistent local donor supply source and absence of some key relief organizations to coordinate relief operations. The main problems are discussed in Box 6.1 on the next page.

### **Box 6.1: MAJOR PROBLEMS ENCOUNTERED WITH MANAGEMENT OF RELIEF OPERATIONS DURING THE NYOS DISASTER**

- The headquarters of the National Relief Committee was located 500km away in Yaoundé, and the other distribution centers in Douala, Bamenda and Wum were located at considerable distances and travel time through a poor road network to and from the beneficiaries. This created problems with coordination of relief activities, personnel movements and storage especially of perishable items.
- Materials for burying the dead such as spades, gloves, and boots arrived 11 days late, while other utensils in great need for carrying, treating and distributing water, as well as drugs to treat water borne diseases fell short of demand. This highlights the patchy and uncoordinated aspect of aid distribution to the displaced persons.
- There was no permanent field staff from the Ministry of Health, Department of Nutrition and Social Welfare to advice on nutrition in the camps where there was communal food preparation during the first weeks.
- The Catholic Relief Services provided funds through the local Archdioceses, but due to lack of staff, did not follow up with the experience already acquired elsewhere in the field of relieving human suffering through supplies.
- The World Food Program authorized the purchase of assorted foodstuffs from its distant Yaoundé base but lacked personnel to follow up and evaluate for a feedback on the food values derived from each foodstuff sent.
- Save the Children Fund sent assistance mostly to children but did not have any feedback from the field to correct any mistakes for future action.
- The UNHCR with headquarters in the capital Yaoundé, far away from the field had very few field staff to work with the displaced people.
- Problems in the camps included stress problems, which stemmed from poor centrally-placed corn mills for many users, inadequate lighting in the camps, and inadequate access to elementary medical care, overcrowding, and no permanent resident camp coordinator to assist and bring rapid solutions to such stress problems.

*Source: Author*

#### 6.2.6 PROMISES AND PLEDGES TO HELP SURVIVORS

Several promises and pledges were made during speeches delivered by government officials during the crises following the disaster. The SDO of Menchum and Bui, the Governor of the North West Province and the President all made promises to resettle the survivors of the disaster and build the road that goes to Nyos from Wum. Other development projects such as health centers and schools were also promised to the survivors. The Cameroon Tribune (19<sup>th</sup> September, 1986:4) published a letter sent to government officials managing the Nyos disaster in which suggestions are made about the long-term management of the survivors. In the letter, educated people in the Nyos area, who had noticed the unusual behaviour of the lake, but did not inform the authorities are blamed. This is probably because some survivors spoke of complaints by villagers that Lake Nyos had been boiling for five days prior to the disaster (Tanjong, 1986). His suggestions also concern the resettlement site, social amenities for the survivors and a good road to the region. He also stated that these projects should be started immediately whilst there was sufficient money to realise them. The detailed content of the letter is reproduced in Box 6.2 on the next page.

## **Box 6.2: LETTER ON HELPING SURVIVORS SENT TO NYOS DISASTER MANAGEMENT COMMISSION**

Cameroon by this tragedy “the Nyos” has suffered heavy loss of lives. This particular unusual scenario has left an everlasting wound in the minds of people of this area, especially those who must have been a little lucky to escape the catastrophe or the orphans, widows and widowers or those who must have been overseas studying or were in other parts of the country doing business.

I start by blaming educated people of this area who had noticed on several occasions the unusual behaviour of this lake but failed to notify government. I'll like to heartily thank those countries which have acted promptly towards the relief program for the survivors.

For this reason, I am suggesting to the administrators that a suitable site of 15-20 kilometers away from Nyos be chosen and a township, created for resettlement. Simple solid building or say 2-bed rooms could be built for each family. Primary schools could be created including a health centre, security post, a market and water system. The main way from Wum to this town should be macadamized and widened. If not all, a portion of it should be tarred to Lake Nyos and to the created township. The entry point of the town should bear an inscription “THE NYOS” or any such significant name that could remind people of the original village.

Government should accept and promote education of orphans up to any level of education they may aspire to obtain. Other victims after accepting to live in the created townships should have a handsome amount to start life with. We don't need to waste time to know first how much we have in hand before starting the project: we have just to start now. There are already large sums of money from friends to start simple buildings for the needs of homeless. We don't need days to draw the plan of the place or choose the resettlement area.

Survivors of these four villages should be encouraged to live in the resettlement sites. It is going to cost much but government should give its support. It is advisable not to give this job or projects to contractors. As for the road our military services could do the digging. The road could be dug to the township not passing through Nyos. If we treat Nyos this way or better than what I have said, the world shall be pleased with us and shall continue to help the Nyos people.

Before I end, I will ask a few questions to some of the volcanologists who visited the area. Where in the world has a volcanic eruption produced CO<sub>2</sub> or any gas that killed people? (2) If it is CO<sub>2</sub> as French volcanologists say, what does this CO<sub>2</sub> contain as elements that cause burns on the body and even deformation of limbs? (3) After death why do they swell? (4) The Nyos tragedy has puzzled a lot; even ants and flies died. Can we compare the Nyos episode to the “nuclear age”?

*Source: Adapted from The Cameroon Tribune (September 19<sup>th</sup> 1986)*

It is the view of the researcher that if the government had followed the advice in this letter, the major problems of the Nyos survivors (related to their socio-economic condition and the development of the region) could have been greatly reduced. But, as discussed in later Chapters, most of the socio-economic problems faced by the victims shortly after their resettlement in the camps remains two decades later, indicating that the problems were either ignored or the government's priorities were placed elsewhere.

### 6.2.7 THE MEDIA

The LND caught the interest of media all over the world, probably because the release of poisonous gases from crater lakes is such a rare event. During the early days of the disaster, there were many inconsistencies in both the local and international media reports of the incident, especially in the number of people and livestock killed. Though these immediate reports were common, Othman-Chande (1987) claims that other relevant aspects of the disaster relating to the long term management were ignored:

*“What is striking about disaster news forwarded to the world public is that there is invariably no mention that the victims need long term assistance and that international solidarity should be manifested not only in bringing immediate relief, which is essential, but also in bringing about long term rehabilitation to the affected population”* (Othman-Chande, 1987: 98-99).

This comment lends further support to the focus of this research on the long-term management plan for the disaster survivors; especially those resettled in seven camps (see Figure 6.1 and the next Section).

### 6.2.8 RESETTLEMENT OF SURVIVORS

Field reports carried out in March-April 1987, under the auspices of the then Ministry of Higher Education and Scientific Research (MHESR) revealed that approximately 40 percent of survivors had gone to live with relatives in Mmen (Shanklin, 1987) where according to Shanklin (1988) *“they are being accommodated and rehabilitated into the community, although not without strains”*. After the disaster and as early as the morning following the incident, some 1,979 survivors were evacuated and provided temporary accommodation around the area in Wum, Kimbi, NKambe, Kumfutu and Bafmen and later resettled in seven camps (Othman-Chande, 1987; Shanklin, 1988; Ngwa, 1992). Table 6.1 shows the temporary camp sites, their populations and distances from the various distribution centers.

Table 6.1: Distribution of survivor's populations in the various camps

Camp site	Resettled Population	Distance from main town (Wum)	Distance from provincial HQ (Bamenda)	Distance from capital city Yaounde	Distance from port (Douala)	Occupation of camp co-coordinator
Catholic Mission	215	-	80 km	480 km	426 km	Parish priest
WADA	200	7 km	87 km	487 km	433 km	Employee of local parastatal
Esu	128	25 km	105 km	505 km	451 km	Administrator of a rural council
Kumfutu	213	16 km	96 km	496 km	442 km	Chief of Police Post
Kimbi River	1041	51 km	131 km	531 km	477 km	Assistant Administrative officer
Misaje	182	88 km	168 km	568 km	514 km	Local veterinary Officer

*Source: Ngwa (1992)*

Many recommendations were made from the various post-disaster studies sponsored by MHESR from February-April 1986 and the International Conference on LND (Box 6.3). Among were recommendations that: the road to Nyos and the resettlement camps be upgraded; survivors be provided with viable farming areas; survivors should be involved in the management of the decision making process that involved their future and a restricted risk zone be imposed in the area.

It is worth noting that these recommendations include both the social and technical aspects necessary to reduce the impact of the disaster for the survivors. But as will be mentioned later in this thesis, the long term management of the disaster focused mostly on the technical and scientific aspects of gas reduction (see Section 6.3.1). Very little attention was given to the social aspects of the disaster as indicated in the later sections of this Chapter.

Table 6.2: Recommendations on the management of the Lake Nyos Disaster

RECOMMENDATIONS ON THE MANAGEMENT OF THE LAKE NYOS DISASTER	IMPLEMENTATION	ACTION TAKEN
That a zoning map identifying known hazards, viable farming areas and areas of possible resettlement be produced.	Poor	Hazard map produced is not comprehensive
That occupation patterns should be analysed and plans for intensification of agricultural and stock-farming activities be implemented.	Nil	No action
That access roads be constructed that will lead to Nyos and the resettlement camps.	Poor	Contracts awarded but project yet to start
That other dangerous lake in the country be identified and a criteria for selecting lakes for further investigation be put in place.	Nil	No action
That government should produce a long term database for monitoring disasters.	Nil	No action taken
That hazard information be integrated into regional development planning.	Nil	No action taken
That emphasis be placed on local community-level disaster preparedness and planning.	Poor	No concrete actions taken though mentioned
That the relevant information be sent to all social scientists who have worked in the NWP.	Nil	No action
That emergency-preparedness training be initiated for all resident relief and mission personnel, for educational staff and for local community leaders.	Poor	Most training are done at national level without local disaster managers
That a solutions be sought for the farmer-grazer difficulties, which have long preceded the current problem of displaced people.	Partial	Insufficient effort made to resolve problem
That survivors be encouraged to farm to supplement their food and sell some for money.	Poor	Farm to market roads remain very bad
That corn mills be provided for each resettlement center.	Partial	Corn mills were given to survivors but no assistance provided for their repairs
That survivors be participants in the decision-making process concerning their future.	Poor	Survivors are not consulted for DM actions
That traditional authorities be incorporated into any emergency evacuation plans.	Nil	No contingency planning has been done
That a thorough census of survivors be conducted.	Partial	Was done only after the disaster
That farm land and farming tools be allocated to survivors.	Partial	Tools not given regularly and only few people get them.

Source: Author, produced from a range of sources (e.g. *The Cameroon Tribune*, 1986; *Othman-Chande*, 1987; *Shanklin*, 1988; *Sigvaldason*, 1989)

### 6.2.9 OPINION ON THE MANAGEMENT OF THE CRISIS PERIOD

The opinion of disaster professionals on the management of the immediate aftermath of the LND was sought through interviews. The disaster managers within the government sector felt that the government handled the affairs of the disaster properly when the incident occurred and committed much human, financial and material resource to it. Though some acknowledged a few shortcomings during the management of the crisis period, including some points mentioned in Box 6.1, they argued that considering this was the most serious disaster the country had ever experienced, the relief and rescue operations had been handled properly. On the contrary, other key officials in DM within the academic field and opposition-controlled councils felt the crises period was not properly co-ordinated by the government. They mentioned the delay in the supply of material and human resources as a main handicap during the crisis period. Even more important is an allegation that government officials embezzled most of the material and financial aid provided by the international community for the survivors. Mbuh (2005: 194) asset that over 80 percent of the aid destined to survivors was diverted away by government officials managing the LND.

*“They steal even blankets and milk destined for displaced people! The case of the bus diverted to Colombe Football Club of Sangmelima is very glaring. Since Sangmelima is Paul Biya's constituency, there is no way Paul Biya can deny this fact. Many reports of how fraud and theft took place were never investigated” (Mbuh, 2005:194).*

Research evidence suggests that many LND survivors also felt the immediate aftermath of the disaster was well managed. The disaster survivors in the URC and those who had moved back to the disaster site generally had the impression that the immediate relief and rescue efforts which led to their temporary resettlement were properly handled. They received goods and gifts from many organisations, communities and church or social groups all over the country, some of which were channeled through the government and others were given to them directly by representatives of the contributing groups. According to a respondent:

*“....Immediately after the disaster, the government took good care of us. Many people donated many things, which were given to us. But things changed later. After that they abandoned us and left us for ourselves and we have been suffering since then” (U03GM)*

Survivors' accounts indicate that material and financial assistance provided by the government dwindled rapidly after the disaster as the months went by. This was also attributed to

corruption. Corruption allegations were also reported in newspapers and articles shortly after the disaster. According to David Alexander, reported in Mbuh, (2005:194)

*"The Cameroon government seemed to have had surprisingly little to say about the quantity and quality of what was supplied by the international community...unnecessary aid seemed to have stimulated corruption...which retarded rehabilitation."*

A report in Cameroon Post (edition of Tuesday 30<sup>th</sup> August, 2005) about the 19<sup>th</sup> anniversary of the LND also states that:

*"From inception, management of resources provided by sympathetic foreign donors was characterised by corruption and sheer dishonesty on the part of those financial "Vampires" and "Draculas" appointed to control them. This commentator personally saw frozen chicken destined for Nyos being hawked in the streets of Yaounde in 1986 by people who never new even the direction of Nyos."*

([http://www.postnewsline.com/2005/08/lake\\_nyos\\_survi.html](http://www.postnewsline.com/2005/08/lake_nyos_survi.html)).

There is a significant body of research and analysis to show that relief and humanitarian assistance, just like aid and development assistance, is vulnerable to corruption and misuse of funds. Analysis of the LND shows that distribution of goods and services fell prey to corruption networks and bureaucratic obstacles limited access to those in need. It was difficult to track the inflow of funds and therefore to assess whether they reached their desired destination. Moreover, while public and international funds were more easily identifiable, private funds were difficult to track and monitor their expenditure.

The relationship between humanitarian aid and corruption in governments, especially in developing countries is well known. Humanitarian operations often take place in environments that are prone to corruption risks and the aid process itself can add to these risks (Walker and Maxwell, 2009). In the humanitarian operations following the LND, international aid entered into an already corruption-prone environment, exacerbating existing endemic corruption.

### **6.3 LONG TERM MANAGEMENT**

This section seeks to examine the DM processes that have been operational for the past two decades after the immediate post-disaster relief and temporary resettlement of the Nyos survivors. Note that the residents of Njindoum village where Lake Monoum is located were not resettled. The discussion of the long-term management has been divided into scientific or technical and social management of the LND.

### 6.3.1 SCIENTIFIC/TECHNICAL MANAGEMENT OF THE LAKE NYOS AND MONOUM DISASTERS

The background to the Nyos and Monoum Degassing Project (NMDP) was set in motion during the International Conference on the Lake Nyos Gas Disaster (ICLND) held in March 1987 in Yaoundé, Cameroon. Some scientist who attended the conference created an International Working Group on Crater Lakes (IWGCL). The strategy for reducing the hazards in Lakes Nyos and Monoum by gas removal was taken by the IWGCL in Nancy, France in 1990 (Freeth et al., 1990:201). The IWGCL, which was subsequently raised to the status of Commission on Volcanic Lakes in 1993, set the basis on which degassing experiments were carried out in Cameroon in the 1990s (Kusakabe, 2000).

To mitigate the gas hazard in the lakes, in 2000 the Cameroon government initiated the NMDP. The main objectives of the project was threefold: to continuously monitor the physical, chemical, and biological conditions in both lakes; to install carbon-dioxide monitoring stations at both lakes to provide an audible and visual warning in the event of a gas release and to install permanent degassing pipes to remove the gas from both lakes. The government (through an Inter-Ministerial Committee responsible for all degassing activities on LNM) had the responsibility to construct roads and permanent buildings close to both lakes, educate the local people about the dangers of the lakes and ensure that Cameroonian scientists and technicians received proper training to manage the degassing equipment and procedures in the future. The Commission on Volcanic Lakes then established an international committee made up of eight members from six countries known as the NMDP Advisory Committee to provide guidance for the project (Kusakabe, 2000; Kling et al., 2006)

Prior to the start of the degassing project, scientific evidence showed that since the catastrophic releases of the poisonous gases in the 1980s, both lakes had been experiencing a carbon-dioxide recharge at alarming rates of up to  $80 \text{ mol/m}^2$  per year resulting in gas saturation levels of up to 97 percentage. To reduce the build-up of these gases, controlled degassing started at LN (2001) and LM (2003) with the installation of one pipe in each lake. This took place amid speculation that it could inadvertently destabilize the lakes and trigger another gas burst (Krajick, 2003). Figure 6.2 shows degassing in progress. The gas content has been reduced in the lakes by approximately 12-14 percent compared to pre-degassing conditions. The monitoring of the effects of degassing suggests that the degassing process is not destabilizing the lakes and increasing the likelihood of another disaster (Kling et al., 2006).



Figure 6.2: Water fountain produced by the degassing process in Lake Nyos. *Source: Author (picture taken during fieldwork in Cameroon in July 2007)*

The main funding for the NMDP has come from France, Japan and USA totalling about \$ 680,000. The Cameroon Government had fulfilled one of her responsibilities, which was to construct permanent storage buildings where scientific equipment for monitoring both Lakes are kept (see Figure 6.3 below) as mentioned earlier in this Section. However, the government has not fulfilled other project requirements including support funding in the areas of road improvement.



Figure 6.3: Scientific storehouse building constructed by the Cameroon Government at the outlet of Lake Nyos to keep scientific equipments used for monitoring. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

## **Present Risk in Lakes**

The two main risks that have been identified in the lakes are the risk of continuous gas recharge into both lakes and the risk of flooding from Lake Nyos. Although the gas is being removed, the lakes are still very dangerous because they still contain tremendous volumes of gas-more than was released in the initial disasters and therefore still pose grave danger to the local population (Krajick, 2003; Kling et al., 2006). Three years after the degassing started in LN, the lake's 500,000 tons of built-up gas had dropped only 6 percent and according to U.S. Geological Survey chemist Bill Evans, quoted in Krajick (2003), "*at this rate, it could take 30 to 50 years to make Nyos safe—and in the meantime, there could be another eruption*". A technical report produced by the U.S. OFDA based on a monitoring program in both lakes in 2006 revealed technical problems with the degassing process caused by the pipes installed in the lakes. Pipe design and implementation flaws in both lakes have led to their malfunction, leading to only a very small quantity of the gas being removed. The report also mentions that in LN, a rock fall or landslide from the cliffs around the lake could supply a tremendous amount of energy that could mix bottom waters upward and trigger another gas burst.

Scientific modeling has predicted that only approximately 30 percent of the gas remaining in LM can be removed, and in LN that the single pipe will remove approximately 25 percent of the gas remaining by 2015. To further reduce this risk, the advisory Scientific Committee for the NMDP recommended that more pipes be installed in both lakes in order to reduce the gas pressures at a much quicker rate. Their model indicates that 75-99 percent of the gas remaining would be removed by 2010 with two pipes in Monoun and five pipes in Nyos (Kling et al., 2006).

Scientific studies on the structure of the dam that holds Lake Nyos's water in place have revealed that it can easily be bridged, leading to devastating consequences in both Cameroon and Nigeria. Figure 6.4 shows the Crater Lake and the dam in which it sits surrounded by high cliffs. The upper 40m of Lake Nyos's 50m-wide natural dam consists of poorly consolidated pyroclastic rock (Figure 6.5) that is being eroded at an uncertain but geologically alarming rate that could cause an eventual failure leading to floods in downstream areas as far away as 108km in Nigeria (Lockwood et al., 1988; Lockwood and Shuster, 1991).

A report published by the joint UNEP/OCHA Unit in 2005 based on a mission to assess the stability of the natural dam in LN on the request of the government, discusses the present risk associated with the dam. The risk was that a breach of the dam would be imminent

within the coming 10 years, with a high likelihood for this to occur within the next five years. Such a breach would lead to severe flooding in downstream Nyos Valley, affecting an estimated 10,000 people in Cameroon and Nigeria. Moreover, that breach could likely lead to a re-occurrence of the 1986 carbon dioxide eruption, affecting a further unknown number of people. The most likely area where the dam could be breached easily is along the narrow spillway (Figure. 6.5), which is the weakest part of the dam (UNEP/OCHA, 2005; Kling et al, 2006).



Figure 6.4: Lake Nyos: Note the spillway at the south eastern part of the lake close to the white house (scientific store house) *Source: UNEP/OCHA (2005)*

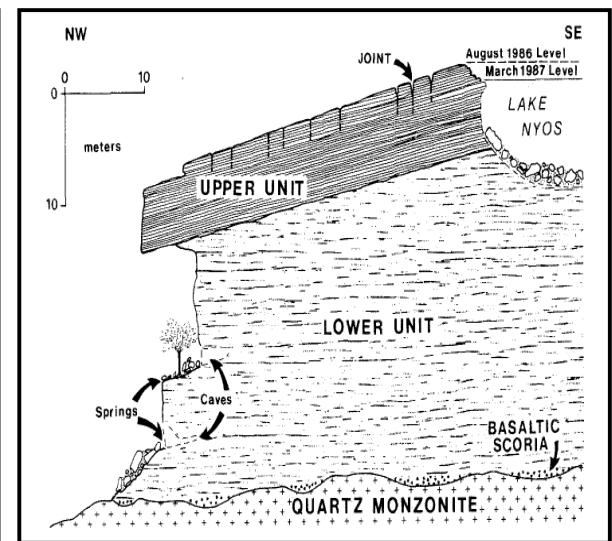
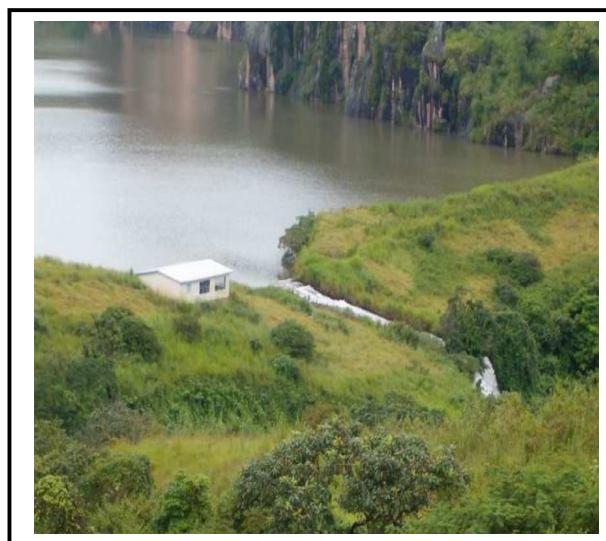


Figure 6.5: Spillway of the Nyos dam. *Source UNEP/OCHA (2005)* Diagram is cross-section of the lake showing upper and lower units of pyroclastic deposits. *Source: Lockwood et al. (1988).*

During the fieldwork for this research, the author also visited LN and undertook an onsite physical assessment<sup>22</sup> of the stability of the dam. Based on the rock types and structures in the rocks found on the natural spillway of the dam in July 2007, the author confirms fears expressed by former researchers that the dam could be breached if nothing is done. The pyroclastic rocks on the spillway are becoming increasingly unstable as they are weathered and eroded. Field observation was carried out in July 2007 when the level of the water in the lake was about three metres lower than the rim of the spillway, thereby exposing the inner surface of the rocks on the spillway. General observation of the exposed rocks in the inner surface reveals differential erosion within the layered rock surfaces, both vertically and laterally. The layered pyroclastic materials show very visible signs of lateral erosion on the upstream side. There is also clear evidence of backwards erosion at the spillway that could cause it to bridge the water in the lake. These structures can easily be seen in Figure 6.6 and provide strong evidence that the rocks of the spillway are undergoing rapid erosion. Note the depression in the picture behind the author that extends backwards towards the outer edge of the spillway.



Figure 6.6: Fragile eroded inner surfaces of the spillway. *Source: Author (picture taken during fieldwork in Cameroon in 2007: Author is wearing a cap and sits on the eroded rocks)*

This photograph is the clearest picture that has been taken of the dam showing evidence of erosion in the spillway, because the level of water in the lake is below the height of the

<sup>22</sup> It should be noted that the author has two Masters Degrees, one of them in Applied Geology and therefore possesses technical knowledge on the scientific aspects relating to the eruptive activity of the lake and the risk posed by the dam's stability.

spillway (3m). The photograph taken during the assessment mission by the joint UNEP/OCHA environment unit in September 2005 (Figure 6.5) shows water overflowing the spillway, thereby covering the eroded surfaces of the spillway rocks. Figure 6.6 therefore makes a significant contribution to the evidence for the continual weakening of the dam along the spillway.

The suggestions for the remediation of the flood hazard are that the water in the lake should be lowered to about 20-40m after which the dam wall can then be removed. But prior to this, the quantity of gas has to be lowered to safe levels first to prevent any gas eruption during reduction of the water level. In the degassing process currently going on in the lake, the level of water is held constant. The full mitigation plan is a more complicated process involving scientific and engineering methods for depressurizing the gas in the lake and pumping the water out (Lockwood and Meyer, 1989; UNEP/OCHA, 2005; Kling et al. 2006). A flow diagram to summarize the process is shown in Figure 6.7.

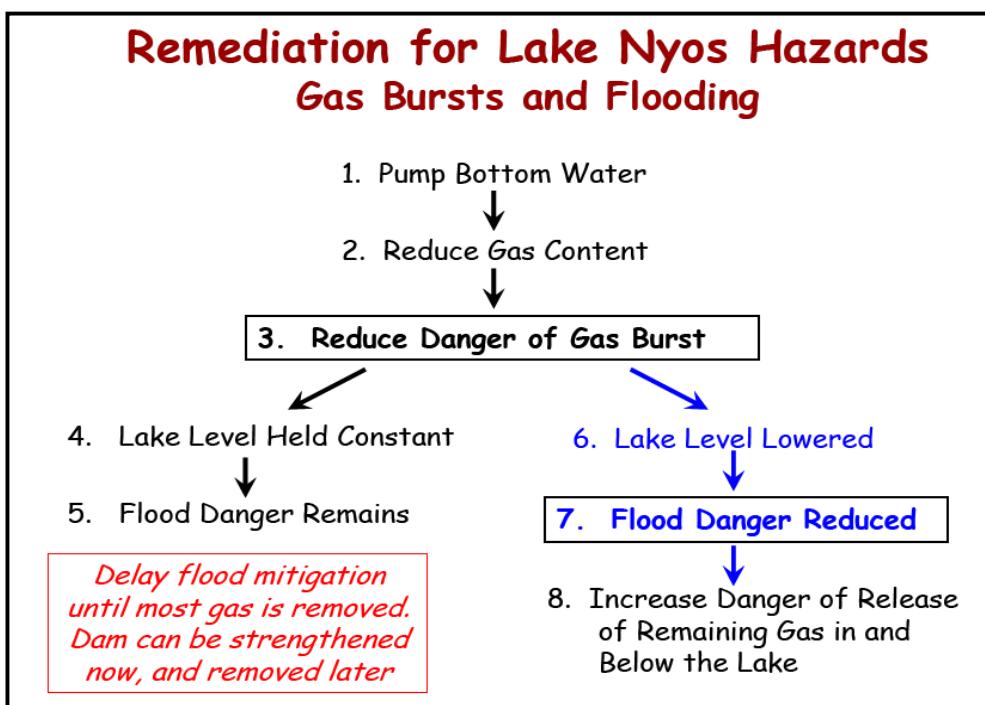


Figure 6.7: Remediation plan for natural hazards of gas bursts and flooding at Nyos. *Source: Kling et al. (2006)*

The present state of remediation in the Lake is at level 3 and 4 in Figure 6.7 where the gas is still being reduced and the level of the lake is held constant. However, the Scientific Advisory Committee for the NMDP recommends that the flood mitigation process should be delayed until most of the gas in the lake has been removed. In the short term, the dam can be

strengthened. Overall, there is considerable evidence that much has been done to mitigate the risk of any subsequent gas release from the lake by degassing. However, the risk of subsequent gas release is still associated with the risk of flooding.

### **Opinion on the Technical Management of the Lake Nyos and Monoum Disasters**

Information from interview sources reveals that disaster managers in all the sectors believe enough attention has been given to the reduction of the physical risks from the lakes. Government officials were quick to mention the NMDP as a government success in reducing the poisonous gases that are accumulating in LNM. Some said the lakes will soon be free of poisonous gases and the survivors will be allowed to return to their ancestral land in Nyos and environs. A senior official said:

*“I think this is one area in which the government has invested many human and financial resources. Cameroonian and foreign scientist are involved in the NMDP project and much money has been invested into the project. If you go to Lake Nyos and Lake Monoum, you will see pipes inserted into them. These pipes reduce the gas in the lake and you can see the gas escaping from them in jets. The government could not have done this alone. It took foreign assistance for this to be done. I think scientifically much has been done and is still being done to make the lakes safe” (D06TML).*

Though other key officials in DM also think much progress is being made to mitigate the physical risk in the lakes, some think the success cannot be attributed to the government. They argue that without foreign aid both in human and financial resources, the progress achieved this far could not have been possible. Some mention that the non-compliance of the government to construct a good road to the disaster site in Nyos (to ease the transportation of equipments and personnel) is also a main setback to the project. This view was expressed by a local official who has DM responsibilities:

*“I know a de-gassing project is going on in Lake Nyos but the government cannot take credit for it. Without foreign assistance, nothing would be done just as nothing was done after the Lake Monoum tragedy. The government has failed to construct a good road to Nyos since the disaster happened although we have heard several times that the road will be constructed. I am sure they are waiting for a foreign government to construct it for them” (D19NMM)*

Though general comments were made about the success of the NMDP, apart from some scientist, most administrators could not give specific information regarding the approximate expected date of completion of the project, when the lake will be declared totally safe from any gas emissions. This indicates that either uncertainty still exists as to when the project will

be completed, or that government officials are not sufficiently informed or aware of the progress being made in mitigating the physical risk.

Just like the disaster managers, most survivors are poorly informed about the risk mitigation process. There is no consistent information channel to update them or give feedback on the progress of the degassing process. According to the WCDR (2005:14):

*"It is necessary to provide easily understandable information on disaster risks and protection options, especially to citizens in high-risk areas, to encourage and enable people to take action to reduce risks and build resilience. The information should incorporate relevant traditional and indigenous knowledge and culture heritage and be tailored to different target audiences, taking into account cultural and social factors."*

Disasters can be substantially reduced if people are well informed and motivated towards a culture of disaster prevention and resilience, which in turn requires the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities (WSSD, 2002; WCDR, 2005). It appears that this is not happening at LN at present.

### 6.3.2 SOCIAL MANAGEMENT OF THE LAKE NYOS AND MONOUM DISASTERS

The social management of the LNM disasters involves the management of the socio-economic aspects of the disaster area, the resettlement camps and the displaced populations. It should be recalled that during the immediate aftermath of the LND, the government made promises to the disaster victims concerning their well-being and the development of the affected area. Other recommendations from elites and organizations from the affected area and early field studies commissioned by the government also related to both the technical and social aspects of the disaster. These include recommendations submitted to the Cameroon government after the ICLND and other studies commissioned by the MHESR between February and April 1987 (Shanklin, 1988; Sigvaldason, 1989; see Boxes 6.2 and Table 6.2)

#### **Recent Social Management Plan for the Lake Nyos Area**

Within the last few years, due to persistent complaints of poverty, hunger and poor living conditions by the survivors, the government seems to have taken the socio-economic aspects of DM more seriously. With the support of the UNDP, the government has come up with a project on the rehabilitation of Lake Nyos and the psycho-social and economic resettlement of the local population. The project structure and design was produced in a report for UNDP and the Cameroon government in 2006 by consultants commissioned by UNDP. The title of the project was "*Formulation d'un projet de rehabilitation du lac Nyos*" and it was estimated to

run for five years. The project had four main objectives: to rehabilitate the zone back to its economic potential; to reinforce the capacity of the population to be relocated; to reduce their poverty, and to improve the infrastructure of the affected villages. The project report mentions that after the immediate post relief and resettlement operations, the survivors were left to themselves and they had to engage in their former agricultural activities with lots of difficulties. It also mentions the poor living situation of the survivors in the camps that was linked to the poor communication network of the region, poor agricultural soils and very low incomes (Oumarou and Ousman, 2006:10). The project proposal plan that was estimated to cost about 7.4 billion FCFA, but with 6.6 billion programmed for the physical risk reduction measures (Oumarou and Ousman, 2006). The very big proportion of the budget programmed for the physical aspects again shows government's inclination more towards technical than social mitigation measures. To set in motion the project, on the 2<sup>nd</sup> of August 2007, the government of Cameroon and UNDP together with MTAD as implementing partner signed an agreement to implement part of the project with title "*Security and Socio-economic Reintegration of Lake Nyos Area (Cameroon)*" with an estimated budget of US\$ 1,990,000 expected from the European Union as the donor partner. The objectives of the program are to: build the capacity of local structures dealing with DM; de-gas the Lake and secure the area; build rural infrastructure; develop land use planning and emergency preparedness plans; and provide information and awareness rising of the population.

#### **Awareness of Disaster Mitigation/Management Plan for the Nyos/Monoum Area**

Interviews with disaster managers show that more than 95 percent hold the view that recently there has been more government interest in addressing the problems of the Lake Nyos disaster victims but only a few respondents' had any in depth information about any current projects or plans for the survivors. The most widely held knowledge about the disaster mitigation plan for the Nyos/Monoum area relates to the NMDP that is ongoing in both lakes. When asked if he is aware of a disaster mitigation plan for the Nyos and Monoum area, a disaster manager replied that:

*"Yes, there had been a plan which is nearing completion. The NMDP has been going on for many years now and very soon the project may end when the gas in the lakes had been removed" (D08NMM). Another respondent simply said "I know there is a plan to remove the gas from the lake" (D14NMM).*

Only few disaster managers within the government departments are informed of the resettlement plans for the disaster victims. Though these top officials could not be specific on the expected start date or period of the impending resettlement project, they were quick to defend the government's non-engagement in any early program. They attribute the lateness in the start of the resettlement project to lack of funds, which some said had been diverted to the NMDP. A senior disaster manager stated:

*“..... the government had set up committees to plan for the resettlement of the Lake Nyos survivors. We shall soon have the result of that committee. That project was delayed because the government has spent much money on the NMDP. The resettlement program cannot be done when the disaster zone is not safe. The resettlement program is government’s priority now and we are working with the UNDP to implement the program” (D03NMM)*

They also felt the NMDP was more important because people cannot be resettled to their original land if the area is not safe. Research evidence from interviews also suggests that administrators at the local level do not have any detail information about the social resettlement project, like their counterparts at the national level. A local administrator within the disaster area said:

*“I think the higher authorities are better aware of any plans for the survivors. We simply get orders from above and execute them. Whatever we at the local level are instructed to do and given the means to do, we simply do them...” (04NMM)*

They seem to get information about projects for survivors and the disaster area only during the period preceding commemorations of the LND when senior officials came to the area and engage them in preparations for the event. This shows that there is no steady stream of information from the higher to the lower levels of the administrative departments.

### **Government Promises to Disaster Survivors**

Though most of the key personnel involved in the LND management were not sufficiently informed of the resettlement project for the survivors, they expressed concern that promises made to disaster victims were long overdue. Disaster managers who were more critical of the government's management of the disaster revealed that a social management plan for the displaced survivors had been in existence since the event but had not been implemented. They highlighted government failures in handling the social concerns of the victims over the years, despite the continuous complaints by the survivors and some local managers whose area of jurisdictions cover some resettlement camps. The general notion was that projects, which

focus on improving the social situation of the Nyos victims, should be considered a matter of urgency. It is notable that the awkward condition in which the disaster survivors have been living and their cries for attention for more than 20 years have been making headline news in recent times, especially during commemorations of the LND.

Many secondary reports, mainly from newspaper articles, also reveal that the disaster survivors have been neglected and left to fend for themselves. The Cameroon Post, (a prominent newspaper in Cameroon) of 30th August 2005 discusses speeches made by survivors of the Nyos disaster during the 19<sup>th</sup> anniversary of the LND. Government neglect of survivors was the main theme in the speeches delivered by survivors and local chiefs in the area ([http://www.postnewsline.com/2005/08/lake\\_nyos\\_survi.html](http://www.postnewsline.com/2005/08/lake_nyos_survi.html)). The paper stated that:

*“All speeches during the celebrations centered on government’s neglect.....He commended the Fon of Sawi, traditional ruler of the area, who championed the protests against government’s neglect in the domain of road network, lack of health facilities and other pressing needs of the victims..... Neglect is not however, the only crime for which government deserves hanging. In the opinion of the survivors, government still has to convince them that the lake, which had been their friend from time immemorial, had suddenly become an adversary”.*

An article in the Cameroon Tribune (the state owned newspaper) of 30<sup>th</sup> August 2007 also makes reference to the 21<sup>st</sup> anniversary of the LND and reports that:

*“Amongst the lots of problems presented to Governor Koumpa Issa included the fact that they have been crying in the rain for standard educational facilities, health and road infrastructure. Aboubaka Suleiman, a representative of the survivors said accessibility to their camps is a nightmare, while some camps have schools without roofs, their living houses are dilapidating and there is great need for well equipped health facilities. Many of their children cannot be educated due to poverty while they keep being haunted by the fact that it is taking too long for them to returned to Nyos, the land of their ancestors”*

*([http://www.cameroon-info.net/cmi\\_show\\_news.php?id=20327](http://www.cameroon-info.net/cmi_show_news.php?id=20327)).*

These recent newspaper articles give a clear picture of the situation during the last two decades. While a significant amount of effort has been put into the physical risk reduction measures, much has yet to be done with regards to the social management of the disaster as revealed in later Chapters. More detailed analyses of government handling of the social aspects of the disaster are discussed in Section 6.4.

## 6.4 REFLECTING ON THE DISASTER MANAGEMENT

### 6.4.1 MAIN CONSTRAINTS TO THE MANAGEMENT OF THE LAKE NYOS DISASTER

The research also examined disaster managers' perspectives on the main problems inhibiting the proper management of LNM disasters. Many top officials were reluctant to respond to questions concerning the constraints faced by the government in managing the disaster, claiming that it is a popular myth that government is doing nothing to assist displaced survivors resettled in camps. However, some of them attributed financial limitations and the weak state of the country's economy as the main limiting factor for the government to meet all promises made to disaster victims. These disaster managers tended to blame the economic crisis that the country experienced in the late 1980s shortly after both disasters occurred and the subsequent devaluation of the CFA francs in the early 1990s (see Section 7.2.1) as major factors that weakened the government's financial capability to handle the long term effects of the LNM disasters.

The disaster managers who were critical of government's DM, attributed improper planning and follow-up of post-disaster projects a major limitation in the long-term management of the LND. Some emphasised that concrete plans were not put in place for the survivor's resettlement and living conditions in the camps, and their eventual rehabilitation back to Nyos. According to a respondent's perspective:

*“.....I think the problem was lack of proper planning into the future. The survivors were resettled without any plans to cater for their need until they return to Nyos. The money donated during the disaster, could have been sufficient to improve the social situation in the camps for a very long time if it was properly managed. I do not agree with those who say there is not sufficient money to assist the survivors because part of the money being used for the degassing project can solve many of their problems....” (D19CMV)*

The complexity of the government's administrative mechanism led to limited initiatives, and the complicated process of approving decisions initiated at local levels and administrative bottlenecks were also identified by some administrative personnel as major constraints.

Some disaster managers, mostly local officials also thought the overall poor governance of the country was responsible for the poor management of the social aspects of the disaster. Their general impression was that other socio-economic problems of the country are also not properly managed and the negligence of the government in the social aspects of the LND is just one of several problems in the country. One disaster manager commented:

*“..... money is being wasted on scientists who live comfortable lives while the disaster survivors are suffering. I think a main problem also is*

*governance. You do not expect a government that cannot manage the country well to manage a situation like this. If the government cannot stop corruption and embezzlement, then you do not expect them to solve the problems of the Nyos survivors because government officials will embezzle all the money and goods sent to the survivors as they did when foreign assistance poured into the country after the disaster" (D12CMV)*

It is also possible that a lack of DM skills in disaster managers is also a contributing factor. The DM processes cannot function properly because many government administrators, and those involved in the management, are politicians who have been given such responsibilities based on their political lineages rather than their knowledge, capability and ability. In most situations, those appointed to handle affairs relating to disasters are politicians within the ruling party who have no experience of DM. General observation during the interview process suggests that the trained administrators who are appointed to administer the provinces and divisions always work to protect the interest of the government. They always try to defend the government on issues that they are failing to resolve, at least in public.

The non-involvement of the disaster survivors in the management of their own affairs is also a major factor in the very limited social management. Survivors only act as representatives of camps with the main responsibility of channeling information to their peers. They are not fully involved in the decision making process that affects their well being. As such, social groups protesting the poor treatment of the LND survivors have emerged from within the disaster affected community (mentioned in Section 5.4.2 on Page 96). These civil society groups like MBO and BUKILSDA came into existence in order to protest at the government's poor treatment of the survivors and to engage in meaningful discussions for solving the numerous social problems that exist in the area. The role of the locals and the disaster community's involvement in their own affairs appears to have been grossly ignored. The Yokohama strategy (UNDP, 1994) stresses the importance of DRR being underpinned by a more pro-active approach to informing, motivating and involving people in all aspects of DRR in their own local communities. Based on a review of post-disaster response in Indonesia, it has been noted that relief and recovery efforts will be more effective if they identify, use and strengthen existing social capital (community based skills, programs, and networks). This community-driven approach to post-disaster recovery, which builds on social capital, results in greater client satisfaction, more rapid disbursement, and local empowerment (Leitmann, 2007).

The mayor of the Wum local council, that was controlled by the SDF<sup>23</sup> at the time of the research, claims that due to government neglect of the disaster victims, his council has been assisting disaster victims in the URC in provision of basic social education to children and livelihoods support, especially in providing basic farming tools.

Some disaster managers mentioned corruption as a major problem facing the management of the LND (see quote D12CMV in previous page). Such people, mostly local officials, said that due to political affiliations with the party in power, some unscrupulous officials embezzled much of the money donated during the crisis period with the complicity of other colleagues in higher positions and claimed this practice has continued since the disaster. They also mentioned that embezzlement, corruption and lack of accountability inhibit the management process and frustrate DM activities because financial and material resources do not reach their intended destinations.

This section has revealed that the response and recovery process was enabled at the international and national levels, ignoring the affected communities. Although some international NGOs have been providing limited assistance to the Nyos survivors resettled in camps, they have not been able to form linkages between the disaster survivors and external social partners. NGOs have been known to operate outside their established disaster response network to form bridges between local communities and the international community. Social capital can be utilized to achieve community integration through the interactions of informal organizations and institutions. This process could help build the socio-economic status of the disaster affected community. The interactions of formal organizations and institutions did not result in social policy outcomes that benefitted the Nyos disaster stricken community. The opportunity for using disaster recovery to enable sustainable development was missed due to the absence of long-term socio-economic development plans to guide the process. The recovery process was led from the top-down rather from the bottom-up and that is why the socio-cultural and economic problems of the affected community were not addressed. These findings reinforce the position that local governance is crucial to empower communities to participate in disaster recovery and development.

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<sup>23</sup> The SDF have controlled the Wum Council for the past eight years prior to the 2007 municipal elections when they lost the council to the ruling government party (CPDM).

#### 6.4.2 HOW THE NYOS AND MONOUM DISASTER MANAGEMENT COULD HAVE BEEN IMPROVED

Many high officials declined to respond to questions on how the management of the disasters could have been improved, with some insisting that all possible actions were taken. Most non-government officials, however, expressed opinion that the management could have been improved if proper planning was done at the onset. Some suggested that different committees with well-defined budgets could have been set-up to manage, monitor and report the progress of their activities regularly to a central coordinating body. According to them, if this was done, the government could have realised the difficult situation of the disaster survivors.

Their opinion was not only restricted to the social and technical aspects of the disasters. Those working at local levels felt the situation could have been improved if they had a greater role to play in DM activities at all stages, including planning, because they could easily monitor the activities as they live in the disaster areas on a permanent basis. They further mentioned that complicated administrative procedures to obtain requests and delivery of financial and material resources hamper the progress of management actions and swift realisation of objectives. A local DM administrator said:

*“After the survivors were resettled, a monitoring program to assess their living conditions could have prevented many of the problems they have been experiencing. No committee was set-up to monitor the conditions of the survivors after their resettlement. An independent committee made up of people of all sectors of the community and political parties is necessary to study the situation of the LND survivors now. Only such a committee can produce a fair and unbiased report to the government. This is what we have been suggesting for many years now but no one listens to us” (D20SDM)*

Failure to improve the road infrastructure to the various resettlement camps was another issue identified. Some of the local administrators believed this alone would have made a significant improvement to the entire management of the disaster, as many of the survivors engaged in subsistence agricultural activities would have been able to transport their goods to Wum.

#### 6.4.3 USEFULNESS OF LESSONS FROM THE NYOS AND MONOUM DISASTERS FOR FUTURE PLANNING

Interview results suggests that many disaster managers at the national level do not appear to recognise that lessons learned from the LND can be useful for further planning of DRM in the country (apart from the technical aspects). However, their peers at the local levels and non-government have a contrary view. More than 95 percent acknowledged that the disasters provide a good platform for Cameroon to be better prepared for subsequent gas related hazards since the country have many crater lakes. Though they think the degassing projects in LNM

can be applied to other crater lakes that might contain lethal amounts of carbon-dioxide or other poisonous gases, there was no evidence that there are plans to set this in motion. The failures and challenges of management of social aspects of the LND have made many government officials wary of such discussion. However, it can be argued (as expressed by some local DMs) that the LND provides important lessons for the management of hazards that involve the displacement of large numbers of people. Lessons need to be learned in the areas of tackling social welfare and livelihoods of disaster survivors after resettlement. This highlights a need for proactive measures, bearing in mind that the phases of relief, rehabilitation and reconstruction following a disaster are windows of opportunity for the rebuilding of livelihoods and for the planning and reconstruction of physical and socio-economic structures, in a way that could build community resilience and reduce vulnerability to future disaster risks (WCDR, 2005). The results suggest that it is necessary to have skilled personnel in DM at all administrative levels. The civil administrators trained at the National School of Administration do not possess adequate DM knowledge. The Hyogo framework for action stresses the need to develop training and learning programs in DRR targeted at specific sectors (e.g. development planners, emergency managers, local government officials).

## **6.5 SUMMARY**

A key feature of contemporary understandings of DRR and DM are that they aim to reduce vulnerability. As has been shown in this Chapter, disaster occurrence and impacts do not only depend on exposure to extreme natural phenomena, but also to anthropogenic factors such as government policy, DM strategies and the effectiveness of the DM process. This Chapter has analysed the management of the LNM disasters over the short and long term, based on secondary sources, personal observations and interviews with disaster managers and the affected populations. The overwhelming result is that while significant progress has been made in technical management (with some issues about its effectiveness), the socio-economic management of the disasters has not been well handled (also see Bang, 2008). Although limitations to the socio-economic management are partly attributed to the poor financial situation of the country, the bulk of the problems appear to be related to human systems (e.g. lack of DM expertise and skills, improper planning, negligence, corruption). These factors partly contribute to the ongoing vulnerability of the survivors and the underlying drivers of vulnerability are examined in the next Chapter.

## **CHAPTER SEVEN**

### **RESETTLEMENT, POVERTY AND VULNERABILITY**

#### **7.1 INTRODUCTION**

An examination of the DM Framework in Cameroon in Chapter five has shown how the various legislation, institutions and administrative processes have been established to guide the process of DM. Whether and how the framework has enabled or constrained the process in the case studies has been introduced in Chapter six. The analysis in Chapters five and six has revealed that one of the key responsibilities of good DRM is to analyse existing hazards and vulnerability. Vulnerability has not been addressed very successfully, as shown in the LND case study. Failures in the management of the LNM disasters, especially their long term socio-economic aspects have been highlighted. This Chapter takes the argument further and examines in more detail, the dire recovery situation and social problems faced by the displaced LND survivors and their families in the resettlement camps. The socio-economic problems, which have exacerbated poverty in the resettlement camps, are examined, thereby indicating some of the major push factors that have forced many survivors to return to the disaster zone and become vulnerable once again to disaster. The relocation process is dealt with in detail in Chapter nine.

This approach builds further on Chapter six in seeking to answer the second research question about the understanding of vulnerability in the case study populations. This Chapter therefore offers a closer examination of the environmental, social and economic factors that are responsible for creating vulnerability referred to here as drivers of vulnerability. These social vulnerability drivers are examined in detail in the LND population groups, but first, it is important to understand the wider socio-economic context and poverty situation in Cameroon.

#### **7.2 CAMEROON'S ECONOMY**

##### **7.2.1 CAMEROON'S ECONOMIC SITUATION SINCE THE LAKE NYOS AND MONOUM DISASTERS**

For a quarter-century following independence, Cameroon was one of the most prosperous countries in Africa. The country is rich in natural resources like minerals, dense tropical forest, oil and gas and fertile volcanic agricultural soils and used to be the commercial and economic leader in the sub-region. Within the last two decades and coincidentally, since the LND, the country's economic development has slowed relative to other countries in the region.

According to one external report, this was caused by economic mismanagement, pervasive corruption and a challenging business environment (US State Department, 2008).

Prior to 1986, Cameroon accomplished an annual growth of 7 percent over a 10-year period (Government of Cameroon, 2003). GDP per capita increased at an annual average rate of 4 percent during 1965–86 but the situation deteriorated into the 1990s and the country suffered a severe social and economic crisis. The country's real GDP declined by an annual average of 3.8 percent from 1986 to 1994 representing more than 60 percent drop for that period. The per capita income increased on average by 6.5 percent during the same period. External debt rose from 39 percent of GDP in 1986 to 65 percent in 1992 before escalating to 105 percent in 1994 after devaluation (Government of Cameroon, 2003:1; Nkama, 2006). The economic crisis was blamed on a slump in the prices of main export commodities (oil, cocoa, coffee and cotton) to the world market in the 1980s, an overvaluation of the *coopération financière en Afrique* (CFA) franc against the dollar and economic mismanagement (Baye, 2006a; US State Department, 2008).

In order to achieve macro-economic stability, the government embarked upon a series of economic reform programs suggested by the International Monetary Fund (IMF) and the World Bank medium-term structural adjustment programs (SAP) from 1988. In order to cope with the budget deficits engendered by the economic crisis, the government implemented the SAP which included reduction in public expenditure, cuts in prices of traditional exports, reduction in the civil service and increased borrowing. Public expenditure was drastically reduced through: (1) restructuring of public and para-public enterprises in the early 1990s, which led to staff redundancies and increased unemployment, (2) slashing public expenditure on education, road infrastructure, extension services, rural water and electricity supply, and healthcare services, (3) freezing recruitment in the public service, and (4) Civil service salary slashed by 65 percent in 1993 (Baye et al., 2002). The CFA franc (the common currency of Cameroon and 13 other African states) was devalued by 50 percent in January 1994. The devaluation was intended to prop up the global competitiveness of the economies of the countries using the CFA francs.

Unfortunately these measures had a serious impact on livelihoods of Cameroonians and did not stimulate growth. Instead they compounded the effects of the crisis on the welfare of households and eroded the real purchasing power of most Cameroonians. Poverty increased and debt servicing grew rapidly and started crowding out investments. Though the country

achieved macro-economy stability after the devaluation, incomes still remained low (Mbanga and Sikod, 2002; Baye, 2006a).

The impact of the economic crisis and the SAPs was considerable. It led to reduction in public finances drastically reducing government spending on maintenance and new development projects. This had a serious toll on public services and incomes. The Government reduced basic health and education funding and this led to a major decline in health delivery systems and school enrolment (Khan and Noumba, 2001). Baye (1998) observes that a freeze in increments and recruitment in the public service, the retrenchment of public sector workers, the meager salaries following the double cuts in the salaries of public sector workers in 1993, and price hikes resulting from the 50 percent devaluation of the CFA franc all eroded the real purchasing power of Cameroonians and increased unemployment. The general impact on Cameroonians as argued by Baye and Fammbon (2002) is reported in Baye (2006b:310) that:

*“the economic crisis and the immediate effects of Structural Adjustment Programmes (SAPs) amalgamated and forced many Cameroonians to adopt coping devices such as moonlighting, seeking for survival in the informal sector, occupational and geographical mobility, changing regional patterns of activities and productivity, and adopting ‘behavioural innovations’ like corruption and other malpractices for survival”.*

The liberalization of export commodities also exposed farmers to the volatility of world market prices. Farmers suffered a cost-price squeeze that reduced their incomes drastically. The high cost of imports and fierce competition for main export crops by countries like Indonesia and Vietnam, depressed output prices on the world market. This lead to low incomes for farmers and many abandoned their coffee and cocoa farms that had sustained them prior to the crises (Baye, 2006a). Investment declined from 27 percent to less than 11 percent of gross domestic product (GDP) between 1985/86 and 1992/93. The steady decline in incomes led to a 40 percent fall in per capita consumption and the external debt more than doubled from less than one-third to more than three-quarters of GDP over the same period (Government of Cameroon, 2003:2). On average, human development economic and social indicators (Table 7.1) deteriorated considerably during the crisis period and the ensuing economic improvement was unable to remedy the situation.

Over the last three years (2004-2007), GDP growth has averaged 3 percent, which is far below the population's expectations and insufficient to meet the MDGs. Official statistics indicate that inflation is under control (projected by the World Bank at 2.9 percent in 2008). The weak economic situation has caused frustration in the county as

Table 7.1: Selected data on some economic and social indicators in Cameroon between 1984 and 1996

ITEM	1984	1986	1988	1992	1994	1996	1984 Vs 1996 (%)
<b>POPULATION AND NATIONAL ACCOUNTS.</b>							
GDP at current market prices (millions of US \$)	7801.82	10621.23	12493.53	11396.2	7853.53	9108.55	16.7
GDP at factor cost (constant 1995 prices, millions of US \$)	8872.03	10291.73	9311.39	7847.97	7490.3	8101.03	-8.7
Annual growth in real GDP (%)	4.1	6.5	-6.8	-3.9	-1.5	4.3	0.2
Population (million)	9.76	10.34	10.964	12.278	13.597	13.597	39.3
Urban (%)	34.8	36.5	38.3	41.8	45.5	45.5	10.7
Labour force participation rate (%)	41.1	40.7	40.4	40.2	40.4	40.6	-0.5
Gross National Income (GNI) per capita (US \$)	780	930	1110	910	730	610	-21.8
Total revenue and grants (% of GDP)	22.6	21.4	16.4	15.7	10.2	14.8	-7.8
Nominal exchange rate, CFA franc/US \$, period average	436.96	346.31	297.85	264.69	322.75	511.55	17.1
Consumer Price Index (1995 = 100)	52.4	61.3	70.5	70.1	91.7	103.9	51.5
<b>SOCIAL INDICATORS</b>							
Life expectancy at birth (years)	51.3	52	52.3	52.4	51.4	50.5	-1.6
Primary school enrolment ratio (%)	101.3	104.2	102.6	93.0	88.5	85.4	-15.9
Illiteracy rate (%)	46.7	43.6	40.5	34.6	31.7	29.0	-17.7
Crude death rate (per 1,000)	15.4	14.9	14.5	13.9	14.3	14.6	-5.2
Crude birth rate (per 1,000)	44.3	43.5	42.6	40.7	39.5	38.2	-13.8
Total fertility rate (per woman)	6.3	6.2	6	5.7	5.5	5.2	-17.5
Daily calorie supply (per capita)	2130	2249	2072	2206	2139	2115	-0.7

Source: Baye (2006A)

people's spending power declined considerably. Recently, public frustration over rising prices resulted in outbreak of social unrest and violence in many Cameroonian cities in February

2008. Poverty in Cameroon is still high, the country remains one of the lowest-ranked economies on the World Bank's annual "Doing Business" survey and regularly ranks among the most corrupt countries in the world (US State Department, 2008).

A strong economy, in which the benefits are shared throughout society, provides more resilience against future disasters. A strong economy means larger financial reserves to cope with future losses. Measures that help the community reduce future economic losses that improve their ability to recover after loss, and that make it possible for communities to afford higher levels of safety are all important elements of an overall mitigation programme (Nateghi, 2000). The low GDP per capita, increasing poverty, and cuts in public expenditures certainly had a toll on natural DM in the country. Unfortunately, the start of the economic crises coincided with the LND and this probably had a serious effect on the management of the event. Since government expenditure decreased on public spending, many projects (infrastructural and social) to improve the disaster area and survivors could not be met because of reduced government spending caused by the crises and measures to restore macro-economic stability proposed by the IMF and the world bank in the SAPs.

## 7.2.2 POVERTY IN CAMEROON

Income poverty today is widely spread over Cameroon as a result of the unprecedented economic crisis although it is unequally distributed among the various socioeconomic groups and regions in the country. An analysis of poverty in Cameroon is based on household surveys carried out in 1984 (the budgetary and consumption survey), 1996 (Cameroon Households Consumption Survey) and the latest Cameroon Household Consumption survey of 2001 carried out by the government's statistics office. Overall, poverty in Cameroon deepened in the period 1984–96 with the incidence of overall national poverty increasing from 39 to 68 percent between 1984 and 1996 (Fambon et al., 2004; Baye, 2006a). From 1996–2000, 50.5 percent of the population lived below the poverty line, compared with 40 percent in 1984 (Amin and Dubois 2001). Because of economic recovery due notably to devaluation and joint World Bank/IMF assistance programs, the poverty headcount index dropped to 40.2 percent in 2001 (IMF, 2003; Nkama, 2006).

Poverty in Cameroon varies considerably (see Table 7.2) and is higher in rural areas than in urban areas. About 86.5 percent of the people in the rural areas are poor compared to only 13.5 percent in the urban areas of the country (Amin and Dubois, 2001). There is also strong inequality among the various regions. The regional incidence of poverty shows that the

study areas (including the West) have the highest incidence of poverty (66 percent) in the country, contributing 36.4 percent to income poverty (Government of Cameroon, 1996).

Table 7.2: Regional ranking according to poverty incidence

Region	Poverty incidence (%)	Poverty contribution (%)	Consumption adult equivalent (CFAF)	Poverty intensity (%)
Douala	19.7	3.8	522,500	12.8
Other urban areas	21.4	5.5	358,500	12.6
Yaoundé	29.6	4.2	441,900	16.7
Savannah	56.7	27.2	188,000	36.7
Forest	63.8	22.9	165,600	41.2
<b>Upper plateau<sup>24</sup></b>	<b>66.0</b>	<b>36.4</b>	<b>219,300</b>	<b>41.5</b>
Cameroon	50.5	100.0	275,300	32.0

Source: ECAM1996.

### 7.3 SOCIAL CONDITIONS OF DISASTER SURVIVORS

As mentioned in section 4.2.2 of Chapter 4, the case study populations linked to the LND are the displaced survivors presently living in the URC and former displaced survivors who have moved back to the disaster zone in Nyos village. Both study populations are located in Menchum Division of North West Province.

Surveys carried out shortly after the disaster showed that the demographic profile of the LND survivors comprised of 984 males (47.7 percent) and 995 females (50.3 percent). Their age range was between 3 weeks to 90 years, with 51.9 percent under 15 years of age (Ngwa, 1992). A report produced from studies on the socio-cultural and economic impact of the LND commissioned in February 1987 under the auspices of the MHESR, produced statistical information which shows that 70 percent of the native population were farmers while 30 percent were cattle herders. The research survey shows that 57.7 percent of displaced survivors at the URC have lived there for 18 years. The average time, which most residents have lived here is 17.6 years. The survivors belonged to five ethnic groups: Nyos, Cha, SuBum, Aku and Bororos. Results from a similar MHESR study in the resettlement camps done in March-April 1986 identified a series of problems in the resettlement camps, which included lack of farmland and pasture and/or employment especially for farmers, an attitude of dependency, poor sanitary conditions, lack of privacy and increase in promiscuity (Shanklin, 1988; Ngwa, 1992; Krajick, 2003).

<sup>24</sup> The study area is located within the Upper plateau region

Empirical data obtained at the URC (see Figures 7.1 and 7.2), were used for analysis of impoverishment due to relocation and resettlement of the LND survivors. The URC is one of seven resettlement camps. The other resettlement camps for the displaced LND survivors are Buabua, Kimbi, Esu, Ipalm, KumFutu and Yemnge camps. The URC is located in Menchum Valley Subdivision in Menchum Division about 9 km East of Wum, the biggest town and divisional headquarters of Menchum division. The URC was chosen as the cluster sample to study the displaced LND survivors because it is the most accessible of all the other camps from Wum. At the time of the research, the camp had about 650 residents with over 65 houses in an area of about 80km<sup>2</sup>.



Figure 7.1: Ukpwa Resettlement Camp in the background. *Source: Author (picture taken by during fieldwork in Cameroon in 2007)*

The main means of transportation to the camp from Wum is by motorcycle and bicycle, though most of the camps inhabitants prefer to walk as the road is very slippery especially during the rainy reason and motorcycle accidents are very common. The disaster survivors resettled in the URC and those who have returned to Nyos village are used in the next section to analyse the factors that exacerbate vulnerability in the LND survivors.



Figure 7.2: Main road into Ukpwa camp. *Source: Author (researcher arriving URC during fieldwork in 2007)*

### 7.3.1 IMPOVERTISHMENT DUE TO RESETTLEMENT

It has been widely recognized that a common effect of involuntary displacement is the impoverishment of those involved (Cernea, 2005). The methodology here used socio-economic variables in the survey questions and interviews to examine aspects of livelihood and wellbeing of disaster survivors. This section analyses the responses of the LND survivors to explore their poverty status and vulnerability to subsequent hazards using the Impoverishment Risk and Reconstruction model (IRR) of Cernea (1997, 2004, and 2005).

Removing people from their known environments separates them from the material and cultural resource base on which they have depended for life as individuals and communities (Oliver-Smith, 2005b). According to Tilley (1994:15) “*Geographical experience begins in places, reaches out to others through spaces and creates landscapes or regions for human existence*”. Resistance to resettlement reveals how important a sense of place is for the creation of an “*environment of trust*” that links space, kin relations, local communities, cosmology and tradition (Giddens 1990:102 as cited in Oliver-Smith 2005B: 48). Recognising the numerous problems faced by displaced and resettlers, the World Summit on Social Development (Copenhagen, March 1995) incorporated the call for reestablishing resettlers’ livelihoods into its Program of Action (United Nations, 1995). During the WCDR (2005) countries were also urged to ensure, as appropriate, that programs for displaced persons do not increase risk and vulnerability to hazards.

As highlighted in Section 2.4.6 on Page 50, Cernea's IRR model is a theoretical model for involuntary resettlement that highlights the intrinsic processes that can cause impoverishment through forced displacement, as well as the ways to counteract and eliminate or mitigate such effects. Cernea's conceptualization of impoverishment emerged out of his own and others research into the impacts of rapid change brought about by forced displacement and involuntary resettlement due to development projects. Whether the displacement was caused by natural hazards, conflict or planned development, the effects and processes of involuntary displacement and resettlement are similar. There are particularly close parallels between the experiences of disaster-affected and development-affected populations (Cernea, 1997; McDowell 2002).

Researchers have been challenged to map the “variables of impoverishment” (Cernea, 2000:19) and understand the ways in which those variables are interlinked and influence one another in ways that lead to livelihood reconstruction or further impoverishment. McDowell (2002) suggests that impoverishment risks are compatible and appropriate when seeking to understand the impacts of disasters and forced displacement on the livelihoods of affected populations and the process of post-disaster livelihood reconstruction. The IRR model has been used as a diagnostic explanatory and cognitive tool (Cernea, 2004) to analyse impoverishment in the displaced and affected case study populations.

The results suggest that survivors living at the URC have been made poorer by a number of socio-economic factors associated with their involuntary resettlement and the political economy (also see Bang et al., 2009). The analysis of factors that have exacerbated poverty is informed mostly by the IRR model (Cernea, 1997; McDowell 2002). Mc Dowell's (2002) proposed “impoverishment risk and sustainable livelihoods” (IRSL) research methodology in post-disaster settings identifies three main synergies between Cernea's IRR model and the SLA, which examine impoverishment processes, institutions and livelihood strategies. The IRSL posits that the concepts of sustainable livelihoods and impoverishment risks are compatible and are appropriate theoretical models to understand the impacts of disasters and forced displacement and the process of post-disaster livelihood reconstruction. These multifaceted interlinked variables of impoverishment (Cernea, 2000:19) share with the SL approach a focus on dynamic processes, livelihood systems and vulnerability. Using categories based on the IRR model (Cernea, 1997, 2004; Mc Dowell, 2002), it is possible to identify a series of impoverishment processes at work in the case of the LND survivors.

### **Access to Land**

Considering that agriculture or farming is the main occupation of the LND survivors, respondents were always keen to talk about the limitations that their new environment posed to this activity. The URC survivors are very bitter about the relatively smaller pieces of land allocated to each household to engage in agricultural activities compared with the land they had in Nyos village. The URC survivors complain that the situation is exacerbated because the land is not as fertile as the volcanic soils of Nyos, on which they had been cultivating crops for many generations. This was a major problem because most of the people are farmers and their livelihoods depend solely on farming. It should be noted that most respondents owned larger pieces of land in their original village and many were keen to mention how they missed their fertile and extensive lands in the Nyos valley. Many of the camp dwellers who owned several hectares of land in Nyos village now owned only an average of  $400m^2$  (0.04 ha) of land around the URC. A young man responded that:

*“I don't feel happy living here at all. My life and that of my family is completely different because I don't have anything. All the cows and sheep we had died. I should have inherited them from my father but they all died and I had nothing to start life with. At least we still have our land back in Nyos. That is the only thing I have left” (U18RL).*

Apart from farming, the land is also used to keep cattle. More than 8000 cattle died during the LND and the survey evidence shows that many URC residents lost from a few cattle to about seven herds<sup>25</sup> of cattle. Some survivors who wanted to start rearing cattle again received some cows from NGO's like Hiefer Project International (HPI). However, these people are facing a problem of restricted land space and paddock area to graze their cattle. Due to limited land allocated to the households in the camp, those who have started keeping cows are forced to graze their cattle very close to their houses in the camp (see figure 7.3).

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<sup>25</sup> According to the Ukpwa Camp survivors, a herd of cow comprises of about 65cattle.



Figure 7.3: Cattle grazing close to houses in the Ukpwa Resettlement Camp. Note the distance of the cows from the house. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

These research findings are in line with earlier work, which shows that populations relocated by disasters or uprooted by government actions usually end up farming inferior quality/size or marginal lands (McDowell, 2002). During the interview session some cows could be seen grazing less than 10m from houses in the camp (see Figure 7.4).

Cernea (1997) argues that limited access to land is the principal reason for increased poverty of displaced people, since they lose both natural and man-made capital. Loss of valuable land removes the main foundation upon which people's productive systems, commercial activities, and livelihoods are constructed. This experience with loss or reduction of original land size is supported by empirical evidence from other areas in the world. For example, a survey by the Institute of Ecology of Padjadjaran University in Indonesia around the Saguling reservoir found that resettled families' land ownership decreased by 47 percent and their income was halved. Similar evidence is available from Brazil (Mougeot, 1989). Findings from sociological and anthropological field studies also show that for farm families, loss of land generally has far more severe consequences than the loss of a house. Unless the land basis of people's productive systems is reconstructed elsewhere or replaced with steady income-generating employment, landlessness sets in and the affected families become impoverished (Cernea, 1997).

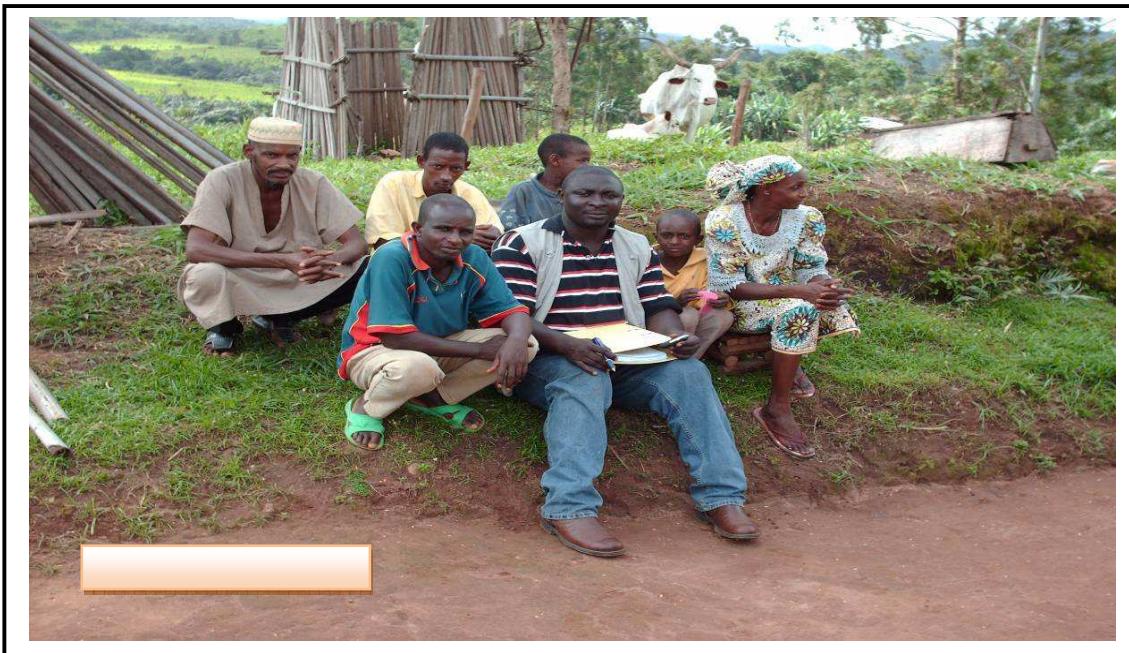


Figure 7.4: Researcher with a young family in front of their house at the Ukpwa Resettlement Camp. Note their two cows close to their bamboo toilet in the background. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

### **Limited Job opportunities**

Many URC residents lost their main source of income and livelihood activity after resettlement. Many cattle herders lost their cattle during the disaster and could not continue with that livelihood and hunters have been restricted from their traditional hunting areas. Apart from their new strange hunting environment, attempts to continue with this activity have resulted in serious clashes with hunters from the host population who complain that they do not have enough wildlife left. As such, these people have been forced to switch to new livelihood means to support their families. The only alternative is farming and apart from adapting to this new livelihood means, the problems of poor fertility and small land size available to household poses a major impediment to raising enough food and income to support their families. A former hunter said:

*“....I cannot continue to hunt as before because the wildlife in this region is smaller than we used to have. I cannot go hunting far from the camp because the natives of this region will not allow me. I am now forced to farm even though the land here is not fertile” (U16 RL)*

The above interview reveals that both the scarcity of wildlife and limited access to hunting area is affecting hunting in the resettlement camps.

The interview results also reveal that some women milked the cows owned by their husbands. Loss of mainstream livelihood activity has also affected women. The milk was then

sold to the local market and also used to produce other local dairy products, which were eaten and also sold to generate income. Following the death of the cows during the disaster, many of the younger women in camp have now resorted to farming, but some older women complain that they are not strong enough to engage in farming because of their age. These women prefer to milk cows than to farm because they think the former is less arduous than the latter. An 82 year old woman in the camp replied that:

*“I lost my means of getting income when we were brought here. I used to milk cows and sell the milk while in Nyos but my husband and all our cows died. Since we moved here I couldn’t do anything because I’m now old. That could have been easier for me to do but at my age I cannot farm. Life is very difficult for me here” (U02RL).*

All the URC respondents stated that their economic situation in the camp was worse than before and had not improved over the years.

### **Homelessness**

The concept of homelessness as in the IRR model refers to the lack of personal house, and in a broader cultural sense, loss of family’s individual home linked with the loss of a geographical area, resulting in alienation and derivation (Altman and Low, 1992). The URC residents are not happy with life where they are now resettled because they feel that is not their home. “*We are living here like strangers*” was a common phrase used by many interviewees to express the way they felt in that area. Many respondents are not happy with life in the URC because, as they say, the land is not theirs and their host population, is often aggressive towards them. Some indicated that they are not secure in the camp and its surroundings because the natives whose land had been given to them were always ready to challenge them concerning farming and grazing space.

*“This is very worrying” said one man (U05DI) “because we are foreigners here and cannot argue with those who own this place even though the government says it’s our land now. But we know that isn’t true because the land has been taken from the Aghem people. When they encroach into the land that has been given to us, we cannot argue or fight with them because it’s truly theirs”.*

Interview transcripts reveal that many other respondents expressed similar concerns and many revealed that irrespective of the facilities they may have in Ukpwa, they will never be comfortable to live there because it is not their home and they do not truly own any property there. Research survey data indicates that while 83 percent of residents at the URC are living in camp houses provided by the government, 93.2 percent of their peers who had

relocated to the disaster zone were living in their own houses. Apart from feeling alienated at the URC, the respondents complain that their camp houses are not the “modern” houses which the government promised to construct (Figure 7.5).

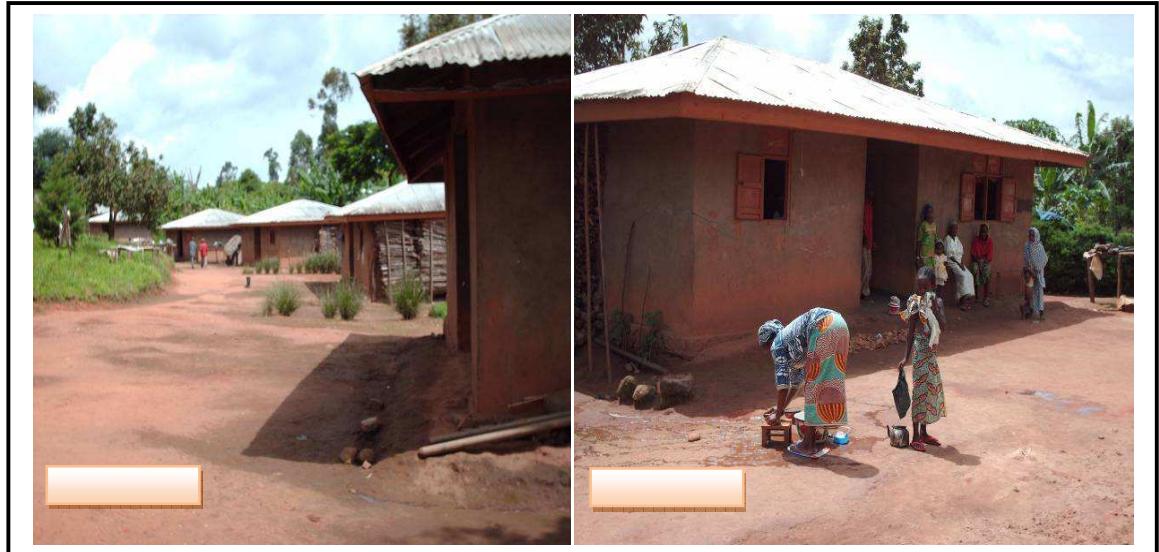


Figure 7.5: Houses at the Ukpwa Resettlement Camp. *Source: Author (Picture taken during fieldwork in Cameroon in 2007)*

### **Housing Conditions**

Most houses have not been completed and promises to complete the many unfinished houses shortly after the survivors moved into the camp in 1997 have not been met by the government. Inspecting the exterior of the camp houses does not give a good picture of the overall state of the houses. As expressed by the respondents, many of the camp houses are not plastered inside and lack ceilings, cemented floors and walls (see Figure 7.6). Some residents have attempted to complete their unfinished houses by putting interior doors that were not fitted and plastering the walls and floors.

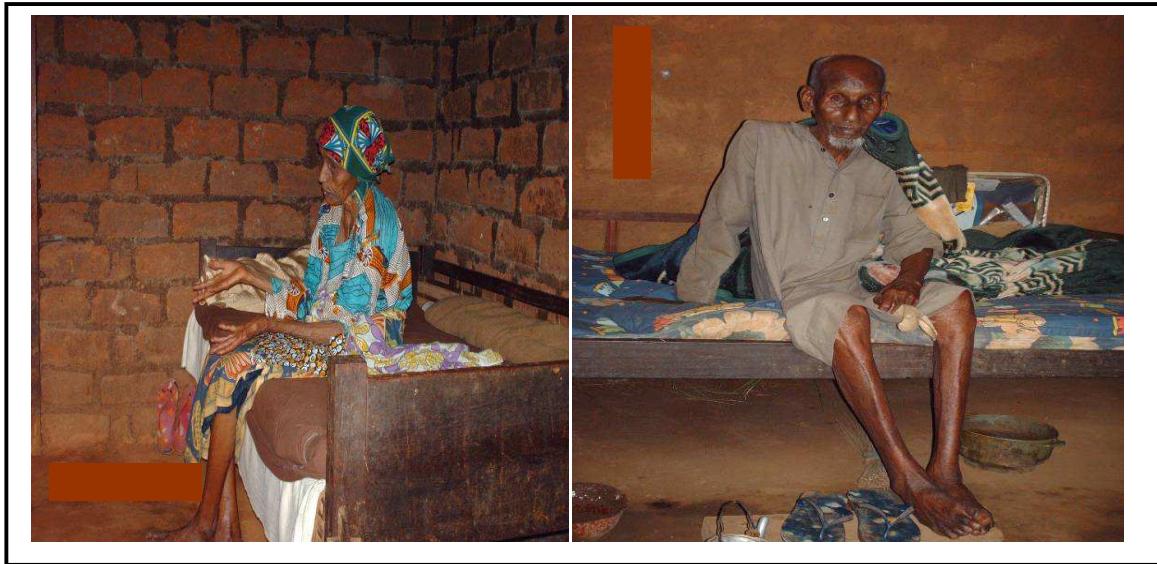


Figure 7.6: Interior of camp houses without plastered walls and floors. *Photograph taken by author during fieldwork in Cameroon in 2007 (Date in picture is default camera date setting)*

The camp residents have also had to build kitchens and toilets, which were not constructed with the houses. The kitchens have been constructed using local materials, in most cases through community labour. Figure 7.7 shows the nature of the exterior kitchens. These findings are not uncommon, since other studies have revealed that resettled populations commonly live in sub-standard housing with few government services, often in conflict with the host population and local government, and without international recognition of their plight (Mc Dowell, 2002; World Bank, 2004). Interviews showed that the residents have to construct their kitchens and toilets though with very limited resources. An elderly respondent explained the situation:

*“The government gave us houses that were not completed. The houses were not constructed with external kitchens and toilets. We have to construct them ourselves. We are forced to use grass roofs on the kitchens because we do not have money to buy zinc. You can see that we cannot even build the toilets we dug ourselves” (U23RL)*

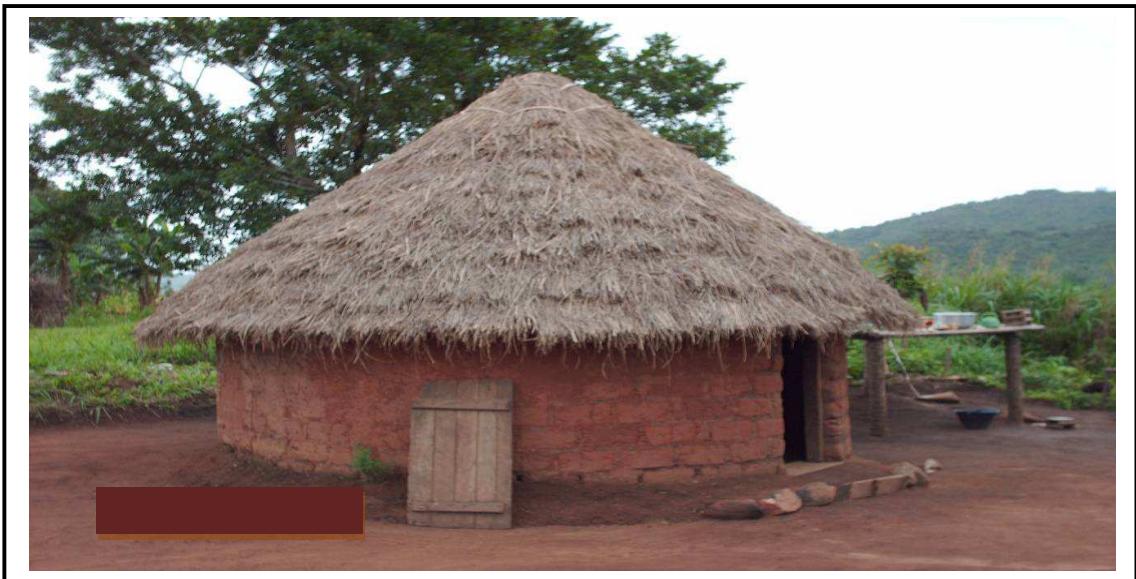


Figure 7.7: Mud kitchen at the Ukpwa Resettlement Camp constructed by the residents.  
Source: Author (picture taken during fieldwork in Cameroon in 2007)

Because of lack of space, many of the toilets have been constructed in close proximity to the houses as shown in Figure 7.8. As a result, this may pose a serious health hazard to the residents because potential sources of infection from these toilets are easily carried into the houses nearby.



Figure 7.8: Pit toilets between two houses at the Ukpwa Resettlement Camp constructed by the survivors using local raffia palm branches and bamboo sticks. Note the closeness of the toilets to the camp house. Source: Author (picture taken during fieldwork in Cameroon in 2007)

Apart from the lack of facilities in the camps such as electricity and piped water, the very poor living condition of the survivors is clear when one enters the camp houses. Photographs taken of the interior of the camp houses (Figure 7.9) shows the basic condition in which the residents live, though they were promised after the disaster that their living conditions would be better than in their original village.



Figure 7.9: The interior of houses at the Ukpwa Resettlement Camp. The first picture shows the living room in one house whose walls has been plastered and locally decorated by the occupant. The other picture is a resident's bed in his bedroom. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

Construction materials used in the houses at the URC are different from those in the disaster zone. The camp houses have been constructed of cement bricks and roofed with aluminium zinc (see Figure 7.5), as opposed to most of the houses in Nyos, which are built of mud-bricks and have grass roofs. However, many respondents still feel that their houses in Nyos are better because, though built of mud bricks, they are more spacious and warmer inside during the rainy season compared with the camp houses. The toilets are also further from the houses than those at the camp. Because of these reasons, the respondents tended to feel that their houses in the village were still better than the houses they have now in the camp. The leader of the URC camp stated that:

*“The government promised that we will live in a better house here than the one we have in the village. You have seen that the houses have not been completed. Many of them do not have cemented floors; the walls are not plastered and have no ceilings. Even many internal doors are not there. Toilets and kitchens were not constructed. We have tried to do what we can do to make the houses better. But we do not have the money to put plywood*

*on the ceilings so the houses are always very cold during the night and many of the people do not have good blankets to keep them warm. I still think our houses in the village are better than these ones here because they are warmer. There we also have enough space to build more houses for the children who have grown-up. The mature children in the family who want to marry cannot build their own houses because there is no land. I don't think the housing situation here is better than the one in our village" (U04DI)*

Apart from the poor condition of the houses in the camp, no repairs are done on them by the authorities. The survivors have to undertake repairs, which at times can be prohibitively expensive. The oldest man in the URC at the time of the survey had been displaced from his camp house because it collapsed, and the authorities could not assist him to rebuild the house. This is an excerpt of what he said:

*"We have received no assistance from the government.....even this camp was constructed with funds from abroad and not from the government and it was not even well constructed.....many of the houses are not plastered, no ceilings, no toilets and external kitchens.....The house I was living in collapsed and I did not have any place to live in. I complained but no one listened to me. This unfinished one that I live in now was constructed by my son who is in the US. No one cares about us anymore..." (U07GM).*

Although those fortunate to be given houses at the URC complained of their poor state, not everyone was fortunate to have a house at the camp. A few survivors who were promised houses did not have one and they had to live with friends and relatives at the camp. For such people, homelessness remains a chronic condition as they experience a lasting sense of "placelessness". These findings are in line with others, which shows that if resettlement policies do not explicitly provide improvement in housing conditions or if compensation for demolished shelters is paid at assessed value rather than replacement value, the risk of homelessness increases (Cernea, 1997, 2005).

### **Increased Morbidity and Mortality**

It has been known that declines in health can result from displacement-caused social stress, insecurity, psychological trauma, and the outbreak of relocation-related illnesses (Shears and Lusty, 1987; Toole, 1995; Collins, 2009). Though the measurement of social stress and disease is beyond the scope of this thesis and not a core objective of the study, from the responses, personal observation and attitude of many of the URC residents, it was clear that many people are suffering from social stress. This should be the case with many of the elderly people in the camp because more than 95 percent of those above the age of 50 complained in

their words of “*always been sick since I came here*”. Some authors have highlighted exposure to “social stress” as having differential consequences on mental health across age, gender, marital and occupational status (Scudder, 1993; Turner et al., 1995),

In the IRR model, morbidity and mortality are addressed specifically to the variety of diseases to which resettlers are prone. The context addressed here is concerned more with access to medicine, medical facilities and treatment. From respondents’ responses, it appears that the URC residents have very little access to medicine, medical facilities and treatment for the range of diseases that they are faced with in the camp. Survey data reveals that common infectious diseases suffered by survivors include gastric problems, and malaria.

Responses reveal that the camp has no medical officer, medical facility and medicines for the residents, contrary to government promises to provide these facilities. The camp residents have to walk about 10kms on a poor, muddy and hilly road to Wum town to get medical attention, treatment or buy drugs. Interview responses reveal that prior to the disaster and subsequent displacement; many common illnesses like fever, malaria, and dysentery were treated in Nyos by traditional doctors, using concoctions prepared from local herbs. This reduced their dependency on modern drugs. Unfortunately many of the traditional doctors died during the disaster. To make matters even worse, many of the local herbs that the survivors knew in Nyos are not found around the camp. These limitations have compounded their health problems and could probably lead to increased mortality in the absence of preventive health measures. Unfortunately no statistics exist in the region to show the scale of mortality and mobility due to these health problems.

### **Food Insecurity**

The problem of loss of extensive fertile lands in the Nyos valley and the smaller infertile lands around the camps, together with the loss or under-utilization of livelihood skills, suggests that food insecurity may be worse for the LND survivors. Survey data shows that 75 percent of the displaced household heads are farmers. According to respondents, food production in the camp is far lower than they could achieve in their native land. More than 90 percent of respondents said that the food production is not enough to feed their families and provide additional income to meet other basic needs. They are also not able to cultivate a variety of food crops, because of limited farm land and also because some crops do not grow well in their present location. Although undernourishment was not assessed quantitatively,

observations showed that the camp dwellers do not eat a balanced diet. The staple food of these people is “corn fufu”, processed from maize, and this is what they eat most of the time.

### **Loss of Access to Common Property**

The most important common property or common pool resources that have been lost by the URC survivors are the sparsely forested land and raffia palm bush within the Nyos vicinity and extensive grazing lands around Nyos village. Since their relocation to the URC, several social tensions have developed between the survivors and their hosts over land for farming, grazing and firewood (a critically important household resource since it is used on a daily basis for cooking). Households at the URC now compete in the search for firewood within the camp’s vicinity. Many of the URC residents explained that they now have to search very hard for firewood, unlike in Nyos where it was readily available. This competition has made the URC residents develop a new habit of storing firewood in order to be sure that the resource is available when needed. During the fieldwork, large piles of firewood could be seen stored on the side of the camp houses (Figure 7.10).

One of the main problems that those who have decided to start grazing are facing is lack of grazing land around the camp. Fertile grass land is abundant in Nyos, (the area used to be the highest producer of cattle in Menchum division and the North West Province). The extent of grazing fields on the many hills in the disaster zone is a resource that is unavailable to the residents of the camp. The common property resources of the LND survivors do not appear to have been considered in the relocation schemes and resettlement plans by the government. Other research evidence shows that loss of access to common property assets that belong to relocated communities (such as forested lands, water bodies, grazing lands, burial grounds) results in significant deterioration in income and livelihood. Several studies have shown that edible forest products, firewood and deadwood, common grazing areas and public quarries account for a significant share of poor households' income (Sequeira, 1994; Mathur, 1997).



Figure 7.10: Firewood stored at the side of camp houses. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

### **Social Disarticulation**

Respondent's experiences in URC parallel other research findings that forced displacement unravels spatial and cultural based patterns of self-organisation, social interaction and reciprocity, which represents loss of valuable social capital that compounds the loss of both natural and man-made capital. Community disarticulation also disperses and fragments communities, social groups or organizations and scatters kinship groups (Cernea & McDowell, 2000:363-364). The disaster incident and activities leading to the temporary and permanent resettlement in the URC have caused a net loss of social capital in the community. This was revealed in many ways at both intra-household and community levels.

Widows complained that the loss of their husbands had increased their burden in providing for the family. Young men complained that they lost property (mostly cattle), which they were expecting to inherit from their parents as is the tradition of the area. The death of almost all the cattle in Nyos created a major problem in the community because cattle rearing were the main livelihood activity in the area. Parents and their sons were deeply engaged in keeping cattle and since most of the children did not go to school, it meant they only had to inherit or be given part of the property to start their own life. The death of livestock meant that most people and young men had virtually nothing left on which to build their lives.

Apart from the death of many “*bread winners*” upon which many others were dependent, post-disaster resettlement further disrupted the remaining social networks. Many family members are separated by the relocation of survivors into the seven resettlement camps

thereby weakening their social ties. Oliver-Smith (2005b) posits that uprooted people generally face the daunting task of rebuilding not only personal lives but also those relationships, networks and structures that support people as communities. Individuals traumatized by loss and suffering due to resettlement are often unable to reconnect or re-enter the weave of the torn social fabric that was their community (Cernea and McDowell, 2000). It was due to the recognition of this problem that countries have been urged to strengthen the implementation of social safety-net mechanisms to assist the poor, the elderly and the disabled and other populations affected by disasters (WCDR, 2005)

The unraveling of spatially-based patterns of self-organization, interaction and reciprocity is a net loss of valuable social capital that compounds the loss of natural and man-made capital. Just like the loss of common property resources, social capital lost through social disarticulation was not considered in the resettlement of the LND survivors. This is probably why the survivors were relocated in a dispersed manner rather than relocating them in groups and social units. According to Cernea (1997), this real loss will reverberate long and detrimentally during subsequent periods because as Downing (1996) states "*The people may physically persist, but the community is no more*". It's spatial, temporal, and cultural determinants are gone. It has also been argued that the heaviest costs of all for relocated people are the severing of personal ties in familiar surroundings, to face new economic and social uncertainties in a strange land (Sowell, 1996).

Other research findings has shown that when faced with deprivation, one way displaces cope is through the maintenance of their rural kinship ties, which play a critical role in both daily survival and adaptation to extreme events such as natural hazards (Greenberg, 1986; Haque and Zaman, 1994). Some primary social groups in rural societies comprise of networks of social and religious links and interdependence whose participants are obliged to assist one another in the event of a difficult situation usually in the form of physical and financial aid, food and material support (Haque and Zaman, 1994:75). Societal reintegration is therefore a major challenge faced by the LND survivors.

### 7.3.2 DISRUPTED CULTURAL AND RELIGIOUS PRACTICES

Though not discussed under the IRR model, disruption of cultural and religious practices was identified as another factor affecting the lives of the URC survivors. Relocation to the URC has affected many traditional practices and traditional rights that constitute an integral part of their custom. It will be seen later in Chapter nine that cultural factors are responsible for

relocation back to the disaster site (see Section 9.2.4). Apart from the fact that some important traditional leaders were killed during the disaster, their displacement has also distorted some traditional institutions, which were instrumental in sustaining the people morally and psychologically. Some traditional ceremonies such as annual cultural festivals and others that are supposed to be performed in particular locations in their ancestral village (e.g. traditional rites for soil fertility) cannot be performed anymore.

The planning for resettlement at Ukpwa did not consider the faith or religion of the survivors. Interviews reveal that residents were unhappy about the neglect in considering their religion when the camp was being constructed because no place of worship was constructed. The URC residents are mostly Fulani who value their faith and religious practice very high. A place of worship is core to their livelihood and daily living. Most of the respondents felt the government was undermining their faith by not constructing a place of worship prior to their resettlement. An old man stated that:

*“The houses were not completed.....even a mosque was not constructed although they knew our religion. We had to construct the mosque ourselves with the help of some NGOs” (U06PR)*

The researcher was taken to the only house of worship in the camp, which the survivors constructed by themselves using local labour and building materials. Due to the poor construction, the small mosque that was built on the highest elevated area in the URC (see Figure 7.11) already has several cracks on the walls and floors. The camp dwellers did not have the means to obtain professional labour or to buy good building materials. They were assisted with some building materials like sticks, planks and zinc by the Wum local council and some NGO's such as Plan International and Helvetas. The survivors had to divert their labour, time and small resources towards constructing the place of worship. The quest for cultural and religious identity by the URC survivors is not surprising because as the works of Hansen and Oliver-Smith (1982) and Malkki (1992) show, those communities that can maintain their cultural identity and social fabric are more resilient in the face of dislocation and resettlement. Furthermore, churches, chapels, shrines have important symbolic meaning for communities. They serve as social resources that are tangible evidence of a group identity and necessary to reconstruct communities (Koenig, 2001).



Figure 7.11: Local mosque at the Ukpwa Resettlement Camp constructed by the survivors.  
Source: Author (picture taken during fieldwork in Cameroon in 2007)

### 7.3.3 INCREASES IN CRIMINALITY

Respondents complained of an increase in crime and other negative social practices, which were far less common in their ancestral village. With regards to crime, interview responses identified the stealing of crops in the farms and some basic household needs as new occurrences to which the survivors have not been accustomed. The URC survivors felt the perpetrators of such criminal activities were people from their host community and other young men in the camp. The difficult living conditions and increased poverty in the camp was mentioned by respondents as the main causes of such bad activities. Some attributed the increase in theft also to the closeness of the camp houses (Figure. 7.5), which makes it easy for someone to know what is in their neighbour's house and gain access to it. A female respondent stated that:

*“....stealing from homes and even crops in the farm is a common problem here. We live closer here .... Even though we are poor, some people keep stealing the little cooking oil, salt and other small items we keep in the house. This was rare in Nyos because our people don’t have that culture of stealing...because of the many financial problems we have, many people have started to steal” (U24RL)*

According to Harvey (1996), the built environment in which we live is a material instantiation of our social relations, and hence it is crucial in the process of community reconstruction. Poorly-designed housing and settlement can endanger the connection that

people establish with their built environment, violate cultural norms of space and place, inhibit the reweaving of social networks and discourage the re-emergence of community identity (Oliver-Smith, 1991). The results here suggest that the latter is the situation in the URC, where the construction pattern of the houses (very near to each other) is different from the scattered settlements of their original area. This arrangement may have exacerbated social tensions within the camp, often as a result of persistent theft. Plans and structures of resettlement camps are generally elaborated according to donor needs of efficiency and cost rather than the needs of the displaced to reconstitute their community. Long, even rows of barrack-like structures built for the uprooted and resettled can aggravate the social tensions and conflict that often plague such displaced populations. The social disarticulation these factors foster, undermines productivity and self-sufficiency. If a planned settlement does not take the form that affected people are used to and like, community recovery will be impeded and the settlement may fail (Oliver-Smith, 2005).

#### **7.4 SOCIAL MANAGEMENT OF THE LAKE NYOS DISASTER**

Although all forced displacements are prone to major socioeconomic risks (Cernea, 2004), it is not inevitable they succumb to them because DM processes can mitigate or prevent the impoverishment risks. As discussed in Section 6.2.2, the management of the long-term socio-economic aspects of the LND has not been very satisfactory (Bang, 2008B; Bang et al., 2009). Some of the social problems discussed in Section 7.3 (joblessness, homelessness, housing conditions and landlessness) can be influenced and prevented if robust and adequate social DM strategies are put in place. These factors fall within the progression of vulnerability discussed in the Disaster and Pressure Release Model of Blaikie et al. (1994) (Page 25), and also within the Human Use System of the conceptual framework of this thesis (Figure 3.1 in Chapter 3). This shows how the human and social systems operate to generate disasters by making people vulnerable (Blaikie et al., 1994:11; Hutton and Haque, 2004). In this case, not just how long-term recovery has been hampered by poor DM post-event but also how poor social management of displacement, has led to people placing themselves again at risk by returning to the disaster site. Survey data indicates that more than 95 percent of the displaced Nyos survivors have not yet recovered from their socio-economic problems since the disaster occurred.

#### 7.4.1 FAILED PROMISES

Promises that were made by the government to survivors during the crises period following the LND are mentioned in Section 6.3.2 on Page 138. Many promises relating to the development projects in the area are yet to be fulfilled. Interview responses reveal that the government has been repeating some of the promises to survivors since the disaster happened for more than 20 years but their rhetoric is not matched by actions. According to a respondent:

*“.....The government has made several promises to help us but very little is done. Our leader in this camp has explained our problems to the SDO many times and every time, he says he will communicate our problems to Yaoundé. But we never get any response. We get a few gifts only during political campaigns and during the commemoration of the LND every year”*  
(U06GM).

Most of these promises are repeated during the annual commemoration of the LND, which takes place every year. Despite persistent complains about the plight of survivors, issues are verbally addressed during these annual events by the SDO, Governor and other senior government officials, but little practical activity results. Promises to complete the uncompleted camp houses with toilets and kitchens and to provide a health centre and medical officer to cater for the health needs of the URC survivors have not yet been met.

Financial assistance to compensate the disaster victims who lost relatives and property during the LNM disasters has also not been provided. In Njindoum a respondent who lost a relative during the lake Monoum disaster said:

*“All those who lost relatives during the disaster were promised financial compensation by the government but nothing has been given to us till today as I speak with you. Some government officials duped us and collected money from us that they were going to follow-up the situation in Yaoundé. We lost that money as well”* (M16GM)

The assertion made by the respondent above was confirmed during a group interview in the palace of the chief of Njindoum during the fieldwork. Those present confirmed that after the Lake Monoum tragedy, some influential government officials, asked the villagers to contribute money, which they claimed would be used to follow-up their financial compensation in Yaoundé. The money was given to the officials but the villagers did not receive the compensation. These unfulfilled promises are certainly exacerbating the other problems faced by the survivors due to relocation and resettlement and certainly increase poverty. Prolonged and severe material deprivation in certain circumstances has been shown to erode the basic identities and interactions upon which community is based (Dirks, 1980). However, Oliver-

Smith (1992) argues that in disaster, the differential perception of whether aid should address basic needs or compensate for loss can generate serious social divisions along socioeconomic lines in stricken communities, impeding the reconstruction of society.

#### 7.4.2 INCONSISTENT ASSISTANCE TO SURVIVORS

Interview transcripts reveal that financial help has been promised several times but rarely do the survivors obtain any money from the government. Even if they do, they receive it in an uncoordinated manner. A respondent in Nyos village square describes one incident when a government minister visited LN prior to the anniversary of the LND and told survivors who gathered there that he had brought some help from the government. He describes how the money the minister brought was distributed to them:

*“The government has not given those of us staying here any assistance, in kind or in cash. I can remember only one time that a minister came here and gave us money in envelopes. He put money in envelopes and threw it in the air. Those who were there had to fight to pick the envelopes. Whatever you picked you took.....the amount ranged from 500 FRS to 2000 FRS. There were also the military men who guide the lake there so all of us including them had to fight to pick the envelopes. They picked most of it and only a few of us had something. I picked one envelope and opened to see 1000 FRS. That is all the money I have received from the government” (N01GM).*

The overwhelming opinion from respondents was that this ad hoc method was used to give the money because much of it had been embezzled. A few survivors receive some material help from the government during the annual anniversary of the LND. These items, which are often farm tools, are destined for all the survivors in the seven resettlement camps but because the items are not many, only few survivors get them. Respondents believe the annual commemoration of the LND is used as a publicity stunt by the government to give the impression that they are assisting the survivors. Soon after the occasion, nothing is mentioned again about them until the next anniversary.

During the fieldwork, the researcher participated in the 21<sup>st</sup> anniversary celebrations of the LND (Figures 7.12), which took place on the 25<sup>th</sup> and 28<sup>th</sup> of August 2007. The occasion was organised by the DCP in collaboration with the Ministry of Sports and Physical Education (MSPE).



Figure 7.12: Participants in front of the Wum grand stand about to begin the remembrance walk during the 21<sup>st</sup> Anniversary of the LND. *Source: Author (Picture taken during fieldwork in Cameroon in 2007)*

The main activities comprised of a remembrance walk around Wum (Figure 7.13) and a visit to the disaster survivors by the Governor of the North West Province who represented the minister of Territorial Administration and Decentralisation. Many government administrators, religious leaders and some NGO's (Figure 7.14) participated in the remembrance walk.



Figure 7.13: Remembrance walk around Wum in progress during the 21<sup>st</sup> Anniversary of the Lake Nyos Disaster. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*



Figure 7.14: Government officials and other guests in the grand stand in Wum after the remembrance walk in celebration of the 21<sup>st</sup> Anniversary of the LND. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

The researcher also played an active part in the celebrations and was awarded a certificate of participation (Figure 7.15), together with other participants. A more detailed account of what transpired during the celebrations based on the researcher's personal observation is presented in Box 7.1. This celebration took place when the researcher was almost at the end of his field work and it was an excellent opportunity for the researcher to observe the interaction between government officials and survivors. Government officials awarded trophies and certificate of participation to themselves and to other participants (see Figure 7.15 and 7.16). T-shirts prepared for the anniversary are an example of superficial help often given to the survivors.



Fig 7.15: Certificate of participation given to the researcher during the occasion of the 21<sup>st</sup> Anniversary of the LND.

It should be noted that the event held in Wum, about 45km from the disaster site. Initially the occasion was planned to take place in Nyos but the decision was reversed because of the very poor and inaccessible road. The promise to improve the road was made again during the 21<sup>st</sup> Anniversary of the LND (refer to Box 7.1). Many of the survivors that the researcher met at the celebration (Figure 7.16) did not believe that anything new will come out of that year's celebrations. However, it seemed the government had finally realised that the social problems of the LND survivors was a major concern because it was in the public domain. Responses from the main government personnel who make influential decisions about the management of the LND and also from speeches delivered by senior government administrators during the event gave the impression that finally the social problems have been taken on board and the government was now prepared to act. More than one year on, no major change has taken place. As this thesis is written, there is no sign that any development project has started.

### Box 7.1: 21<sup>ST</sup> ANNIVERSARY OF THE LAKE NYOS DISASTER

Celebrations commemorating the 21<sup>st</sup> anniversary of the lake LND were held on the 25<sup>th</sup> and 28<sup>th</sup> August, 2007 instead of the 21<sup>st</sup> of August, the date the disaster occurred. The government shifted the celebrations due to the opening of the new session of parliament following the twin municipal and council election that held in July, 2007. The main activity of the 25<sup>th</sup> was a solidarity march around Wum town while on the 28<sup>th</sup> the main item on the agenda was a visit to the survivors by the Minister of Territorial Administration.

The solidarity march was organized by the MSPE in collaboration with the DCP. The activities started at the main grand-stand in Wum at about 9am with exercises coordinated by physical education teachers from MSPE. About 300 people were present. The participants comprised of the civil society, prominent local government administrators, and other government officials from various ministries, senior military officials, religious personalities, some NGOs and survivors of the LND who traveled to Wum.

After the various exercises, the solidarity walk started and took about 3hours to go around Wum town. The march ended at the Wum main grandstand where it started. This was followed by a few speeches made by the SDO of Menchum, the Divisional Delegate of MSPE and a representative of DCP. The speeches centered on the significance of the day, the solidarity of Cameroonian with the survivors and government pledge to continuously remember the victims of the LND. After the speeches, certificates, medals and trophies were awarded to the participants. The awards went first to the government officials followed by the other personalities invited, and ended with representatives of the LND survivors. The following personalities were awarded certificates, with certificates of merit going to the top senior officials.

1. The SDO of Menchum	8. 1 <sup>st</sup> assistant SDO of Menchum
2. 2 <sup>nd</sup> assistant SDO of Menchum	9. The company commander of Menchum
3. The SDO of Wum Central	10. The commissioner of public security
4. Divisional delegate of Youth and Sports	11. The delegate for basic education
5. The delegate of Social affairs	12. Reverend sisters of Menchum
6. Delegate of public works	13. Delegate of Commerce
7. President of Red Cross	14. Commissioner of special branch

Three trophies were also awarded to:

1. The Divisional Officers-Collected by the SDO of Menchum
2. The Divisional Officer of Fungom sub division where Nyos is located and
3. Disaster Survivors- collected by the coordinator of Lake Nyos victims.

After the award of trophies, there was light refreshment comprising of soft and alcoholic drinks with snacks. The government officials and other guest were served in the grand-stand while the LND survivors queued to get their share. The ceremony ended after the light refreshment at about 4.30pm.

On the 28<sup>th</sup> of August, the governor of the North West Province, Mr Koumpa Issa traveled to Wum, where he represented the Director of Civil protection. The occasion began with an ecumenical service to remember the dead followed by a speech made on behalf of the government. The governor announced a CFA 24 billion package targeted towards the Nyos project to relocate survivors. He said the project involved the degassing of the lake, which is on course, construction of houses, schools, health centers, roads and other facilities to improve the wellbeing of the survivors. He also announced the construction of a monument for those who lost their lives during the disaster.

He also announced that he was the bearer of gifts from the government comprising bags of rice, salt, oil, mattresses, beds, corn mills, school needs for children and financial assistance to orphans. He said these items would be handed over to the leaders of the seven resettlement camps for onwards transmission to the survivors. The governor said the gifts were worth 15million CFA francs and reiterated that the wellbeing of the survivors have always been the concern of the government.

*Source: Author (based on his personal experiences during the 21<sup>st</sup> Anniversary of the LND)*



Fig 7.16: LND survivors and other participants who attended the 21<sup>st</sup> anniversary of the LND queue outside the Wum grand stand to be entertained after the occasion. *Source: Author (picture taken by author during fieldwork in Cameroon in 2007)*

#### 7.4.3 POOR TREATMENT OF DISASTER SURVIVORS

There is the general perception among disaster survivors that they have been poorly treated and neglected by the government. Respondents complain that the government does not listen to their social problems or fails to take any action. Many survivors feel they are just being neglected or have been abandoned to fend for themselves because no one gives them any attention despite the numerous problems they are facing. A respondent said:

*“The government does not bother about what happens to us. We have been abandoned in this camp to fend for ourselves. No one listens to our problems. We are really suffering and do not have any assistance” (U19 GM).*

Some survivors confirmed that they have been receiving assistance from the Wum rural council controlled by the SDF opposition party and from Helvetas and Plan International. Helvetas have provided them with a hydraulic pumped well from which they get good water. Plan International also assisted the camp residents to start animal farming through the supply of goats and fowls. The NGOs have also provided other farm utensils and organised workshops to train the survivors on basic agricultural techniques and micro-credit schemes.

Interview responses also show that respondents feel the government is discriminating in its treatment of disaster victims in the country. The general impression is that disaster victims from French speaking Cameroonian are treated better than those from the English speaking sector. Some informed respondents cited examples of the Nsam fire disaster in Yaoundé, which occurred 11 years after the LND and that the victims and the families of those

who died had been compensated financially. But victims of the LND, which occurred earlier, are yet to receive any compensation although this was a natural event unlike the Nsam fire disaster, which was triggered by people trying to steal petrol. A respondent at the URC had this response:

*“For managing the disaster, I can give them a fair mark but the management could have been better. The Nsam disaster victims were responsible for their death because they went to steal fuel from a truck but they have been given more assistance than those of us here who suffered a natural disaster that was not caused by us. The government gave huge sums of money to them a few years after the fire accident but has not given us anything although the LND occurred many years before the Nsam fire disaster. This shows that the government favours those people because they come from President Biya’s Province and are closer to the administration”* (U01GM).

There were also complaints from respondents that compensation is regularly given to victims of other natural hazards such as landslides, storms and floods in other parts of the country shortly after those events happen.

The LND survivors feel they are being unfairly treated for two main reasons. The first is because they are Anglophones or English Speaking Cameroonians from the North West Province. This links with wider allegations in the country that Anglophone Cameroonians are being marginalised by their majority French speaking counterparts who live in eight out of the ten provinces in the country. Survivors in the camp also held this view:

*“.....I am not surprised with the way we are treated. Anglophones are generally treated very badly in this country. We hear that the government has assisted many victims of natural disasters in the French speaking part of this country but does not want to help us because they say we are Anglophones and supporters of the SDF”.* (U11GM)

This has led to secessionist movements like the Southern Cameroon’s National Congress (SCNC) calling for the separation of West Cameroon (North West and South West English speaking Provinces) from the rest of the country. Though most of the main resources in the country are located in West Cameroon, this part of the country is argued to be marginalised politically, socially and economically (Mbuh, 2005).

The second reason is political. Disaster survivors hold the strong belief that the reluctance to solve their problems is partly due to the fact that they are sympathisers of the main opposition party, SDF whose founder and headquarters are in Bamenda, the capital of the North West Province. Whether this is true or not is beyond the scope of this thesis but there is the common feeling among survivors that they are treated unfairly compared to other

disaster victims in the country. Respondents reveal that during political campaigns, politicians from the ruling Cameroon People's Democratic Movement (CPDM), that has been in power since 1982 have been repeatedly warning them to vote for the CPDM if they want their problems be resolved. A survivor at the URC made this comment:

*“....I think they do not want to support us because they accuse us of supporting the opposition. During the recent municipal elections, those campaigning for the CPDM told us that if we continue to support the SDF, we will not receive any help from the government. They said if we vote for the CPDM, then our problems will be solved easily....” (U08 GM)*

The CPDM party have always lost all elections in this region and the entire province as a whole. The unpopularity of the main ruling party in this part of the country is regarded as a reason why the government has a lukewarm attitude towards solving the socio-economic problems of this region, including the long lasting problems that the disaster survivors have been experiencing for more than two decades.

## 7.5 SUMMARY

The economic crisis that Cameroon experienced in the 1980s, the devaluation of the CFA francs in 1994, embezzlement of state funds and economic mismanagement has set the precedence of Cameroon's continuous weak economy. This has impacted seriously on poverty, development projects and the management of state institutions and is an important factor in the weak long-term response by government to the Lake Nyos Disaster.

This Chapter has shown how multiple aspects of poverty have reduced the capability of the LND survivors to recover from the impact of the LND and, by acting as a driver for subsequent relocation to the disaster site, makes them more vulnerable to subsequent hazards. Institutional assistance to the survivors is infrequent, and reliance on traditional social networking and kinship for assistance is very weak since the survivors were resettled in seven different camps and separated. This removes past securities, increasing vulnerability and social problems. When reflecting on their past, most displaces tended to fall into a mindset that has been called “*the wished-for former state*”, that refers to idealized images of the community before the displacement (Oliver-Smith, 2005).

Interview data and inferences from them reveal that legitimate expectations of the disaster survivors are intimately linked to social, economic and cultural/religious factors. The disaster survivors expected that the resettlement planners would consider their extended family relations, potential increase of family sizes and houses when choosing camps. Though

resettled in uncompleted camp houses, it was also expected that the houses will be completed soon after they move in as promised by the government. With limited income from the main livelihood activities in the camps (farming, hunting and cattle rearing), the survivors expected the government to give them more access to land, and also to regularly provide them with fertilizers and farming tools. To ameliorate the hardship in the camps, it was also expected that the government would fulfill the promises made after the LND, especially financial compensation for the victims or those who lost relatives. The survivors in the Ukpwa resettlement camp thought that since the government knew their culture and religion very well, a mosque would be constructed for them. Unfortunately, these expectations were not met, exposing the failures in the socio-economic management of the disaster as has been shown in the Chapter.

It should however be noted that the resettlement processes responsible for impoverishment do not play out in isolation from the wider political, economic and social context. The difficulties faced by uprooted communities, as has been shown by this case study, is as much due to poor DM policy, implementation of DM measures and the non-recognition of the plight of the survivors.

## CHAPTER EIGHT

### RISK PERCEPTION

#### 8.1 INTRODUCTION

Ideas of risk and its perception reviewed in the earlier part of this thesis are a critical theme in this research and this Chapter focuses on themes of knowledge, communication and attitudes to risk. Approaches to risk analysis in Cameroon employ mostly technical perspectives as the analyses in Chapters five and six have shown. However, the conceptualization of risk in this thesis is both as a physical and social attribute. The Impoverishment Risk and Reconstruction (IRR) model has been used to show that resettlement can cause socio-economic processes that undermine livelihoods and wellbeing. The socio-economic condition of such hazard-affected communities influences their knowledge and attitude to risk. It is not only relevant to understand the perception of decision-makers, scientists and policy-makers who plan or design strategies to reduce vulnerability, but also the often neglected populations who are affected or vulnerable to these hazards/disasters. This is because the fundamental base for their decisions and resultant actions or behavior concerning natural hazards and disasters are shaped by individual and collective perceptions of risk (Tobin and Montz, 1997). Many disaster researchers posit that people's Risk Perception (RP) can be used to predict natural hazard judgments, preferences, preparedness and behaviours (Slovic, 1992; Oliver-Smith, 1996; Whitehead et al., 2000; Ronan et al., 2001). However, it has also been asserted that the impact of RP on preparedness intentions seems much higher than on actual preparedness behaviors (Paton et al., 2001).

The threat posed by LNM and especially the very high fatalities of the LND raise questions about how the affected community is reacting, or responding to these disasters, and potential future hazards in the region. To understand these behaviours, the research question "*How do people perceive and respond to the risk that still exists in the disaster areas?*" is addressed in this Chapter. The aim is to analyse the perception of risk by the case study populations and the various stakeholders in DM. Revealed and expressed perceptions of risk are used as the main analytical techniques to understand this process.

Revealed risk is analysed through careful responses and behavior of the disaster survivors and disaster managers. Expressed preferences are obtained through interviews, which were designed using risk attributes and determinants of perceived risk. These two risk measurements are utilized in this Chapter to understand disaster survivor's attitudes towards

contemporary risks and to gain insights on how disaster manager's RP influences effective DM and DRR in Cameroon.

## **8.2 DISASTER MANAGER'S PERCEPTION OF RISK**

### **8.2.1 REVEALED PERCEPTION OF RISK**

From the preceding Chapters, one can deduce revealed perceptions of risk from the legislative, institutional and administrative DM framework of the country discussed in Chapter five. Attitudes to risk are also revealed in the long-term management of the LND.

#### **Disaster Management Framework**

A close examination of the legislative framework in Cameroon reveals that disaster manager's perception of social risk management is limited to the crises period and the period following the immediate aftermath of a hazard or disaster. The long-term management of social risk including the secondary effects of primary physical risk is not considered. The legislation does not address the plight of populations affected by natural hazards in the long term. No laws or regulations on the monitoring and management of displaced populations exist. However, legislations exist on some specific aspects of DM such as relief and rescue operations and technical modes of disaster prevention (e.g. Decree N° 98/031 of 09 March 1998 relating to the organization of emergency and relief plans and Prime Ministerial decision N° 037/PM of 19 March 2003 creating a National Observatory for Risks). The non-existence of regulations on the management of the long-term socio-economic problems of disaster-affected populations suggest disaster managers perceive that problems created by physical risks can be completely resolved shortly after the catastrophic events.

The oversight in the long-term management of the socio-economic aspects of the LND was due probably to the fact that the DM legislation and institutions in Cameroon attempt to address all the different types of disasters, without giving special attention to natural disasters whose impact can cause displacement, which may continue to impact the population long after the cessation of the relief and rescue operations.

#### **Disaster Management Process**

Though many researchers in DM favour the management of all disasters (natural, technological and human induced) by the same agencies, I argue that special attention is required in the legislative, institutional and managerial processes for natural hazards whose

secondary effects can inflict long lasting socio-economic problems on the affected populations. Disasters normally require immediate assistance to the affected populations and the problems created by some rapid onset disasters may be resolved a few weeks or months after these incidents. But disasters such as the LND can take many years if adequate DM decisions are not made in consideration of the social problems they may create.

This proposition seems to be justified through a closer examination of the management of the LND discussed in Chapter six. During the crises period of the LND, three committees were created to manage the relief aid and its associated logistic operations in the disaster site (a National Committee for the Reception and Management of Relief Aid, and two other provincial committees for the reception of aid in Douala and Bamenda) (see Section 6.1.2). Interestingly, no committees were formed to manage the long-term social problems created by the disaster though it was obvious that those displaced by the disaster would live in camps for many years. This oversight occurred either because this specific issue was not addressed in legislation or because the government did not understand or anticipate the socio-economic problems likely to be faced by the disaster survivors.

The concentration on technical aspects in the management of the LND also reveals that disaster managers tend to prescribe technical solutions to disasters in order to mitigate subsequent impacts. This 'realist' position that is common among governments (see Section 2.4.1), is shown by the domination of the NMDP in the management of the LNM disasters, while the socio-economic problems created by displacement and resettlement have been virtually ignored for more than two decades now. It is notable that amongst many other livelihood and social problems, the survivors of both disasters remain uncompensated decades after the tragic incidents, despite government promises to compensate them. This argument is further strengthened by research evidence, which shows that many promised development projects in the disaster affected areas have not been carried out though some of these projects would facilitate the technical management. For example, the road from Wum to Nyos (see Figure 8.1) has not been upgraded to make the disaster area accessible. This would not only facilitate the movement of equipment and other resources necessary for the NMDP, but would also benefit the disaster survivors especially as a farm to market road. Only high military trucks and 4-wheel drive vehicles can use this road during the dry season, hampering the development of the region.



Figure 8.1: Two sections of the road to Nyos village. *Source: Author (picture taken during fieldwork in Cameroon in 2007. Researcher in picture on his way to Nyos)*

### 8.2.2 EXPRESSED PERCEPTION OF RISK

#### **Cameroon's Natural Hazard Mitigation Program**

Based on disaster manager's expression of the success rate of Cameroon's DRM, it could be inferred that most respondents consider risk to be a physical attribute. More than 95 percent of DM at the national level considers mostly technical and scientific factors when making an assessment of the success rate of DRR strategies in the country. The NMDP is viewed by many as the only tool that can be used to measure Government's engagement in reducing the risks from the area. This skewed view is supported by past research on RP, which has shown that governments, science and industry usually adopt a realist or objective approaches to risk (Williamson and Weyman, 2005; also refer to Page 39 in Section 2.4.2). When asked if they were aware of disaster mitigation/management plans for the Nyos/Monoum areas, responses like

*“A degassing project has been going on in both lakes for many years now. The aim is to reduce the gas in the lake to prevent any future gas explosion” (D05NMM); “....You can get more information about the NMDP from the National Institute of Geological and Mining Research in Yaounde, which is coordinating the gas removal in the Lake...” (D06NMM); “A lot of money is being spent to reduce the gas in the Lake” (D09NMM).*

Reducing the social and economic risks caused by resettlement through social management of survivors is not considered a viable option in the assessment of the success of the mitigation

program by many stakeholders involved in the DM process, especially within the government department. This further supports the hypothesis that the LNM disaster management has been skewed mostly towards technical means, influenced at least in part by disaster managers' perception of risk.

### **Natural Disaster Risk Assessment**

Interviews with disaster managers suggest that their risk assessment is influenced mainly by scientific and technical processes. More than 65 percent of disaster managers interviewed rate the risk of disasters occurring in the country to be moderate and high based mainly on the frequency of natural hazards on the CVL. Their judgements do not consider the processes operating within the human system that can mitigate or prevent these hazards from becoming disasters. Many responses were similar to those mentioned below:

*"I think the risk is high. This is because you cannot stay for two months without hearing of a natural hazard especially in the rainy season. We always have many floods and landslides every year, which makes the risk very high" (D01HRA); "Cameroon is a country that is prone to natural hazards because of the many volcanic eruptions that occur here. Apart from eruptions, landslides also occur frequently all over the country. The risk is very high" (D05HRA). As a geologist you know why the risk is high. The frequent volcanic eruptions, the gas stored in the lakes..... is testimony that this country is at great risk to hazards ....." (D06HRA)*

This also supports the argument that their perception of risk is mostly from a technical, scientific or structural and physical perspective.

### **Cameroon's Preparedness and Resilience to Natural Hazards**

Expressed views by disaster managers within the government sector on Cameroon's preparedness suggests that the country is well prepared to tackle natural hazards from volcanic origins like lava flows and gas emissions from crater lakes. It seemed fashionable to use the NMDP as an example to show how the risk from another lethal gas discharge from the lakes can be managed. Government sources also talked of more investments in scientific monitoring equipments like seismographs on Mount Cameroon to predict future eruptions and minimise any casualties. A disaster manager at the national level responded that:

*"I think scientifically the country is very prepared. Through external help, a lot of money is being spent on scientific equipment to monitor and predict hazards like volcanic eruptions and the gas stored in some lakes. A similar project to that in Nyos and Monoum will be done in other lakes that may contain poisonous gasses. The government is committed to continuously*

*support the NIGMR in its programs to reduce the risk of natural hazards in Cameroon". (D05VPR)*

These responses show an inclination towards physical vulnerability reduction, further confirming the general perception of risk, which is highly polarised towards scientific aspects. Past research shows that the interpretation of perceived physical risk, which acts as a catalyst for preparations to minimize harm is sustained and nurtured by public sector bureaucratic disaster agencies that dominate DM (Mamun, 1996; Kirschenbaum, 2003). However, a few respondents, especially those within the non-government sector acknowledge that the poor economic state of the country, corruption, embezzlement and inefficient DM exacerbates vulnerability to natural factors. A respondent in charge of DM at the local level said:

*I think Cameroon is not prepared for future hazards because it seems the government has not learnt anything from previous hazards. The LND is a good example. More than two decades since it happened, the victims have not recovered because of government neglect and poor management of the social problems of the survivors. This problem is worsened because corrupt officials embezzle even small gifts and money donated by well-wishers to the survivors. If these attitudes do not change, many more people in this country will continue to suffer from disasters. It is the responsibility of the government to make sure that the social problems of survivors are also solved..... (D02VPR)*

The different opinions expressed by disaster managers from different sectors suggest that those within the government departments (national and local levels) are keen to protect or defend government position on the general management of disasters in the country. Those within other sectors (non-government sector) seem to project a more objective view of the DM situation in the country and their perspective of risk encapsulates both the technical and social aspects. It is not clear if the defensive position shown by government administrators means they are conscious or not of the social risk aspects of DM. But from the DM policies and the practicalities of DM in the country, we can at least infer that the overall risk reduction strategies of government are driven by a 'public transcript' of risk that constructs it basically as a physical attribute, which has mainly technical solutions (Bryant and Bailey, 1997).

### **8.3 DISASTER SURVIVOR'S PERCEPTION OF RISK**

As in Section 8.1, here we examine first the revealed perception and then the expressed perception of risk.

### 8.3.1 REVEALED PERCEPTION OF RISK

For the study populations, analysis of revealed perception of risk is based on the behaviour and attitude of those affected by the LND and the LMD. This is based on the assumption that our actions are framed by the type of perceived threat and its inevitability (Kirshenbaum, 2005). The analysis covers disaster survivors affected by the LND who have relocated back to the disaster site and those affected by the LMD whose activities still interact with the Lake.

#### **Relocation to Disaster Zone**

After the LND, the affected area was pronounced a disaster zone by the government and everyone within that area was evacuated to safety far from the region. The area was declared unsafe and the residents restricted or prevented from coming back because the gas threat, which caused the disaster was still considered to be high. As this thesis is being written, the area is still declared unsafe as measures to reduce the gas risk from the lake through the NMDP continue. However, many survivors who were resettled in camps have relocated back to the disaster zone. Field research evidence suggests that more than 300 people are permanently living in the LND area with about twice that number who visit the area at intervals and live there on a temporary basis. Research in other parts of the world has also documented cases where populations living near active volcanoes or geological faults remain or return to their former homes after a disaster (Alexander, 2000). This behaviour defies any simplistic assumption that perceived high risk of occurrence and severe consequences to oneself, family or community should lead to specific behaviours such as evacuation and preparedness (Kirshenbaum, 2005).

Research evidence also shows that even non-natives of the area who were not affected by the disaster have also moved to live in the region. The reasons for their in-migration to the disaster zone are discussed in the next Chapter but this action alone raises interesting questions about how they perceive the risk in the restricted area. Interviews indicate that relocation and in-migration to the disaster zone are due mainly to economic factors. Past research evidence indicates that people's adoption of hazard adjustments is linked with the perceived cost of these adjustments in relation to household income (Peacock, 2003; Peacock et al., 2005). The relocation behaviour suggests either that the relocated population does not consider that the restricted area poses any serious threat to their lives, or that the advantages of living with the risk outweigh the gas threat in the area.

### **Living in Close Proximity with Lake Monoum**

The revealed RP of the returnees to Nyos village is also shown by the Njindoum residents who live close to Lake Monoum. Although the residents of Njindoum were not evacuated from their village after the LMD, they were restricted from close proximity with the Lake. People who lived very close to the lake were told to move further away, farms near the lake were abandoned and livelihood activities in the lake were prohibited. The prohibition on fishing was taken very seriously after scientist expressed fears that any disturbance on the water column may trigger another gas burst from beneath the lake. Like LN, the area is still not safe since the degassing project is still continuing. However, at the time of the fieldwork for this research, farming activities were in full operation around the lake. The young villager at the extreme right in Figure 8.2 below was seen farming less than 50m from Lake Monoum.



Figure 8.2: Farming activities close to Lake Monoum. *Source: Author (picture taken during fieldwork in Cameroon in 2007. In picture are researcher “second from left”, research assistant “holding file” and local residents)*

Njindoum villagers were seen fishing in the lower sections of the lake in which degassing equipment were not installed. These prohibited activities are going on despite warning notices close to LM, warning of the danger of poisonous gases in the area (Figure 8.3). Another notice explains the carbon-dioxide detector installed close to the lake and the warning system associated with it.



Figure 8.3: Warning notice of gas risk at the entrance to Lake Monoum disaster zone. *Source: Author (Picture taken during fieldwork in Cameroon in 2007)*

Apart from livelihood activities, which are going on unperturbed around the danger zone close to the lake, field observations and experiences within the area indicates that there are no strict measures to restrict access to this risky area. It was observed that military guards are stationed permanently at the main entrance into LM, and restrict access to the lake through this point. Anyone who attempts to go to the lake through this entrance is questioned and many people are turned away or refused access (including the researcher until he provided a letter of introduction). However, the larger perimeter of the lake remains unguarded. Figure 8.4 shows the unguarded perimeter of LM, which has unrestricted access to the Lake.



Figure 8.4: Unguarded perimeter of Lake Monoum. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

Again it seems either that the lake is no longer considered dangerous by citizens in the area or

that they have re-engaged in their normal activities prior to the tragic incident despite being conscious of the risks in the area. The following discussions of expressed RP attempt to shed further light on these questions.

### 8.3.2 EXPRESSED PERCEPTION OF RISK

Data on expressed perception of risk was generated by empirical information from the three disaster affected study populations that are central to this study. These study populations could simply be identified as the displaced victims of the LND, presently living in the URC, former displaced victims of the LND who have relocated back to the disaster zone in Nyos and residents in and around LM who were not resettled and have not moved from the disaster area.

#### **Type and Origin of Hazard**

Survey data indicates that all disaster survivors (100 percent) and those interviewed in the URC were affected by the LND. Most respondents expressed doubt about the nature of the disaster as ‘natural’ as they had been told by the government and scientists. They believe the source of the gas was from the testing of a lethal weapon by a foreign government with the complicity of the Cameroon government (Bang, 2008B). A respondent in the URC had this to say:

*“I don’t think they are telling us the truth that the gas came from under the lake.....I believe it came from something that was put in the lake to kill us. Whatever it was, only God knows, but I’m sure that it will not be repeated. If they want to do it, they will surely go to another place. I’m sure it will not happen again so I’m not afraid to go back” (U10HA).*

Another respondent who expressed a similar opinion simply said “*Only God alone knows what actually happened*” (U06HA) and many said they hoped such an incident will not happen again. Survivors who had returned to the disaster zone share a similar opinion to their counterparts who are still living in the camps. They persistently recounted popular myths in the North West Province of Cameroon that the gas source was a trial bomb planted in the lake. Perceptions of disasters are to a large extent influenced by subjective interpretations of objective events (Slovic, 1999). According to past research, such interpretations are dependent on ethnic group identity (Fothergill et al., 1999; Buckland and Rahman, 1999) as well as community and social networks (Kirschenbaum, 2004). The LND occurred shortly before a state visit of the Israeli Prime Minister to Cameroon. Many survivors believe the hypothesis that the gas was the test of a new chemical weapon in the Lake by the Israeli Government and

that is why the Israeli prime minister was in Cameroon shortly after the incident to assess the success of the new weapon. These rumours, which are strongly believed by the people in the region, are in effect a social representation of risk: groups of individuals who have similar backgrounds or characteristics are likely to perceive risk of disasters in a similar light (Cutter et al., 1992).

### **Unusual and Unexpected Disaster**

Interviews suggests that many of the LND survivors are conscious that the disaster zone is still not declared safe but are not afraid to move and live there. Respondents argued that even if the area is declared safe, there is no guarantee that something unexpected like the LND might not happen again. Many of the survivors both in the disaster zone and at the URC felt safety was not an issue, because even the government and scientist have accepted that it was a strange type of incident that no one anticipated. As such, many UCR expressed the desire to move back to the disaster zone irrespective of whether it is declared safe or not. One respondent at the URC replied that:

*“Something might also happen here which we never expected and which no one ever told us before that it could happen. So I am not sure that we are also safe here or anywhere. I prefer to live in my village. Only God can safe us. If he wants something to happen, it will happen no matter where you are” (U15HAgas)*

This respondent said he is not afraid to go back and will prefer to die in his village like his relatives, rather than live and suffer in a foreign land. The same opinion is shared by those who had relocated to the disaster zone. More than 90 percent of those interviewed in the disaster zone indicated that they are no longer afraid of any gas eruption and are ready to live in their village with the treat of any subsequent gas eruption. When probed further on whether they are not afraid to die from another gas eruption form the lake, many replied that moving away from the area will not make them safe because another previously unknown and unexpected hazard might still occur where-ever they may be located. Interview transcripts suggest that many would prefer to die of an unexpected and sudden hazard like their relatives in their village of origin rather than die elsewhere.

### **Past Knowledge of Hazard in Area**

A majority of the respondents believe the LND was a one-off incident that will not happen again because it has never occurred before in that region. Respondents both in the URC and the disaster zone said they have never heard from their ancestors that any such tragic incident

had occurred in their ancestral land. Interviews show that respondents mention numerous cultural and mystical myths surrounding the lake, but none that relates to a devastating event in the past. A respondent in the URC replied that:

*“.....Our parents told us that the ancestors of the village are in the lake. When the Nyos people violate the traditions of the Land, the ancestors will be angry and the Lake will dry up. But they have never punished the village the way the gas did by killing many people” (U02/EH)*

A similar response was given by an elderly woman who insisted that the Lake has always been a source of inspiration and blessing to the village and what happened was very strange and abnormal. She said:

*“.....The ancestors of the village do not punish the people by killing them when they are angry. When the harvest is not good, we know that the ancestors are not happy and the chief makes some sacrifices in the Lake. What about all our cows that died? Those innocent animals were killed. I cannot understand what actually happened but the problem was not surely caused by the Nyos people” (U08/06)*

There is the overwhelming feeling among the interviewees that the LND was a one-off incident that might never happen again and this gives them the confidence not to fear another gas-related hazard. These expressions are in line with past research evidence that what we perceive as risky depends to a great extent on historical experiences that are culturally embedded in various social frameworks, including the community and the family (Kirshenbaum, 2005).

### **Hazard/Disaster Preparedness or Readiness**

Despite the many problems in conceptualizing disaster RP, the weight of the evidence points to its relevance for explaining disaster behaviors such as preparedness (Barberi et al., 2008). Hazard or disaster preparedness can be conceptualized as a social based event (Norris et al., 1999) and/or as a social psychological process (Enders, 2001; also see Section 2.4.2). Kirschenbaum (2002) describes preparedness in relation to obtaining supplies or provisions, planning for future threats, obtaining emergency skills and providing physical protection against potential disasters. In Chapter six, it has been shown that the government's disaster mitigation strategies focus mainly on technical aspects, dominated by the NMDP (see Section 6.3.1). It has also been revealed that no post-resettlement contingency planning was done (refer to Section 6.4.1), resulting to the dire socio-economic conditions in the resettlement

camps discussed in the last Chapter. The following section discusses how the disaster survivors would mitigate the effect of subsequent similar hazards or disasters.

Research evidence reveals three main ways in which the affected case study populations can prepare for or can mitigate the effect of another similar catastrophe. These strategies are influenced by the respondents' education and belief in risk mitigation.

### *Religious and Cultural Beliefs*

Some respondents in the three study disaster affected populations do not believe it is possible to prepare for any subsequent gas hazard from the Lake or to escape from its impact. This group of respondents seem to hold very strong religious and cultural belief (see role of cultural variables in risk perception on Page 39 in Section 2.4.2). A few argue that God or their ancestors wanted the tragedy to happen and only they can prevent it. Those who think the causation has cultural roots said the solution could be with the traditional rulers of the areas and/or their ancestors. According to a respondent:

*“..... I will go back to Cha and live there. I am sure the chiefs of Nyos and Cha have asked for protection from our ancestors. I am sure that if anything like that should happen again, my forefathers will prevent me from being killed just as those of other families did for them. I am confident that nothing will happen to me in Cha” (U15RI)*

This response support the assertion that cultural variables play an important part in how people understand risk and differences in public evaluations of risk might consider the social and cultural context in which those exposed to risk are located (Pidgeon et al., 1992). Respondents who had religious thoughts suggested that citizens of that area should get closer to God in order to avoid any subsequent disastrous happenings in the area. One resident in Nyos (N09DP) expressed his view that:

*“.....How can we be prepared for such a thing? Only God knows what truly happened here and only him will save us. When the disaster happened I was very afraid but now I have given my life to God so I'm not afraid anymore of the Lake. I pray every day to God and only him will save us here in Nyos. No one can save us here because if God wants it to happen, it will happen. No human being can stop it. So I think only God will protect us”.*

Some respondents think that because of their strong faith in God, they will be spared in case of any subsequent hazard or disaster in the area and therefore do not think any preparations are needed. From the perspective of these individuals, disasters are interpreted within religious and cultural milieu, and disaster risks are aspects of life over which they have very little influence or control.

### *Local Indigenous Method*

Some displaces in the URC and their counterparts who now live within the disaster zone are ready to use local indigenous methods to prevent death by inhaling gas. Such respondents think drinking palm oil and using it to rub their bodies will prevent death. Research evidence shows that respondents with this opinion now keep at least one litre reserve palm oil in their houses for this purpose. A respondent in Nyos village said:

*“I know what to do if the gas comes out again. I will drink palm oil and rub my body with it. I always make sure that there is enough palm oil in the house, which can be used. I hope you know that when the disaster happened, those who drank palm oil did not die” (N02DP)*

A young man in Upwa also expressed the desire to store palm oil if he returns to the disaster zone.

*“If I go back to Cha, I will always keep palm oil at home. I hear that if you drink it, you will not die when you inhale the gas. Those who drank palm oil when the disaster happened did not die” (U15/DP)*

This knowledge is not new in this population because some of the LND survivors used this method to protect their lives when the tragic incident occurred. The Cameroon Tribune (Friday 29<sup>th</sup> August, 1986:2) has the picture of five men in Nyos who drank palm-oil and survived the disaster. How this knowledge was generated or conceived is beyond the scope of this research but it could be important to carry out further anthropological research, in order to understand the indigenous knowledge base regarding natural hazards and their prevention as a whole.

### *Scientific Method*

Some residents in the Nyos disaster zone and Njindoum are conscious of the scientific means of avoiding danger from the gas in both lakes. These groups of respondents are aware of the carbon dioxide gas detector placed near both lakes and the sound warning system linked to them. On approaching Lake Monoum, there is a notice by the road side that warns of the gas danger in the area (Figure 8.3). There is also another notice placed by the NMDP closer to LM, by the side of the road that briefly explains the carbon-dioxide warning system and gas detector (see Figure 8.6) placed nearby. The notice (see Figure 8.5) explains that in the event of any gas discharge from the lake, an alarm will sound and a red light will be seen flashing on the carbon-dioxide gas detector and warning system.



Figure 8.5: Notice of carbon-dioxide warning system close to Lake Monoum. *Source: Author (Picture taken during fieldwork in Cameroon in 2007)*

Respondents in the disaster zone in Nyos have been given the same information informally by scientist. However, the study populations generally do not understand how it will work or how it will sound. Doubt about the success of the device was also expressed by some interviewees. Some were concerned about what might happen if the device sounded at night and the distance they might have to cover to reach safety in an elevated area or hill nearby. A respondent replied that:

*“I hope the gas does not happen again because I am not sure of what to do. We have been told by some scientist working in the Lake that if we hear a sound from the lake that means the gas is coming out so we should run to the hills. You can see that the closest hill here is where the lake is. If I have to go to the other hills, it will take me about one hour thirty minutes. If it happens in the night like it did the last time then you cannot run to the hills in the dark. Only God will help us here” (N12 DP).*

Other respondents were very sceptical about the possibility of moving their entire families (which comprise of elderly parents and very young children) in time and up elevated areas and, worse of all, at night. Research evidence suggests that because of such impressions, many respondents do not think the scientific method can be successful in preventing many people from being killed by another gas emanating from the lake.



Figure 8.6: Carbon-dioxide gas detector and sound warning system placed in Lake Nyos.  
Source: Author (picture taken during fieldwork in Cameroon in 2007)

According to Barberi et al., (2008), among the important factors that are thought to encourage community preparedness and resilience during and after the crisis are self-efficacy and sense of community. Likewise, stronger community bonds and attachments make it more likely that residents will participate in a community response to a disaster situation (Paton et al., 2001). Although there is a high sense of community in both disaster zones, the lack of self-efficacy due to poor or inadequate risk communication reduces community preparedness and resilience. The role of risk communication and community response to that information is now discussed in more detail.

### 8.3.3 RISK COMMUNICATION

Disaster researchers have since recognised the link between risk communications and disaster preparedness behavior, particularly the effect of official warnings. Some have shown that appropriate and reliable risk information or warnings influence risk perceptions, which in turn affects preparedness or protective behaviors (Mileti and Sorensen, 1990; Plapp, 2001). As explained earlier in the theoretical Chapters, research in this area is concerned with the ‘social amplification of risk’ or social processes that increase public concern and socio-political activity over some hazards (see Section 2.4.2).

## **Sources of Risk Information**

Risk information from government sources is one source of information. Apart from the annual celebrations of the LND when the media and speeches inform the general population of government's action or activities in the disaster region, some government officials occasionally pass on information to the public and the affected community informally.

Interviews reveal other risk information sources that are potentially available to disaster survivors. The most common and popular information source is from the general public. This source has a great influence on respondents. It leaves them with different opinions about the gas mitigation program and also influences their general perception of the disaster as a whole (such as the rumour, which links the gas disaster with the trial of a lethal weapon). One respondent at the URC was clear:

*“..... We are not having any information from the government about their work in the Lake so we cannot rely on them for help anymore because I think they do not care about us. Maybe they are not sure of what to tell us about what is happening in the Lake. The general public knows the truth about what happened in Lake Nyos and no one can deceive us again. They cannot lie to us anymore about what happened...” (U11GI)*

There is also evidence from interviews that the survivors take the opinion of their elites from Menchum division more seriously than any information they get from strangers or non-natives of that region. The general belief is that, elites from the disaster area will be more informed about the risk situation and can't lie to them.

*“.....People from this region who are educated know the truth about what happened in the Lake. They cannot lie to us because they are our children and what happened here also affected them. I believe in what they tell us more than anybody else.....” (N06GI)*

The researcher noted from interacting with people from this region that perception about the origin of the disaster as not being natural is a view that is also held by some elites from the region that has been transmitted to the local populations.

Survivors in the two study sites also get scientific information from scientist, researchers and tourists who visit the lakes. Njindoum residents gave different dates from within 3 to 6 years as the duration they have been told by scientists and researchers the degassing will be over and the lake will be free from any gas threat. Survivors of the LND could not give any time frame or interval for the completion of the degassing projects. Most interviewees' knowledge on the NMDP is that if the lake truly contains gas, then it still requires many more years for the gas to be completely removed. Interviewees in both study

areas admitted to have more confidence in information obtained from non-government agencies including, opposition parties, clergy men, elites of the region and NGOs. However, it is not quite clear if this group of people have been giving them information that is contrary to what the government is providing about the source of gas in the lake.

### **Inadequate Risk Information**

Respondents in the three study populations do not get sufficient information about the risk in both lakes from government sources. Research evidence shows that there is no steady or organized information channel to regularly update the affected populations about the progress in eliminating the risk in both lakes. Interviewees get information about the progress of the degassing project most of the time in an informal manner from talking with the Divisional Officers in the region or members of the public and scientists involved in the NMDP. A LND survivor responded that:

*“We are not getting any information from the government about what they are doing in the lake and when we will go back to Nyos. I have said they don’t care about us so they don’t bother to come and talk to us about the disaster just as you are doing” (U20GI).*

Most of the information about the NMDP is conveyed to the population only intermittently through government sources mostly during the annual commemoration of the LND, which takes place every year on the 21<sup>st</sup> of August. One respondent was very clear:

*“I have said that the government is not doing anything to help us or give us any information. The only time they say anything about the lake is during the celebrations of the Lake Nyos Disaster. That is when we hear they are removing the gas from the lake. After the celebrations, we don’t hear anything or see any government person” (U05GI).*

It should, however, be noted that information on the progress of the NMDP is available on the internet in various reports by the project coordination team and is regularly updated. However most of the affected citizens are not literate and do not have access to the internet. Most of the information communicated to survivors by scientists and tourists is probably information they have read from internet sources, which may be diversified or not consistent. The establishment of a reliable and consistent information communication channel to the affected population will certainly improve their knowledge and understanding of the technical safety measures going on in the lakes. However, numerous studies over the past decades have shown that merely providing an at-risk population with information about a hazard does not influence preparedness behavior (Paton et al., 2006).

### **Confidence and Willingness to Follow Government Advice or Orders on Risk**

Interview results show that respondents in both case studies do not have confidence in Government's information on the risk in both lakes. Respondents are generally suspicious of information from government sources that filters through to them. One main reason is the suspicion that the disaster was not natural as propagated by government sources and some believes whatever activities going on in the lakes are just a cover-up to conceal the truth of what really happened. Another reason identified during the research process is that failure by the Government to keep several promises made to disaster survivors has made them not to trust the government. An elderly female respondent was very annoyed about this issue:

*"I cannot trust them. No one trusts them here because they are liars. They have made many promises to us in the past but have never respected them.....We never saw the goats they promised to give to the women in the camp here. We finally had the goats from some NGO.....They gave one goat to each woman and we were told to give the first offspring to women who did not receive the assistance.....if the government has lied to us many times in the past, how can we believe that what they are telling us about the lake is true? (U03CI).*

Other respondent affected by the LND also expressed doubts about the certainty of any information from the Lake because they felt it has taken too long for the government to resolve the problem. A skeptical respondent said:

*".....It has taken too long to make the lake safe. If the government knows what happened as they claim, they should have solved the problem by now. I actually wonder if anything important is happening in the lake or they are just trying to give us the impression that they are working to make the lake safe" (N17/09)*

Though the Njindoum population seems to be more confident about the scientific information about the safety of the lake, the general impression held by most respondents is that the government is deceptive, untrustworthy and unreliable and therefore its information cannot be trusted. Therefore it is clear from the results that a major education-information effort is still needed to improve the survivor's knowledge and confidence, thereby improving their collective and individual capability to positively face subsequent hazards or disasters.

Past disaster research has shown that the level of risk perceptions affect our response to warnings (Mileti and O'Brien, 1992). Other findings suggest that responses to warnings are also influenced by a number of social and psychological characteristics of the population (Farley et al., 1993; Sorensen and Mileti, 1989). However, findings from this research suggests that response to warnings is also likely to be influenced by past disaster experience.

Responses to the willingness of disaster survivors to follow government instructions can be grouped into four categories: conditional; obey temporarily; will not follow orders or take advice; will follow orders unconditionally.

#### *Conditional*

Responses under this topic show that most survivors would be judgmental of any government orders or advice before deciding on a course of action. The general impression for those who held this conditional view is that they will initially examine the orders or advice given before deciding to take or ignore it. Research evidence reveals that this is a new attitude based on their past experiences with the LNM disasters. One man in Cha within the disaster zone stated:

*“I will not obey them. Except they tell me something I know is good for me.....we were sent to the camps and told that life will be better than in Nyos after the disaster. All we had in the camps was suffering until I decided to come back here. If I knew that was how I will live in the camp, I should not have gone there.....now I have learnt a lesson. No one can deceive me anymore. Not even the government” (N17GA).*

Another respondent in the URC also expressed his reaction to any subsequent orders from the government:

*“Well I will obey advice from the government because they have the power to control us. But that does not mean I will follow the advice if I think it will not be good for me. When we were told that we will come here, we did not expect to come and have all these problems and that the government will abandon us here. If I knew, I would not have come here. I cannot trust the government so I will not just believe what they tell me. I will first think about it before taking any orders from them now because of what I have experienced since we came to this camp” (U04GA).*

The disaster survivors also intend to consult with peer and social groups prior to deciding on any orders they might face from the government. Respondents indicate that they will consult with relatives, friends, family members and other members of their community before taking any actions that might affect their livelihood. Some believe it will be easier as a group to resist any government orders than as individuals. Those who have resettled to the disaster zone indicated that they did not have any intention to move from there irrespective of any orders to do so.

#### *Obey Temporarily*

Another group of respondents can be classed as those who will obey government instructions, even if they think they are not good, but only on a temporal basis. Respondents in this

category believe it is not possible to defy government orders because the police can be used to enforce them. However, they are confident that if the orders are not respected subsequently, the government will not do anything to reinforce them. An interviewee in the URC said:

*“It is difficult to resist government orders because they can send the police to arrest you. But I know that nothing will happen to me if I return to Nyos now. If you disobey instructions after you had earlier obeyed, they will know you have a good reason” (U10GA)*

Research evidence suggests that the survivors within the disaster zone in Nyos are aware that they are not supposed to be there and believe it would have been impossible to resist government orders to leave the area when the disaster happened. However the fact that nothing has been done to forcefully remove them is evidence that the government cannot continue to enforce decisions taken to keep them away from their village. A respondent in Nyos stated that:

*“.....I don’t want to leave Nyos. But if they ask me to leave, I will leave temporarily. When the tension has subsided, I will return. When the disaster happened they said no one should come back here. When the tension subsided people came back. You see we are many here now and they have not done anything to remove us. But they know that we are here. The SDO comes here and sees us and says nothing” (N11GI)*

#### *Will Not Follow Orders or Take Advice*

Another set of respondents were emphatic about not following any advice from the government, after the experiences they have had during their stay in the resettlement camp. These people do not believe that the government can tell them anything good or has good intentions for the disaster victims, following the sort of treatment they have received in the camps. A farmer in Nyos expressed his view on this:

*“.....If I was following their advice, I would not have been here. I can farm and feed my family here and no one will deceive me to leave this place. No matter what government officials say, I will not leave my village anymore....” (N06/GA)*

These respondents feel they have to take their own initiative to survive and cannot rely on the government because of the experience they have had since the LND. Another respondent simply said *“I came back here to stay and no one including the government will convince me to leave” (N10GA)*. A similar view was expressed by respondents in Njindoum who indicated that some unscrupulous officials extorted money from them after the LMD. Other studies have indicated that individuals who feel they have some control over their fate and believe they

have the skills necessary to take action, are more likely to actually adopt self-protective measures (Bandura, 1997; Lindell and Whitney, 2000).

#### *Will Follow Orders Unconditionally*

A few respondents in both study areas informed the research process that they did not have any intentions to defy government orders. These people expressed the idea that the government has the technical and human resources to know the risks in the region and are placed in the best position to advise them on what course of action to take. A respondent in Njindoum stated that:

*“I will take government advice because it is the government’s responsibility to protect its citizens. The government has educated advisers and scientists who can warn them of any dangers in the lake. If we are given any orders to protect our safety, it will be unwise not to follow them” (M07GA)*

Although some believe the government may not always make the best decisions on their behalf, they felt it was their responsibility as citizens to obey orders from the government and then to complain later if necessary. A Nyos survivor stated that:

*“The government has the powers to control everyone and it is difficult to disobey government orders. .... If I am told to leave this village, I will not disobey. I will return to my family in Kimbi...” (N18GA)*

#### **8.4 SUMMARY**

This Chapter has shown that the technical information of risk, which had dominated the Cameroon DRM system only partially, contributes to understanding of risk and determines risk behaviors or decisions. Results from the study populations on both expressed and revealed RP indicate that a complex set of psychological, social and organizational factors affect how individuals express their risk assessments. Examining the DRM framework shows the government’s perception of risk to be polarized towards technical or scientific causations. Efforts to mitigate the physical risk in LNM through the NMDP, without a project to cater for the socio-cultural and economic problems of the survivors, also reveal the skewed nature of RP in Cameroon. Disaster managers overwhelmingly indicate their perception of risk as a physical event whose prediction and mitigation lies in physical measures. The relocation of disaster survivors back to Nyos village and the resumption of livelihood activities close to Lake Monoum suggest that both populations perceive the risk in these lakes to be low or at least low enough to be tolerated. Expressed RP in these areas also confirms the revealed behavior. Survivors who had relocated to the disaster site in Nyos believe the source of the

poisonous gas was not natural while both the Nyos and Njindoum study populations believe both lakes would not emit poisonous gasses again for a very long time because such events are rare. The expressions of hazard or disaster preparedness and readiness are influenced by respondents RP, which is rooted in their religious belief, past and contemporary knowledge and information on physical risk in the area. Research evidence also shows that respondents have more confidence in risk information from other sources than from government sources. Analyses show that most respondents are not willing to take orders from the government without first reflection on the implications of such orders for their livelihoods. Based on the experiences of the socio-economic management of the disasters, some respondents feel that it is the responsibility of every citizen to take full control of their livelihood and safety rather than rely on the government.

## **CHAPTER NINE**

### **RELOCATION DECISIONS**

#### **9.1 INTRODUCTION**

The analysis of relocation decisions presented in this Chapter follows on from the previous Chapter because people's perception of risk when faced with natural hazards underpins their preferred relocation sites. This Chapter seeks to answer the fourth research question "What makes people settle or move away from the risky areas?" The objective is to explore and gain an understanding of the reasons behind the choice of where people decide to settle and/or resettle after the disasters. This Chapter forms the core of this thesis because it is not only influenced by the findings of other research enquires, but can also influence them. Ultimately, how relocation decisions influence the other main research themes will be explained in the new disaster model derived from this thesis in Section 10.2.

It has been known that people commonly return to restricted or forbidden zones after natural disasters (Norio et al., 2003; World Bank, 2006:46) but few detailed studies have been performed to understand the motivations for relocations. This research attempts to bridge this gap by examining how relocation decisions are influenced by vulnerability drivers, risk perception and disaster management. Understanding the motives for relocation or non-relocation from hazard areas will hopefully guide government's DM and decision making process, and enable decisions to be made that will not only benefit the affected populations but will also be respected by them. A comparative analysis of the non displaced Njindoum residents and of those who had returned to the disaster zone in Nyos provides insight into the factors that make people remain in or relocate to disaster areas.

This Chapter develops four themes related to relocation decisions based on empirical information from the study populations. The themes addressed are motivations for relocation back to the disaster zone, motives for non-relocation to the disaster zone, intention to relocate from present location, and preferred relocation area (when the disaster occurred or if another should occurs).

#### **9.2 MOTIVES FOR RELOCATION BACK TO THE DISASTER ZONE**

Empirical data for motivations to return to the disaster zone was generated from the disaster survivors who have moved back from the various resettlement camps and are living in the disaster area at the time of the fieldwork. Information from respondents in this area indicates

that more than 330 people are living in Nyos village while about 90 were living in Cha. Figure 9.1 is a photograph of the disaster area taken by the researcher during the fieldwork along the road that leads to Nyos.



Figure 9.1: Scenery of Disaster zone. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

### 9.2.1 SOCIO-ECONOMIC SITUATION IN THE RESETTLEMENT CAMPS

The deplorable socio-economic conditions in the resettlement camps are the main push factors motivating the survivors to relocate from there to the disaster zone. The impoverishment factors discussed in Chapter seven are mainly responsible for making people relocate back to the restricted disaster zone. Although empirical data to analyse the socio-cultural and economic situation of the disaster survivors was conducted at the URC, responses from disaster survivors from other camps indicate that the living conditions there are similar to those in the URC. Poverty and hunger in the resettlement camps are the main complaints given by residents in the disaster zone as the primary motive for leaving the camps. Information on the income of the studied populations, obtained through survey questionnaires (Table 9.1) shows that returnees to the disaster zone have slightly higher incomes than those in the camps. Although this data confirms information on the dire economic situation obtained from interviews, incomes in the disaster zone is not as high as would have been expected. This is

probably because as some respondents complained, the bad road makes it difficult to transport their products for sale in Wum.

Table 9.1 The average monthly income for the three study populations.

STUDY POPULATIONS	INCOME									
	Farming		Cattle Rearing		Salaries/Wages		Given by relatives		Remittances abroad	
	FCFA	US\$	FCFA	US\$	FCFA	US\$	FCFA	US\$	FCFA	US\$
Displaced Nyos Victims	12,900	29	14,500	32	4,200	10	4,000	9	10,000	22
Returnees to disaster zone	15,500	35	20,800	46	1,000	2	5,000	11	9,800	27
Non-displaced Njindoum residents	101,000	223	170,000	376	55,000	122	9,000	20	12,000	27

Respondents living in the disaster zone, (Figure 9.2) complained of acute poverty in the camps, which is exacerbated by poor soils and limited farming and grazing space for agrarian activities.



Figure 9.2: Houses in the disaster zone; Nyos (left) and Cha (right). *Source: Author (Picture taken during fieldwork in Cameroon in 2007)*

One respondent replied that:

*“I moved back here from Kimbi because we were very poor there without enough food and money. Here I am able to cultivate and sell maize, beans, groundnuts, yams and also bananas and plantains, which we have in our farm. I have more money here than in Kimbi though the problem we face*

*here is that of transporting the crops to the farm. At times my bananas are ripe and get rotten in the farm because I cannot transport them to Wum to sell since vehicles don't come here because of the bad road. But the little that we are able to carry on our head to sell in Wum still give us more money to pay the fees of our children" (N06MR)*

Apart from the land problem, which has been troubling the disaster survivors in the resettlement camps, the cattle of their host population, the Aghem<sup>26</sup> people, also eat and destroy the crops they cultivate. This has been an ongoing issue that the camp residents have not been able to resolve for many years despite several complaints to the authorities. A female respondent who has relocated back to Cha village stated:

*"What brought us here was hunger. We came back to Cha from Ipalim Camp and have been here for 8 years. At Ipalim camp we were working but the cows were eating our crops and when we complained, nobody listened to us. We were living there like strangers and suffering. Here we cultivate corn, cassava; plantains and the crops do very well" (N14MR).*

### 9.2.2 FERTILE VOLCANIC SOILS

The fertility of the Nyos Valley and Nyos volcanic plains (see Figure 9.3) is a crucial pull factor into the disaster zone. The fertility of this region has been known for a long time and the natives of this region have always known that they produce much food because their land is very fertile (Melinda, 2002:5). The Cha people are said to have come originally from Fungi and have moved to their present location to farm the land below Lake Nyos (Troyer et al., 1995). Most respondents (85 percent) made reference to the high richness and fertility of the soils in this region compared to the resettlement camps. The poorer soils of Wum and the surrounding areas create food insecurity to the Aghem people and the situation is worsened because the poor farmers do not have money to buy fertilizers, which can be used to enrich the soils (Thermoset, 2000). Interviews suggest that residents in the disaster zone have higher yields and incomes (see Table 9.1) than from the same farm size in the camps. Residents in the disaster zone also cultivate more variety of crops than in the resettlement camps. According to the account of one respondent in the disaster zone,

*"I came back to cultivate here because the soil here is very fertile compared to that in Kumfutu where I have been living since the disaster occurred. Here I can farm corn, ground-nuts, beans, sugarcane, cocoyams, egusi and cassava. In kumfutu, cassava does not do well. You can understand that if I really need to have more food then I had to come back because the crops grow better here and there are no cattle to destroy them" (N03MR)*

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<sup>26</sup> The word used to describe the language and inhabitants of Wum.

The field research process also discovered people who are living in the disaster zone but are non-natives of the area and were not affected by the disaster. Research evidence shows that some of these people have moved into the area from the neighbouring villages like Koskin, Fonfukka, Kong, Su, and Munken (see Figure 6.3) and from as far as Wum town. These in-migrants have taken advantage of the absence of most of the natives of that area and moved in to cultivate the rich soils. In Nyos, some in-migrants have been farming in the area for more than 15 years now and research evidence suggests that their numbers have been increasing over the years, with more and more non-natives from the neighbouring villages coming into the area. Many of the non-natives of the region do not live in the disaster area.



Figure 9.3: Fertile Nyos valley. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

A few live there temporarily but the majority only travel to and from the region on a daily basis to farm. Interview transcripts also reveal that many of these people are using the lands of the disaster victims they knew who either died during the disaster or are living in the resettlement camps. Some in-migrants in the region also claim the land they cultivate is owned by people they know and that they have obtained permission from the owners who are not resident in the disaster zone. However, others gave the impression that they were farming on land that is not occupied or has been abandoned.

### 9.2.3 FARMING AND GRAZING SPACE

One other dominant motivation for returning to the disaster site noted by respondents is the availability of enough land for farming and grazing. Many respondents who mentioned the fertility of the Nyos valley as a major pull factor also talked of the extensive land available for farming a variety of agricultural products. The respondents have overcome the land size problem encountered in the resettlement camp and are able to cultivate more crops and generate more income than in the resettlement camps. Survey data shows that 72 percent of those in the disaster zone are crop farmers and 24 percent grazers. A few people are engaged in both farming and grazing of cattle. Crops like maize, beans, cassava, groundnuts, egusi, plantains, banana and vegetables are grown on large areas (Figure 9.4). Respondents also indicated that the crops are safe from destruction by cattle unlike in some camps where cattle can easily enter farms and destroy or eat crops. In the disaster zone, the cattle are kept in hills and ranches far from farms and only few people have started livestock farming again since the death of thousands of cattle during the disaster. A transcribed interview reveals the account of a resident in the disaster zone:

*“I came back from Ipalm resettlement camp to farm because the land here is fertile and we did not have enough farming land there. Here we have enough land to ourselves and don’t have problems like we used to have in Ipalm with the natives over land. Before the disaster, I used to rear cattle but everything died and I was left with nothing. My wife was the one who used to farm. Since she died, I had to start farming because there was nothing else to do. We had our land here where she used to farm so I had to come back to continue farming on the family land we have here in Nyos”* (N17MR)

As mentioned earlier, some people who have returned to the area are engaged in livestock farming. Prior to the disaster, livestock herding was the main livelihood activity of the Mbororo people in this area. These pastoralists made a significant contribution to the economy of the region and raised herds primarily composed of breeds thought to be more resistant to trypanosomiasis (Frantz, 1981). Livestock farming is relatively low key in this region now, possibly because most of the cattle died during the disaster and the remaining cattle were taken out of the region. Respondents in the disaster zone who are livestock farmers have few cattle compared to the pre-disaster period. They stated that there is abundant green pasture for

the cattle and their only worry is salt that is needed to improve the diet of the cattle.



Figure 9.4: Extensive maize field growing in the Nyos valley. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

A respondent in Nyos who is engaged in livestock farming responded that:

*“I came back here to graze my cattle. There is enough land and fresh grazing pasture here. I was having problems in Ukpwa with my cattle because I didn't have enough land there. The land given to us by the government was very small. People's cattle often destroyed my crops and my cattle also encroach into the farms of other people and at times will damage their crops. I was constantly having problems so I decided to come back here where we have enough land.....we used to have more than five herds before the disaster” (N13MR)*

It should be noted that farmer/grazier problems are not uncommon in the Wum area where the URC is located. Several farmer/grazier conflicts, which have sparked serious protests by farmers in the region over the destruction of crops, have occurred in the past with the most recent happening in 2004. According to Nyeh and Chongsi (2005), a generation-old problem was repeated in 2004 when about 6000 Aghem women in Menchum Division camped outside the offices of the SDO and later laid siege on the Aghem Fon's palace for 48 days demanding that grazers in the region remove their cows, which had been destroying and eating cultivated crops in the area, including at the URC.

The farmer/grazier problem dates back to 1937 when the different administrations in the region began to seek solution to this old problem. The women in Wum always blame the predominantly Mbororo and Aku'u graziers for failing to restrain their cattle from grazing on cultivated crops in the farmlands (Ngeh and Chongsi, 2005). It is very clear that these cattle

encroach into farmlands because grazing pasture in this area is insufficient. This has compounded the problems of the resettlers, whose crops are also destroyed. Residents of the URC have also started keeping cattle, thereby adding to a problem that has long been in the region.

#### 9.2.4 CULTURE

Interviews suggest that cultural factors such as place of birth, burial site for relatives and family members and inheritance rights are important pull factors into the disaster zone. Respondents indicated their wish to live where they were born rather than in what they referred to as “a foreign land”. Many said it was not possible to live away from their land of birth indefinitely. Some said they had to return independently because the government have not told them when they will be rehabilitated back to their ancestral land. This is expressed by a respondent in Nyos:

*“This is our house. This is my village. This is where I was born. I cannot continue to live in Yemgeh without knowing when we shall be told to come back. My parents and grandparents are buried here and I prefer to live with them here. This lake has been here for many years and we cannot run away from our village because of it” (N15MR)*

Many respondents said they returned to the region to live near the graves of their ancestors, including those who died during the disaster. A few said the survivors are having numerous problems in the camps because their ancestors are angry with them for abandoning their homes in the village. Respondents also emphasised that it was their custom to live near the graves of dead relatives and weed them in order to receive their blessings. One respondent (N07MR) responded that:

*“I came back here from Wum where I have been living with relatives since the disaster. I came back because I could not abandon our compound here and live elsewhere. In Wum, I was always having nightmares in which I was informed to come back to our house here in Nyos. My parents are buried here and I cannot abandon their graves to live elsewhere. I had to come back so that I can be weeding their graves”.*

It should however be noted that these cultural factors were not mentioned in isolation. Most respondents gave more than one reason as a motive for relocating to the region with the knowledge that the area is still declared unsafe.

### 9.2.5 PROPERTY RIGHTS

Interview results suggest that some respondents returned to the disaster zone in order to protect their family property (such as farms and houses) from in-migrants who had moved into the region. They are afraid that these properties can be taken permanently by strangers if there is no one to protect them. A 57 years old man in Nyos said:

*“When the disaster happened I was not here, I came back from Wum eight years ago to farm our land which other people were using. I came back to protect the land for my children because I am the only one left after my brothers and parents died....” (N01MR)*

This fear is supported by previous research, which indicates that people who occupy sites that communities have fled because of threat or actual violence may resist the return of original occupants and owners (Oliver-Smith, 2005B). Similar arguments presented by respondents for being in the disaster area relates to inherited property. Some claim that it was their responsibility to protect property they inherited from family members, some of which have been owned within the family for hundreds of years and they had the responsibility to pass them on to others. Failure to carry out this family obligation may result in them being cursed by their ancestors and they may die or suffer from an incurable disease. Respondent N05MR said:

*“I was in Bafmen before coming here. All our family members died leaving only two of us. At that time I was just 12 years old. All our cattle died so we inherited only the land. My brother and I came back to preserve our family land. Our ancestors will be angry with us if we abandon the family land, which was given to our parents. We have to pass it on to our children.....”*

### 9.2.6 FAMILY SIZE

The continuous expansion of the family size in the resettlement camps is another reason for relocation back to the disaster zone. Interview sources revealed that increase in family sizes with more children being born and the elderly ones get married, creates pressures within families for living space in the camp houses and also for farming land. Most of the camp houses at the URC have only two bed rooms to be shared by the parents and the children. The elderly children who eventually get married do not have place to live with their spouses since there is no provision in the camps for extended or new families. Responses from some young families in Nyos village indicate that many young families move away from the camps in order to be independent and to build their own lives. These young families do not want to continue living with their parents or relatives and prefer to relocate to their village where there

is often family land on which to build their own houses. Alternatively, some have moved back to their family houses that were abandoned when they were forcefully uprooted after the disaster. According to one young married person in Nyos,

*“What brought me back here is hunger. I decided to come back because I did not have enough food to feed my family and this is where I really belong although we were removed from here. My parents and three brothers were killed during the disaster and I went to live in Esu with my uncle. I came back because I got married and could not continue to stay with my uncle since I was having my own family. My uncle’s house was small for me and my wife and his own family since he has 6 children. The land there is also small for all of us. When one of his sons also got married, I had nowhere else to go so I came back here where we have our house. The life in Esu was not good because we did not have enough money. I have been here for 4 years now and I’m happy because I have enough food and also sell some of my maize, cocoyam and beans. My wife and I have enough land to farm because my other brothers died and I was left alone” (N11MR).*

The photograph below (Figure 9.5) shows the researcher with a young family in Cha village who have relocated back to the disaster site.



Fig 9.5: Researcher with family who have relocated back to the disaster area in Cha. *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

#### 9.2.7 FAMILY STRUCTURES

This research has also revealed that 30 percent of respondents in the disaster zone do not live there with their whole families, and that some do not reside there on a permanent basis. Interview results reveal that some survivors came into the disaster area only to farm and thereafter return to their houses in the camps. Interview responses indicate that these survivors

live in the disaster zone from a few days to four months. During the harvest season, more people move into the area to harvest the crops, which are then carried to the camp houses for food and for sale. At this time, the younger children may accompany their parents to help in the harvest and the transport of harvested products to the camp houses or the market. The respondents said this arrangement provides them the opportunity to have more food and also protect their entire family from being killed in the event of another disaster since the area is still declared unsafe. This is expressed by a respondent that:

*“.....I am living here alone and my whole family is in Wum because the children are in school. I go to visit them once every two weeks and during the harvest season they come to help me harvest the crops and take to town.....I am not sure that something terrible will not happen again here but if it does, it is better that I die alone, than for the entire family to die....”(N20MR)*

This behavior is certainly an adaptive strategy employed by the people to have a means of livelihood while trying to cope with life in the camps. However, some respondents informed the research process that they intend to move their families on a permanent basis to the disaster site in the nearest future.

### **9.3 MOTIVES FOR NOT RELOCATING TO DISASTER SITE**

Interview conducted in the URC also revealed reasons why some disaster survivors have not relocated or do not intend to relocate to the disaster site. The motives for non-relocation back to the disaster zone are related to education, age, and adaptation.

#### **9.3.1 EDUCATION**

Many families are reluctant to move back to the disaster site because of the education of their children. Though the URC lacks many social facilities as mentioned in Chapter seven, it has a primary school (Government Primary School Ukpwa) that was created in 1997 (Figure 9.6). Survey results indicate that at the time of the research, 35 percent of households in the URC had children below 10 years of age. At the time of the fieldwork, the school had seven streams (class 1 to 7) in 9 classrooms with 623 pupils. This is the only educational facility in the URC and is regarded as a valuable resource by the camp dwellers. The children attend primary school here although many cannot attend secondary or high school because there is none in the camp. Children in the camp who want to attend secondary or high school have to travel 10kms to Wum where the nearest secondary school is found or move away from the camp and live in Wum in order to attend secondary and high school. Interview results suggest that parents are

reluctant to allow their teenage children (less than 15 years old) attend high school in Wum. The few who are able to sponsor their children in Wum are only willing to send them there if there is a relative with whom they can live while studying. Due to financial limitations and the constraints mentioned earlier, many of the children in the URC end their education in primary school. A young parent responded that:

*“...that is the primary school our two children attend although we do not have a secondary school in this camp. If by the time they complete primary school and we still do not have a secondary school here, they will stay at home. They cannot walk from here to Wum everyday to attend secondary school and I do not have money to rent a house for them in Wum..... I don’t want them to live alone at a young age and will not leave this camp until they complete primary school.” (U06RL)*

Many parents in the URC want their children to have primary education even though their education might end at that level. Informal interaction with survivors indicates that many did not have formal education but simply followed the livelihood activities of their parents, which was basically cultivation of crops and livestock farming. They think their children should at least be able to read and write even if they cannot get a higher qualification. When asked why he does not want to move back to Nyos one man replied:

*“I don’t like being here because this place is strange to me. Although the government says this is our land, we are not free here. I always feel like a stranger here and have discussed with my wife the possibility of us going back to Nyos. But the problem is that our two children are going to primary school here and we cannot take them to Nyos because there is no school there. We want them to have some education because we did not go to school. If we went to school, maybe we should not have been suffering here. We don’t want them to suffer like us. Even if they don’t go to secondary school because there is none here, it is good for them to have at least the First School Living Certificate. If not of our children, we should have gone back to Nyos to farm there because the crops don’t do well here” (U15RL).*



Figure 9.6: Government Primary School Ukpwa *Source: Author (picture taken during fieldwork in Cameroon in 2007)*

Although many respondents in the camp have been held back for these educational reasons, interviews indicate that 52 percent plan to relocate to the disaster zone as soon as their children have completed primary school, and are either old enough to leave the camp for secondary or high school in Wum or move there to live with relatives on a temporary or permanent basis. A respondent said:

*“..... Coming here has been good and bad. Good because my children can go to school. We did not go to school in Nyos because our parents thought education was not important for us. Now my children can learn how to read and write even if they cannot go to secondary school. The sad thing is that this camp is a foreign place for us. We will return to Nyos when our children complete school.....” (U13 RL)*

One can infer from such responses that many residents of the URC are only there temporary and plan to relocate back to the disaster zone in the near future. This finding strengthens the argument that the non-availability of basic facilities is a push factor from the camps and makes people to defy government orders or instructions not to move back into the disaster zone.

### 9.3.2 AGE

A few elderly respondents expressed the desire to relocate to the disaster zone but indicated that their age was preventing them doing so. These elderly people are too old to do any work and too weak to walk on their own. Some depend on their families and neighbours in the camp for water and even food and cannot live without assistance. Such people are willing to relocate

from the camp but need assistance. Interviews reveal that these elderly people can only relocate with relatives who will assist them in their village of origin. One old man responded that:

*“If I were younger, I should have moved back to my village a long time ago. You can see that I am old and sick and cannot take care of myself. My grandson and the people in the camp are those taking care of me and my children who are living in the town come to see me from time to time. I cannot go back by myself and will not have someone to cater for me as they are doing here” (U08RIage).*

It can be deduced that these people are willing to relocate from the URC but cannot because their decisions are dependent on the goodwill of others who have to provide them with long term assistance. The wish of many of these people is to die in their village and be buried there and if it were possible, they would relocate to the disaster site as soon as any opportunity presents itself. Survey information shows that about 14.5 percent of survivors in the URC are above the age of 60.

### 9.3.3 CAREERS

Transcribed interviews reveal that few people intend to move to bigger towns such as Wum and Bamenda. A critical examination of these responses shows that it is mostly the younger people and couples (generally less than 30 years of age) who are interested to live in townships or urban areas. These individuals are not interested in farming and want to learn some livelihood professional skills like carpentry, motor-mechanics, driving, sewing, hairdressing etc. A young respondent said:

*“..... As soon as I have money, I will relocate to Bamenda to learn carpentry. Some of my friends who could not continue school learnt some professional skills and are working in Bamenda. They are better than us in this camp. The problem is that I do not have anyone who can assist me to learn a professional skill” (U20RL)*

Most of these people were probably less than 10 years old when the LND happened. It should however be noted that not all the LND survivors were resettled in camps. Many moved to live with relatives away from the region and also in the cities. Some children were also adopted and have grown away from the region in urban areas. As revealed in the interview above, it is likely that some survivors are influenced by the career path, which their peers who had moved away from the region have followed.

## 9.4 FURTHER RELOCATION PLANS

Enquiries about plans to relocate from the present sites was conducted in all three disaster affected study populations. An understanding of the relocation plans in the region could help planners or disaster managers to anticipate potential demographic changes in the region.

### 9.4.1 INTENTION TO RELOCATE FROM DISASTER ZONE

A few residents within the disaster zone mentioned that they did not expect to live or continue with their livelihood activities there indefinitely. Such responses were given mostly by the non-natives of the region who have taken advantage of the absence of the original displaced indigenes of the region to move into the area. All respondents who are farming on pieces of land that are not theirs (including those who have obtained permission to farm in the disaster zone) stated that they are prepared to leave the area at any time the rightful owners of the land tell them to vacate. An in-migrant said:

*“I was not affected by the disaster but have come to Nyos mainly to farm. I do not own the farm I am using at the moment and will stop using it when the owner comes. I am not here permanently and will have to leave one day even if no one instruct me to leave because this is not my village” (N05RI)*

However, those farming on pieces of land whose owners died during the tragedy hope to continue farming indefinitely, with the assumption that no one will stop them. The general feeling of the in-migrants in the disaster zone is that they intend to leave the area once the natives return.

### 9.4.2 NO INTENTION TO RELOCATE FROM DISASTER ZONES

There is strong evidence that the LND survivors who have relocated back to the disaster zone and the Njindoum residents who were not displaced from their village do not have any intention of moving away from their ancestral land. More than 64 percent of respondents stated that they have no intention to leave the disaster zone irrespective of the risk that exists there. A majority of the respondents said that they prefer to live with the risk in the disaster zone and be sure to have food to feed their families than to live away from there as previously and suffer. A respondent said:

*“I will never move away from here. I am not afraid to die from the gas disaster. I prefer to die of the gas disaster here than to die elsewhere. I prefer to live here in happiness with enough food and die of the gas from the lake than live elsewhere and die of starvation” (N07RI).*

Some respondents who relocated to the disaster zone alone are planning to bring their families to live with them permanently in future. During the interview discussions, one respondent in Lower Cha responded that:

*“I will never leave my house again and no one will force me to abandon my village ever again. I am planning to bring my wife and children during the next summer holiday to live with me here. No one will convince me to leave this place, not even you. I hope you have not been sent to tell us to leave our village because I will not leave. This is where I was born and will die here. I don’t care if the gas should happen again and kill me. I’m happier here than in Kimbi camp where I was living like a stranger” (N09RI).*

The Njindoum residents also expressed a similar opinion to those living in the Nyos disaster zone. 88 percent of Njindoum interviewees indicated that they have never even considered leaving their village. Respondents living close to Lake Monoum were quite optimistic that nothing would make them leave their homes and that if anything were to happen again, the worst they would do is to move temporarily further from the lake. They did not express any intentions of ever leaving their village or abandoning their homes because of the potential consequences of a subsequent gas discharge from the lake. An elderly man had this response:

*“I have lived here for more than 50 years and you do not expect me to leave my house, and all the property I have worked to acquire all my life here because of the treat of dying from gas from the Lake. My children may leave elsewhere but not me. Since the gas incident happened, people have been talking of the risk from the lake. But I have never considered leaving the village because of that” (M08RI)*

## **9.5 PREFERRED RELOCATION SITE**

During the research process, respondents were also asked about the characteristics of the area where the disaster survivors could have preferred to be resettled. The impression of Njindoum residents was also sought as to the site they would prefer to be resettled in the case of any hazardous or disastrous event that requires forceful displacement. Their responses are discussed under social and natural capital.

### **9.5.1 SOCIAL CAPITAL**

The LND respondents in the camps and the disaster site said they would have preferred to be relocated in an area or community that has a similar religion and culture to theirs. Survivors in the URC are the Mbororo people whose culture, religion and lifestyle are different from that of their host community. For example their host community, the Aghem people of Wum, have a matrilineal system of inheritance and lineage, which is an important attribute of the Aghem

culture. Aghem economics, family structure, and traditional culture are bound up in its matrilineal roots. The Aghem women have property and land-use rights, which remain constant before and after marriage (Thermoset, 2000). This is in stark contrary to the Mbororo at the URC who have a patrilineal system of inheritance and the women do not own property. The religion of the two communities is also different. While the Mbororo are more inclined to the Muslim faith and religious practices, the Aghem are mainly Christians of the Catholic and Presbyterian denominations.

It is known from respondents' perspectives that life in the URC would have been better if their host community had the same culture and religion. In such circumstances many problems are likely to be resolved more easily or not allowed to escalate to disproportional dimensions that can damage community relationships. In such situations, it is easier for the resettled community to easily integrate in the life and activities in their new environment. A respondent in the URC said:

*"We should not have had many problems if we were resettled in a community with whom we speak the same language and share a similar culture. They would easily understand our problems and easily cooperate with us" (U07PR). Another respondent simply said "....We can live more comfortably in an environment where the host community easily understand our religion and way of life. Our relationship with the host community will be better if we share a similar culture" (U15 PR).*

According to Oliver-Smith (2005b), culture and community are variously rooted in places and communities that can maintain their cultural identity and social fabric are more resilient in the face of dislocation.

Some respondent mentioned particular areas they would have preferred to be resettled in. The predominantly Muslim Northern provinces and Hausa Quarter in Bamenda are some of the preferred relocation areas mentioned by the Nyos respondents. The oldest woman in the URC at the time of the fieldwork stated:

*"I cannot be sure if life would be better elsewhere but would have preferred to be settled in Adamawa Province where we have relatives...." (U03PR).*

The inhabitants of these areas are the Fulanis and Hausas who have similar religious and cultural practices to those of the resettled community in Upkwa. An attempt to probe this same issue with the Njindoum residents also produced similar results or responses.

### 9.5.2 NATURAL CAPITAL

Another point highlighted by respondents on preferred resettlement site is intimately linked to their livelihood activities. Areas that have extensive fertile land where the resettlers can freely engage in farming and other livelihood-related activities such as livestock farming of cattle, goats, sheep and fowls are preferred relocation sites. It was noted that respondents always compared the anticipated productive assets of such an area to their native land in Nyos. Being unable to identify an area with similar characteristic within their vicinity, some respondents indicated that they should have been resettled very close to the disaster zone because that area possesses similar characteristics to their native land in terms of environment and its agricultural potential. A respondent in Nyos said:

*“There is plenty of fertile free land in this area where we could have been resettled. I don’t know why we were taken to a place where the land is not only poor but the natives are prepared to fight over the small pieces of land given to us. At Kumfutu we were constantly quarrelling over the small land given to us, which became smaller as our families grew bigger. If I knew that we would go through all these suffering, I should never have left this village. But at that time I was afraid and could not take any decision because I was young.” (N08PRL)*

These reasons are similar to others found elsewhere in the world where disaster displaced populations generally prefer to remain near their former homes, as was the case in Bam, Iran (Ghafory-Ashtiany and Hosseini, 2008 :231-232), Islamabad, Pakistan (USAID, 2006:9) and Yogyakarta, Indonesia (Manfield, 2007:4). From these findings, one can deduce that productive assets are central in the mind of displaced populations when deciding where they would like to be resettled.

Research into the preferred relocation site has underlined the importance of considering the opinion of the displaced population in deciding their resettlement site. This section has revealed that cultural, religious and productive land assets are central in determining the preferred resettlement site for displaced populations. Research findings have also revealed that displaced population can have very valuable opinions in choosing their preferred relocation site which if accepted, can prevent long term socio-economic problems.

However, further research is needed to understand the perspective of the LND survivors who were resettled in communities with a similar culture and language. Most of the survivors from Cha and Nyos villages were resettled in Yemgeh and Ipalim camps respectively. These camps are not only closer to the disaster site (see Figure 6.3) but the languages and culture are similar to the Mmen language, which is the most widely spoken

language in the region (Grant et al., 1993; Troyer et al., 1995). Nyos in the Mmen Language means “good”. It would be interesting to test the assertion that life can be better with a community of similar culture and religion in the Ipalm and Yemgeh resettlement camps.

## **9.7 SUMMARY**

This chapter has addressed four main themes related to relocation decisions that concern both case study populations and in so doing has attempted to answer the fourth research question. Analyses have shown that the motives for relocation from the resettlement camps are mainly related to social, economic and cultural factors. These factors are either acting as push factors away from the resettlement areas or pull factors into the disaster zone. The reasons why many survivors are still living in the resettlement camps while their peers have relocated elsewhere are related to education and age. Many residents of the URC are reluctant to leave so that their young children can acquire primary education in Government School Upkwa. Some elderly people in the URC who would have preferred to relocate back to the disaster zone are only prevented from doing that because they do not yet have someone to live within the disaster zone. Research evidence also shows that most of the residents at the URC plan to relocate from there in the nearest future and are only constrained by either the education of their children or old age. The original inhabitants of the disaster zone who have relocated back do not have any plans to leave the region again. Those who are willing to leave the disaster zone are generally in-migrants who took advantage of the absence of the real natives to enter the zone for farming. The non-displaced Njindoum residents whose village lies close to Lake Monoum also indicated that they have not considered leaving their village and do not expect to do so because of any threat from the lake. Cultural, economic and social reasons underpin this steadfast position. The study populations of both disasters also indicated their preferred relocation site to be a region with similar or the same culture, religion and good economic potential in terms of natural and physical capital. These findings do not only inform knowledge on migration decisions but are relevant for disaster management plans and policy building. They also relate to and inform the other main research enquiries in such a way that has led to the production of a new disaster model that links relocation decisions, vulnerability drivers, risk perception and disaster management (discussed in Chapter 10).

## CHAPTER TEN

### SUMMARY OF MAIN FINDINGS AND NEW DISASTER MODEL FOR RELOCATION DECISIONS

#### 10.1 INTRODUCTION

This thesis set out to address the social context of natural disaster risk and vulnerability with particular emphasis on relocation decisions following the LNM disasters in Cameroon. A major motivation for the research was the need to broaden the scope of DRM in the country, which has focused on technical analyses and structural mitigation measures. This failure to reflect wider paradigm shifts in DRM approaches, which emphasize social risk and vulnerability analyses and non-structural mitigation measures, has been highlighted during the research process.

In a poor country that experiences regular occurrences of ‘natural’ disasters, sometimes with devastating consequences, resettlement and subsequent relocation are processes often forced on or adopted by the affected populations. At Nyos, this has included the unauthorised return of displaced people back to the disaster site, despite on-going risk of hazards recurring. Since the DM system in Cameroon is not robust, not efficient and ineffective in policy as well as practical implementation, understanding relocation decisions is central to the subsequent application of DM practices that will impact positively on disaster victims. It is hoped that an attempt to provide answers to the research questions that link disaster management, vulnerability drivers, risk perception and relocation motivations will contribute in both a conceptual and practical manner to understanding the complex social framing of risk in Cameroon and beyond. These findings reiterate the need for DRM programs in the country to establish the link between risk, vulnerability, poverty and livelihood that is crucial for sustainable development.

The logical order of the research questions (1-4) is reflected in the presentation of the analytical chapters (Chapters 5-9) that address the questions. In this concluding Chapter, the aim is to summarize and synthesize the findings. Based on the main themes and the key findings, a new disaster model for relocation decisions that links the themes has been suggested. This is followed by a discussion of further research needs. This Chapter also addresses major policy recommendations based on the need to integrate the main findings with the development process in the country. The key findings from the research, the new disaster model for relocation decisions and policy recommendations are presented in the following Sections of this Chapter.

## **10.2 SUMMARY OF MAIN FINDINGS IN ANALYTICAL CHAPTERS**

### **10.2.1 SUMMARY OF FINDINGS FROM QUESTION ONE**

*(What strategies have been adopted for the affected people to cope with and recover from the Lake Nyos and Monoum disasters?)*

Research enquiries to provide answers to question one have been presented in Chapters five and six. While Chapter five provides an overview of the natural disaster management framework in Cameroon, Chapter six deals with the management of the LNM disasters. This is the first time that a comprehensive document has been produced concerning DM in Cameroon. One major problem encountered during the research was the difficulty in finding any document about the functioning of the DM system in the country. All available material on the subject is not only incomplete, but scattered in different government documents and policies concerning Civil Protection in Cameroon. It was therefore a challenge to produce a Chapter, which will not only provide answers to question one, but will also be useful to policy makers and disaster managers by scrutinizing the DM framework of the country. The success of the DM process is being put to test in the management of the LNM disasters that has been examined in Chapter Six. Both Chapters therefore provide information that is relevant to understand the strategies that have been used and are still being used to recover from the LNM disasters.

In Cameroon, the management of risks posed by natural hazards/disasters, together with other hazards is under the common umbrella term of CP (Section 5.2). The legislative, administrative and institutional processes of CP, including response to disaster, have been built into the governance structure of the country over many years. National government organs (8 main ministries) and local government bodies (local and city councils including municipalities) are the main government sectors involved in DM (see Section 5.4.1). The institutions within the non-government sector include national and local NGOs, development agencies and members of the research and academic community (refer to Section 5.4.2). The government has also established relationships with international development organisations (UNDP, UNICEF, WHO, IOCP etc), and with other countries that facilitate the process of DM in the country (see Section 5.4.3). The DCP in MTAD is the nodal agency responsible for coordinating and managing all disaster activities in the country.

The administrative and power structure of DM reflects the general governance structure and process in the country (refer to Section 5.5). The DM structure is divided into the national, provincial or regional, and divisional or local levels, with the main disaster

managers being government administrators appointed through a presidential decree to govern these administrative units. These disaster managers can either be civil administrators or politicians of the various political parties (discussed in Section 5.5.3). The descriptive account of the DM framework in Cameroon has been presented above. How the research critically analyzed this framework is summarized below.

Empirical analysis of the state of Cameroon's hazard mitigation program suggests the following:

- 1) The DM framework follows a hierarchical top-down power structure from the ministries at the national level to governors at the provincial or regional level down to SDOs at the divisional or local levels.
- 2) The roles of some institutions involved in DM are not identified in government policies.
- 3) Most disaster managers possess only superficial knowledge of government's regulations on DM. They are aware that the regulations exist but lack more detail information regarding the application and enforcement of the laws even in their own sectors.
- 4) Most government disaster managers (administrator, politicians) assessed Cameroon's hazard mitigation program as a success although they acknowledged that the program requires more resources for further improvements.
- 5) The non-government disaster managers (mainly academics and mayors of opposition-controlled councils) who presented a more objective view about Cameroon's hazard mitigation program said the program is not working well. They attributed the failures to poor enforcement of government legislation on DM, the shortage of skilled and trained personnel in DM and the shortage of adequate financial and material resources as key constraints on the effective functioning of DM in the country.
- 6) Most disaster managers rate the risk to natural hazard in Cameroon as moderate and high. This rating is based on their knowledge of the geology and tectonic setting of Cameroon, and also the country's frequent occurrences of geophysical and hydro-meteorological hazards (landslides, toxic gas emissions from crater lakes, volcanic eruptions, floods)
- 7) Disaster managers within the government sector rate Cameroon's vulnerability preparedness/resilience to natural hazards as high. These disaster managers' perception of Cameroon's preparedness and/or resilience to natural hazards/disasters is heavily influenced by the progress of technical risk mitigation processes (of which the NMDP is considered the prime example).

- 8) Disaster managers without government administrative functions classified Cameroon's vulnerability preparedness as low for the following reasons: Inadequate financial resources for natural hazard mitigation programs; insufficient scientific instruments to monitor hazards; the non-existence of a natural disaster management plan for the country; the non-existence of a natural hazard contingency plan; that government programs on DM are more reactive than proactive and that the complex administrative and power structure in the country stifles DM programs.

The management of the LNM disasters has been analysed under the immediate aftermath of the disaster, the long term management process and contemporary reflections and perceptions on the management of both disasters. The LMD disaster (37 deaths) occurred two years earlier than the LND in 1984, but the danger and risk posed by Lake Monoum only came to light in 1986 after the LND killed 1746 people through a similar release of poisonous gasses. The secondary effects of the LND included the displacement of thousands of people from the disaster zone. In the Lake Monoum case the surviving residents of Njindoum village close to Lake Monoum did not leave their village and only experienced restrictions on livelihood activities around the lake's vicinity such as fishing and farming.

The very challenging relief and rescue operation that followed the LND was coordinated by the Cameroon government with financial and material help from the humanitarian and international community (refer to Section 6.2.2). The management of the massive relief aid that poured into the country was entrusted into the hands of three committees created at the national, provincial and divisional levels. The location of the headquarters of the National Relief Committee, 500km away in Yaoundé, with distribution centers in Douala, Bamenda and Wum, at considerable distances through a poor road network, created problems with coordination of relief activities, personnel movements and storage especially of perishable items. The variety of relief and material goods that was also contributed within the country and beyond was far in excess of needs and inappropriate. This eventually led to allegedly widespread embezzlement of the relief aid, which had serious consequences for the socio-economic management of the disaster.

The initial stages of the rescue operation to evacuate the disaster zone were characterized by confusion and inadequate resources, since no contingency plan had been in place for such an operation (discussed in Section 6.2.3). Although many government officials visited the region to console the survivors, most of them ended in the divisional headquarters in Wum and did not proceed to the disaster zone. Research evidence suggests that this was due

to the poor road condition to Nyos and fear of the unknown (the cause of the disaster). The rescued survivors were provided with accommodation in seven temporary camp sites shown in Table 6.5.

The recovery process for the LND survivors has been approached mainly as a short-term material problem. The aid and assistance marshalled to help the survivors largely focussed on material needs such as clothes, blankets, farm tools and housing. During the immediate post disaster period, several suggestions and promises made on how to help the disaster survivors have not been met two decades later. While the government administrators or disaster managers feel the crises period was well managed, their counterparts in the opposition parties hold a contrary view. Interview sources reveal that the survivors feel their welfare and basic needs were initially catered for during the immediate aftermath of the disaster, though this dwindled rapidly as time went on. The most pressing demand now from the LND survivors is to achieve a greater balance between addressing their basic material needs and acting in a way that supports, rather than undermines, their struggle to reconstitute the social basis of their communities.

Overall, the management of the LNM disasters has been biased towards technical aspects without sufficient attention given to the socio-economic problems of the survivors who were resettled in camps. The technical management has been dominated by the NMDP (see Section 6.3.1). The main funding of the project came from the USA, France and Japan. Preliminary technical results from the NMDP indicate very limited success with the degassing process, with flaws in the pipe designs and installation. The risk of flooding has also been identified in Lake Nyos (refer to Page 131 in Section 6.3.1) with investigative reports that the Lake could be bridged with catastrophic consequences that would lead to severe flooding in Nyos and part of Nigeria (UNEP/OCHA, 2005; Kling et al., 2006). During the field work, the researcher also carried out an onsite geologic technical assessment of the rocks on the spillway, where the breach is most likely to occur (see Figures 6.6, 6.7 and 6.8). Suggestions to remediate the flood risk include a further reduction of the gas levels followed by lowering of the lake's water level. Despite these problems, most government officials feel the NMDP is an outstanding success while their counterparts feel it is too early to assess the success of the project (discussed on Page 135).

Knowledge of DM plans for the LNM disasters held by most key disaster managers within the government sector is limited mostly to the technical aspects, particularly the NMDP. Only a few at national levels and in the DCP are aware of detailed plans for the socio-

economic reintegration of the Lake Nyos area. Disaster managers within the government sector attribute the limitations in the management of the LND, especially the social aspects, to the following:

- 1) Economic crises in the late 1980s that weakened the economy.
- 2) Poor governance, negligence, incompetence, corruption and politics (discussed in Section 6.4.1).

Interview results show that disaster managers think the management of the disasters could have been improved if:

- 1) Proper planning had been undertaken for both the technical and social management of the disaster in the long term.
- 2) Committees were set-up to monitor and report the progress of projects progressively-gaps in the socio-economic management of the survivors in the camps could have been easily identified and addressed.
- 3) Local disaster managers worked directly with the beneficiaries in all the decision-making stages thereby removing unnecessary administrative bottlenecks in the application and reception of resources (see Section 6.4.2).

Failures in addressing the social concerns and livelihood problems of the survivors is also a lesson that some feel should be learned and corrected in subsequent disasters that cause mass displacement of people. A summary of some key findings from question one and how they influence relocation decisions is mentioned in Table 10.1.

#### 10.2.2 SUMMARY OF MAIN FINDINGS FROM QUESTION TWO

*(How can we understand the vulnerability of individuals and their households to the present risks at Lake Nyos and Monoum?)*

Answers to question two are provided by sections in Chapter six that analyse physical vulnerability by examining the technical management of the LNM disasters and Chapter seven, which examines the social vulnerability drivers in the displaced Nyos populations. Socio-economic factors in the resettlement camps are motivating survivors to relocate to the disaster zone, thereby making them vulnerable to the physical/technical risks, which exist there.

The LNM gas disasters, which form the case studies of this research, occurred on the Oku mountainous range that is part of the CVL (See Appendix 1). The populations in these areas are vulnerable to natural hazards in this extensive volcanic range. The case study populations in Nyos and Njindoum are even more vulnerable to the ongoing physical risk in

both lakes. The NMDP has not been very successful because the pipes installed in the lakes malfunctioned and caused only small quantity of gas to be removed. Recent scientific evidence showed that since the LNM disasters, both lakes still contain tremendous volumes of gas (see Page 129 in Section 6.3.1), more than was released in the initial disasters and therefore, still pose grave danger to the local population (Krajick, 2003; Kling et al., 2006). The risk of flooding has also been identified in Lake Nyos (see Page 131). Scientific studies have revealed that the upper 40m of Lake Nyos's natural dam is being eroded at an uncertain but geologically alarming rate. This dam can be bridged, leading to floods in downstream areas as far away as 108km in Nigeria (Lockwood et al., 1988; Lockwood and Shuster, 1991; UNEP/OCHA, 2005; Kling et al, 2006). Despite these physical factors, socio-economic problems affecting the LND survivors are serving as push factors from the resettlement camps, driving disaster survivors and their families to relocate back to the disaster zone.

A combination of specific conditions of resettlement and the wider political economy are also responsible for vulnerability. Cameroon's economic situation paints a gloomy picture. Within the last quarter century, the country's economic growth has declined due to: serious economic crises in the 1980s; a challenging global environment; the implementation of economic policies dictated by international financial institutions; pervasive corruption and consistent mismanagement of resources (Baye, 2006b; see Section 7.2.1). Unfortunately, the SAPs adopted by the government to solve the economic crisis instead compounded the crises on households and eroded their purchasing power leading to increased poverty. The severe cut in civil service salaries of up to 65 percent and the devaluation of the CFA franc by 50 percent in January 1994 aggravated an already precarious situation.

This economic downturn impacted seriously on poverty (about 87.5 percent in rural areas), development projects, and management of state institutions and programs. Indeed, the government has often used the economic crises as a rationale for not implementing promises and planned projects designed to solve the socio-economic problems of the survivors. Against the negative backdrop of the economic situation, the displacement and resettlement of disaster survivors has further compounded their impoverishment.

The sudden displacement and resettlement experience that the LND victims have endured, has limited opportunities for survivors to regain their pre-disaster livelihoods and adopt coping strategies which might ease the hardships associated with displacement. The social conditions of the LND survivors have been analysed based on Cernea's IRR model (Cernea, 1997, 2004). These include access to land, limited job opportunities, homelessness,

housing conditions, increased morbidity and mortality, food insecurity, loss of access to common property, social disarticulation, disrupted cultural and religious practices, and increases in criminality (analysed in Section 7.3.1). These socio-economic problems have distinct and identifiable links with the involuntary resettlement processes. Wider research evidence shows that such problems reduce the capability of resettled populations to recover from the impact of the natural hazards (Wisner et al., 2004).

The displaced populations have ended-up worse off for more than two decades now since the disaster occurred. The survivors have lost their homes, ancestral lands, and properties, and suffered strains on their spiritual, cultural and economic wellbeing. This has been compounded by the dire social and economic situation in which they live in the camps with increased poverty, limited livelihood options and reduced coping strategies and capacities. Coming from agricultural backgrounds dominated by agrarian livelihoods, these survivors have extremely limited opportunities compared with more skilled labour force. The majority eke out subsistence livelihoods mainly in agriculture in very difficult circumstances, on small and infertile land holdings with lack of essential farm tools, and insufficient cattle for the herders. More than 98 percent of the survivors are confined to unskilled labour activities, of which more than 85 percent are engaged in subsistence agricultural activities working as farmers, cattle grazers or hunters. Only two disaster survivors in the URC were found to be building a career in skilled employment as primary school teacher trainers away from the camp in Wum.

Research results indicate that the social problems of the survivors are not exclusively economic. The survivors now experience more property theft both in the farms and at home (see Page 168 in Section 7.3.3). The survivors have also seen many aspects of their cultural and religious activities, which used to be integral to their daily activities and social life, seriously disrupted because of geographical relocation and the non-construction of a place of worship when resettled (see Page 166 in Section 7.3.2). The poor management of social aspects of the LND has also contributed to further compound the problems of disaster survivors.

Government's handling of the disaster, which has downplayed the social and cultural aspects of the overall long term DM, is also critical because it exacerbates the impoverishment factors. There is infrequent institutional assistance to the survivors and the government has failed to comply with promises to compensate disaster survivors, in tackling the socio-economic problems and to carry out major development projects (see Page 170).

When reflecting on their past, most survivors tend to fall into a mindset that has been called “*the wished-for former state*”, that corresponds to idealized images of the community before the displacement (Oliver-Smith, 2005). Since the social management of the LND has not been addressed effectively, the impoverishment has added to the poverty problem in the region. This is one main driving force for the relocation of survivors back into the disaster zone, thereby increasing their vulnerability to any subsequent gas explosion or the risk of flooding from Lake Nyos. Table 10.1 have a summary of some key findings from question two, and how they influence relocation decisions.

#### 10.2.3 SUMMARY OF MAIN FINDINGS FROM QUESTION THREE

*(How do people perceive and respond to the risks that still exist in the disaster areas?)*

Analysis in Chapter 8 focused primarily on question three. It examined both revealed and expressed risk by the various stakeholders involved in DM in Cameroon and the populations that were affected by the LNM disasters. Analysis for revealed risk was based on observation of the behavior of the study groups, while expressed risk is based on interviews conducted during the field research process.

Revealed perception of risk by disaster managers is informed mostly by the characteristics of the DM framework of the country and DM actions taken to solve the problems created by the LNM disasters. Detailed examination of this framework reveals that the government’s perception of solutions to risks from natural hazards centers mainly on scientific and technical methods (see Section 8.2.1). The legislation only addresses the immediate post-disaster relief and rescue operations. Measures to mitigate the socio-economic risks in the long-term are not mentioned. This is revealed in the management of the LND where crisis committees were formed to manage relief and rescue operations but none formed to anticipate and oversee the long term problems of the survivors. Preparations were not made to contain any future socio-economic vulnerability that may develop as a result of the resettlement experience of survivors in camps. This shows the shallow perception of risk by the government.

In terms of expressed risk, interview responses from disaster managers regarding several risk-related themes strongly indicate that their overwhelming perception of risk is from a technical, scientific or physical perspective (see Section 8.2.2). No considerations are given to the robustness of the non-structural mitigation measures. Most disaster managers within the government sector said Cameroon’s natural hazard mitigation program is effective, based on

the NMDP. Expressed views on Cameroon's vulnerability preparedness and resilience to natural hazard is also based on physical vulnerability, which indicate an overriding perception of risk as a physical event, whose prediction and mitigation lies in physical measures. Social vulnerability, which in this context will be the ability of affected populations to cope with, resist and recover from the impact of disasters (Wisner et al., 2004), is seldom considered.

An analysis of the revealed and expressed perception of risk by the affected populations in the LNM areas was also performed. The relocation of some LND survivors back to the disaster zone, though still restricted, and the livelihood activity of Njindoum villagers in LM, which is still declared unsafe, is indicative of their revealed perception. Whole families are now living in the Nyos disaster zone and fully engaged in livelihood activities in defiance of government restriction orders to live outside of this area. In Lake Monoum, farming and fishing activities have since resumed in the lake and its vicinity. In both cases the affected inhabitants do not consider the lakes to be a prohibitively serious threat.

Interview data shows that the disaster respondents expressed doubts that the LND was a natural hazard, with feelings in line with a popular myth that the source of the gas is not natural (refer to Page 189 in Section 8.3.2). Their uncertainty is heightened by the general rarity of similar hazards in the world, and especially because no evidence or historical records exist to show that poisonous gasses have been released from LN in the past. Survivors also doubt if such an event will happen again, at least in the near future. Respondent's perception of hazard/disaster preparedness and readiness are rooted in their religious belief, past knowledge and belief in contemporary information on physical risk (Kirschenbaum, 2002). Respondents who doubt scientific theories about the cause of the disasters believe prevention or safety lies in God, and that any physical risk mitigation strategies are beyond humans. Other survivors believe indigenous knowledge to drink palm oil if faced with a threat of breathing poisonous gas is better than the scientific safety measures. However, the more literate and educated survivors seems to adhere to scientific recommendations that people should stay away from the risky sites and follow the warning system that has been put in place.

Research evidence on risk information suggests that respondents get risk information from the government, civil society and scientists (analysed in Section 8.3.3). A majority of respondents lacks confidence and doubts the authenticity of government's sources of information that often trickle down to survivors at intervals (see page 197). The indigenes are

more confident in information sources from the public and members of their own community than other sources.

Analysis of the willingness to follow government's advice or orders is grouped into four categories (see Page 198 in Chapter 8). Research evidence suggests that most respondents in the first group are not willing to take orders from the government without first reflection on the implications of such orders for their livelihoods. Another category believes government orders can be obeyed on a temporary basis. This group believes that if the motives for such orders are not good, and the consequences are dire, then the orders can be defied later. The next groups of survivors are prepared to defy government orders. This group believes the government does not have genuine interest in helping them and expressed the feeling that every citizen should take full control of their safety rather than rely on government for help. The last group is willing to obey government instructions unconditionally. Those in this category said the government has the responsibility to protect all citizens and it was impossible to defy government orders because they have the means to enforce them. A summary of some major findings from question three and their relationship or influence on relocation decisions are further explored in Table 10.1.

#### 10.2.4 SUMMARY OF MAIN FINDINGS FROM QUESTION FOUR (*What makes people move away or settle in the risky areas?*)

Chapter nine addressed four main themes related to relocation decisions that concern both case study populations and in so doing, attempted to provide answers to the fourth research question. The themes addressed are: motives for relocating to the disaster site; motives for not relocating from the camps; further relocation plans and preferred relocation site.

Analysis has shown that the main driving forces, which make people to leave the resettlement camps, are related to social, economic and cultural factors (see Section 9.2). These factors are either acting as push factors away from the resettlement areas or pull factors into the disaster zone. The dire social conditions discussed in Chapter seven, act as push factors for relocation. These include:

- 1) Livelihood problems associated with smaller areas of land with poorer soils in the camps.
- 2) The inability to fully engage in cultural practices in the camps due to a different geographical location where cultural and religious institutions cannot be established.
- 3) Lack of health and medical facilities in the resettlement camps.

- 4) The ever growing family sizes in the resettlement camps with no extra camp houses for more family members.

Pull factors into the disaster zone include:

- 1) The high fertility of the disaster zone and the availability of lands for farming.
- 2) Abundant, available pastures that attract the traditional pastoralist groups (Mbororo people).
- 3) The desire to live close to the grave of dead relatives and ancestors in order to receive blessings from them.
- 4) The protection of physical capital (houses and lands) and inheritance rights in the disaster zone.

The reason why many survivors are still living in the resettlement camps while their peers have left seems to be related to education and age (analysed in Section 9.3). Many parents in the URC whose children attend Government School Ukpwa are keen that their children should complete primary school, or are able to look after themselves before they leave the camp. Some elderly survivors (who cannot take care of themselves) are reluctant to return to the disaster area because they do not have someone to support them there. These old people expressed the desire to return to their ancestral land if they could have someone with whom to live in the disaster zone.

Indigenes of the disaster zone that had relocated back to the area do not express the desire to leave the region again (see Page 217 in Section 9.4.2). They are engaged in re-establishing their lives and livelihood on a permanent basis and are poised to continue living in their village irrespective of any threats. Most expressed the desire to live with the risk in their village and have enough food and income than to live away from the threat in poverty. Those planning to leave the disaster site are the non-natives who entered the region to take advantage of the absence of the original inhabitants. These respondents do not intend to resist the incoming of the displaced or to remain there indefinitely. The non-displaced Njindoum residents also indicated that they have never considered leaving their village and will not do so in-spite of any threat from Lake Monoum. Cultural, economic and social reasons underpin this steadfast position.

The results suggest that if confronted with the prospect of relocation, preference for a preferred relocation site is given to regions with a similar culture; religion and good economic potential (see Section 9.5). Interview responses from URC residents suggest that survivors feel their socio-economic and cultural problems could have been far reduced if they resettled

within a similar ethnic group with whom similar moral, religious and cultural values are shared.

Findings from the first three research questions have similar implications to relocation decisions that question four addresses. How the results relate to or influence relocation decisions is presented in Table 10.1.

Table 10.1: How findings from the first three research questions relate with the fourth research question on relocation decisions.

<b>Summary of main findings from research questions</b>		<b>Relationship with relocation decisions</b>
<b>QUESTION ONE (Disaster Management)</b>	Cameroon's DM framework follows a top-down hierarchical power structure.	Such a framework makes it difficult for the problems of disaster survivors to be known and resolved, making them to relocate.
	The roles of some institutions involved in DM are not explicitly addressed in government policies.	The role of the Ministry of Social Affairs, which is supposed to cater for the resettled disaster victims, is not explained. This could be why they can't solve the social problems of survivors, causing relocation.
	Government disaster managers possess superficial DM knowledge, including the application and enforcement of DM regulations.	DMs do not understand the social based risks that facilitate relocations. They are also unable to implement orders restricting relocation into the disaster zone.
	Government disaster managers rate Cameroons DM as a success based on risk mitigation strategies using scientific methods.	The neglect to incorporate non-structural measures in assessing DM success means they are not tackling the socio-economic push factors that are causing relocation.
	Non-government disaster managers attributed the failures of DM in Cameroon to the shortage of skilled personnel in DM.	Lack of skilled disaster managers who can anticipate, understand and solve the social problems of disaster survivors, leads to relocation when social problems remain unresolved...
	Non-government disaster managers attributed the failures of DM in Cameroon to the shortage of adequate financial and material resources in DM.	Failure to provide the financial resources needed to solve the socio-economic problems of the LND survivors, or the embezzlement of limited resources sent to them has aggravated their problems. The livelihood problems that the disaster survivors are facing as a result, has forced them to relocate to the disaster site as a coping strategy.
	Government disaster managers attribute the limitations in the social management to limited funds caused by the economic crises in the 1980s, and embezzlement of resources destined for survivors.	A DM plan that addresses the socio-economic problems associated with resettlement could have addressed such problems, thus preventing them from acting as push factors for relocation.
	Disaster managers without government administrative functions rate Cameroon's vulnerability preparedness as low, due to the non-existence of a DM plan for the country.	Government failure to implement development programs that mitigate long-term disaster risks such as good roads and medical facilities in the region are contributing to livelihood problems, thus facilitating relocation.
	Some disaster managers also criticize government programs to be more reactive than proactive.	

QUESTION TWO (Vulnerability drivers)	Disaster managers think the management of the LND could have improved if proper planning had been done for the social management of the disaster in the long term.	Despite persistent complains by survivors, no serious measures have been taken to solve the dire socio-economic problems of the disaster survivors. With their problems unsolved, they are seeking alternative livelihood strategies-one of which is to relocate back to their ancestral land in the disaster zone.
	Some disaster managers think the DM could have been improved if committees were set-up to monitor and report the progress of projects in the socio-economic management of the survivors.	
	Disaster managers are also critical of the complex administrative and power structure of DM in Cameroon, which include unnecessary administrative bottlenecks in the application and reception of resources.	Top-down as opposed to bottom-up DM approaches that have been recommended by the international disaster community poses constraints in the management of the social problems of the survivors. Problems of disaster survivors and DM initiatives taken from below or local levels and transmitted through the hierarchy are rarely acted upon or implemented. Survivors are forced to relocate in areas where their lives can be better.
	Local disaster managers think the DM process can improve if they work directly with the beneficiaries, and involve them in the decision-making process.	
	Since the LND in the 1980s, Cameroon's economic growth has declined continuously due to: economic crises in the 1980s; the implementation of SAPs; corruption and mismanagement of resources	Cameroon's poor economy is a constraint in solving the socio-economic problems of the LND survivors. The survivors are forced to seek better livelihoods in the disaster zone.
	Cameroon has a very high poverty rate, which is about 87.5 percent in rural areas.	The poverty situation, exacerbated by resettlement limits the survivor's ability to solve their problems or to receive external help from relatives. They relocate to improve their financial situation
Economic problems that the resettled survivors have endured include food insecurity and limited job opportunities.		These livelihood problems, with limited external assistance are encouraging relocation in search for a greater food security.
Social problems are homelessness, increased morbidity and mortality, poor housing, social disarticulation, loss of access to common property, and increase in criminality.		These problems as discussed in Section 7.2 are caused by resettlement. The easy option to get out of them is relocation back to their original land.
In the resettlement camps, survivors are unable to perform cultural and traditional practices that require their presence in specific geographical locations in their ancestral land.		In order to perform these cultural activities, they are forced to relocate to their ancestral land in the disaster site.

<b>QUESTION THREE (Risk Perception)</b>	<i>Government's revealed risk perception</i>	<p>Solutions to risks from natural hazards focus on scientific and technical methods. Government Legislation addresses only the relief and rescue operations to solve the immediate post-disaster crises period.</p>	<p>Measures to mitigate the social risks in the long-term are not mentioned in government legislation. This contributed to the lukewarm attitudes in solving the social problems of the LND survivors, leading to relocation as a survival strategy.</p>
		<p>In the management of the LND, crisis committees were formed to manage relief and rescue operations but none to oversee the long term problems of the survivors in the camps.</p>	<p>Therefore, no preparations were made to contain any future socio-economic vulnerability that may develop. That is partly why the socio-economic problems of the disaster survivors have not been resolved, acting as a push factor from the resettlement camps.</p>
	<i>Government's expressed risk perception</i>	<p>That Cameroon's natural hazard mitigation program is effective based on the NMDP and efforts to mitigate physical risk on the Cameroon Volcanic Line.</p>	<p>By not recognising social risks in the assessment of Cameroon's hazard mitigation program, the social vulnerability problems of the LND are not resolved, acting as a push factors from the camps.</p>
		<p>That Cameroon's vulnerability preparedness and resilience to natural hazard is high because the country has experience in implementing structural mitigation measures.</p>	<p>Since social vulnerability is not taken as seriously as physical risks the government has not implemented non-structural mitigation measures, causing suffering survivors to relocate back to the disaster zone.</p>
	<i>Disaster survivor's revealed risk perception</i>	<p>Many LND survivors have relocated back to the disaster zone though it is still declared unsafe.</p>	<p>Since the LND survivors do not consider Lake Nyos to be a prohibitively serious threat, they have relocated back to Nyos.</p>
		<p>The Njindoum villagers have resumed their livelihood activities in and around Lake Monoum, such as fishing and farming.</p>	<p>Since the Njindoum residents do not consider Lake Monoum to be dangerous anymore, they have resumed their livelihood activities that were restricted in the Lake.</p>

Disaster survivor's expressed risk perception	<p>There is doubts that the LND was not a natural hazard because such hazards are rare, have not happened before in lake Nyos and also due to a popular myth in the region that the source of the poisonous gas was not natural.</p> <p>The perception of hazard/disaster preparedness and readiness are rooted in their religious believes.</p> <p>Other survivors believe their local indigenous knowledge, which saved some survivors during the LND, can still save them from a similar hazard.</p> <p>A majority lack confidence and doubts the authenticity of government's sources of information about the dangers that lurk in Lake Nyos and Monoum.</p> <p>Many disaster survivors are not willing to take orders from the government without first reflection on the implications of such orders to their livelihoods.</p> <p>Another category believes government orders can be obeyed on a temporary basis and defied later if the motives of such orders are later discovered to be wrong.</p> <p>Other survivors are prepared to defy government orders because they think the government does not have genuine interest in helping them.</p>	<p>Since many survivors believe that the LND was a conspiracy involving the government, they do not think that such a plan would happen again in their area. This is partly why some are returning to their village.</p> <p>Many disaster survivors believe that due to their strong faith, God will save them from any risk in Lake Nyos if they relocate there.</p> <p>With the knowledge that palm-oil can prevent poisonous gasses from killing them, many survivors have relocated back to their village in Nyos-with the intention to drink palm-oil in a similar event.</p> <p>They believe more in myths that link the LND to a conspiracy involving the government. They are relocating into the disaster zone with the notion that such a conspiracy will not occur again.</p> <p>Due to their present and past experiences, the survivors think that in order to avoid further damage to their livelihoods, which was not anticipated prior to resettlement, they have to relocate to Nyos.</p> <p>This group believes that since they initially obeyed and have endured hardship in the resettlement camps with limited help, the solution to prevent further suffering is to relocate back to their village.</p> <p>This group is prepared to take responsibility for their own safety in the disaster zone and have better livelihood opportunities there.</p>

This shows that answers from the other research questions lead logically and builds on to Chapter nine, which contribute to the knowledge and understanding of resettlement and related migration decisions. The key findings of this Chapter, which address research question four, are:

- 1) That relocation decisions are influenced by both socio-economic and socio-cultural factors that shape the livelihood, living conditions and aspirations of the affected populations; these can act in a dualistic way as both ‘push’ and ‘pull’ factors. Relocation in many situations constitutes a conscious livelihood coping strategy.
- 2) That effective development projects can enable people to stay in resettled areas to take advantage of opportunities, which may not be available in their planned relocation site. This can help prevent the reproduction of social vulnerability by discouraging relocation back to disaster zone.
- 3) That households facing the difficult choice between earning a livelihood in a risky environment and protecting their family from risk may structure their activities as a form of partial relocation such that at no particular time would the whole family be exposed in the risky area.
- 4) That people when confronted with the prospect of forced displacement or resettlement will prefer to live in areas with a similar culture and religion. This can be just as important as economic factors in cementing a social foundation for resettlement.

These findings inform understanding of migration decisions, and are relevant for DM plans and policy building. They also relate to and inform the other main research themes or enquiries in such a way that a new model that links relocation decisions, disaster management, vulnerability drivers and risk perception can be produced.

### **10.3 NEW DISASTER MODEL FOR RELOCATION DECISIONS**

The initial conceptual framework of this research (see Figure 3.1) was based on the key theoretical concepts relating to the research goal of studying the social dimensions of risk and vulnerability in the case studies and asking how the knowledge can be integrated in disaster and development planning. The main conceptual elements that guided the research process centered on the Human Use System, which interacts with the Bio/geophysical system via the resource base and political economy. Drawing on this initial framework, the interesting results from the research have yielded a new model for relocation decisions, which links the main research themes.

The model, which is grounded in the field realities, is named the Disaster Management, Risk Perception and Vulnerability (DRV) model for Relocation Decisions (Figure 10.1). How disaster management, vulnerability drivers and risk perception (corresponding to the themes in the first three research questions respectively) relate to or influence relocation decisions (see Table 10.1), makes a major contribution to the knowledge of natural disaster-induced displacement, resettlement and migration decisions.

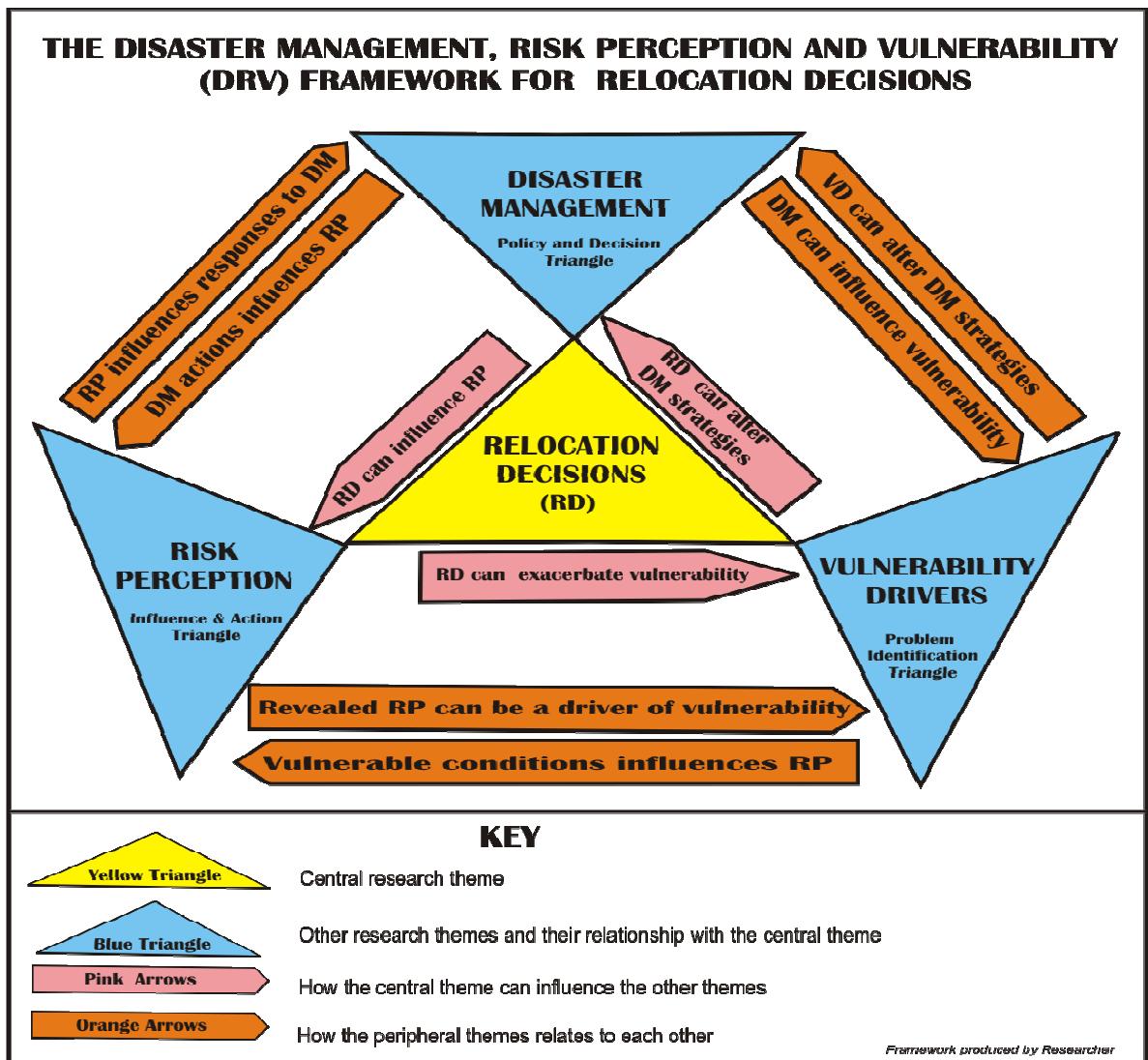


Figure 10.1: The Disaster Management, Risk Perception and Vulnerability (DRV) framework for Relocation Decisions

Most disaster and vulnerability frameworks recognise man and nature as human and natural systems, which interact to produce natural hazards. Many of these frameworks also have an adjustment process control system, which incorporates key concepts and hypothesis on natural hazards like perception and preferences (See sections 2.2.3). Although themes and hypotheses

on perception, disaster management and vulnerability drivers are popular in these models, how they relate or influence relocation decisions is not captured or given explicit examination in the disaster models.

The proposed DRV model for relocation decision comprises of four main themes (disaster management, vulnerability drivers, risk perception, and relocation decisions), which correspond to research questions 1-4 and are represented in the triangles. How the themes relate to each other is shown by the arrows that link the triangles. Relocation decision is the main or central research theme that is influenced by and also has the capacity to influence the peripheral themes (see Figure 10.1).

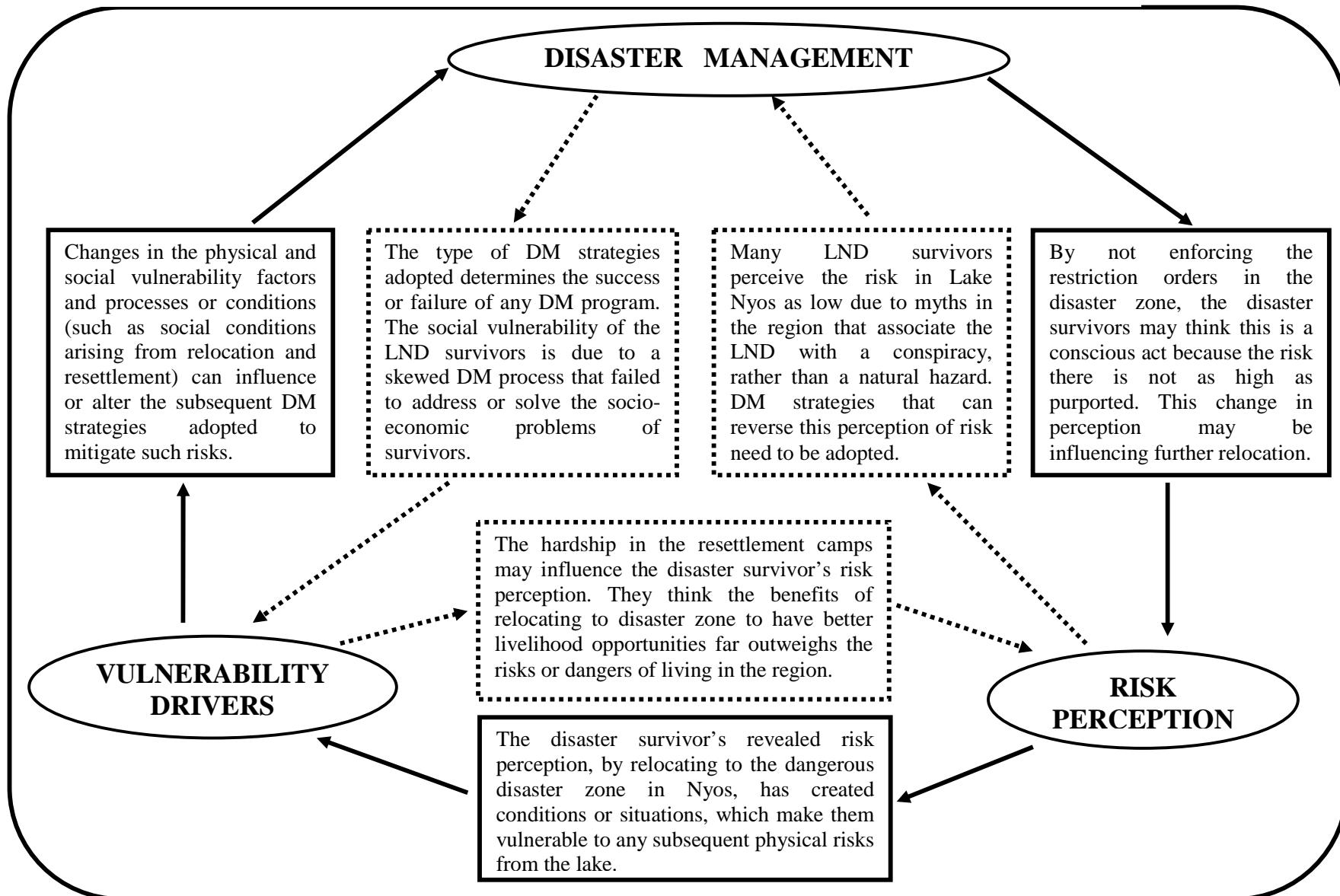
How the peripheral themes influence relocation decision is shown in Table 10.1. The key findings from the research themes have been presented and how they affect, determine or influence relocation decisions is shown in the third column of the table. Relocation decisions can also influence the other themes as shown by the pink arrows in the model and explained in Table 10.2 below.

Table 10.2: How Relocation Decisions influence Disaster Management, Vulnerability Drivers and Risk Perception.

Peripheral Themes	How Relocation Decisions influence the peripheral themes
Disaster Management	The survivors who have relocated back to the disaster zone, or resumed livelihood activities in Lake Monoum and its vicinity undermine DM efforts to protect them from subsequent risks from the lakes. The government needs to revise the present DM strategy or adopt a new strategy that can prevent survivors from further exposure to both social and physical risks.
Vulnerability Drivers	The LND survivors who have relocated to the restricted disaster zone in Nyos, and the Njindoum villagers who have resumed livelihood activities within Lake Monoum's vicinity are now vulnerable to physical risks (flooding in Lake Nyos) and poisonous gas explosions in both lakes.
Risk Perception	The permanent relocation of disaster survivors in the disaster zone (who are fully engaged in farming and other livelihood activities) has a psychological impact on their peers in the resettlement camps. This influences their perception that the area does not pose a serious threat and encourages more relocation into the disaster zone.

Apart from the reciprocal relationship between the peripheral themes and the central theme in the model, the peripheral themes also influence each other as shown by the orange arrows in the model. This relationship is explained in Figure 10.2 in the next page.

Figure 10.2: How Risk Perception, Disaster Management and Vulnerability Drivers influence one another.



As has been analysed above, evidence for framing the DRV model for relocation decisions is grounded in the research findings. The key message in the research findings that need to be embedded within Cameroon's DM and research community is that disaster prevention, mitigation, and management has to be considered from a political, institutional, socio-cultural and economic perspective. Social vulnerability, conceptualized in this thesis as political, institutional, socio-cultural and economic factors have been shown to be more responsible for creating ongoing risk and vulnerability within the affected disaster community. Success in integrating natural disaster mitigation with development planning cannot be achieved without considering the implications of social based risks and vulnerability in the society, as has been shown by the case studies.

Negligence in tackling the socio-economic problems of the Lake Nyos disaster survivors and failed promises to provide basic development facilities in the region has caused major livelihood and poverty problems, which made the survivors destitute. This is a major push factor away from the resettlement camp into the disaster zone where the survivors become vulnerable again to the risks of any subsequent gas emission and flooding from Lake Nyos. Failure to compensate disaster victims and those evicted from their livelihood activities close to LM in Njindoum has also lead to the rejuvenation of restricted livelihood activities in LM and its immediate vicinity. As this study has shown, integrating such concerns into the DM and the development planning of Cameroon will be crucial in minimizing similar subsequent risks in the country.

#### **10.4 FUTURE RESEARCH NEEDS**

Since the study of natural hazards/disasters is multifaceted and usually requires interdisciplinary approaches, it was clear at the start of this research that it would not be possible to explore all the defining features and effects or consequences of natural hazards. As such, some related but separate areas, which are beyond the scope of this research, could be identified for future research. Experiences gained during the research process have also identified some key areas that warrant further study. These research needs are relevant to Cameroon as a country and/or important for disaster research as a whole.

As highlighted in the thesis, "natural" disaster research in Cameroon is skewed towards technical mitigation measures. Disaster research by both local and foreign researchers has focused mostly on the scientific aspects of natural hazards. Very few publications exist on the socio-economic and socio-cultural aspects of natural hazards/disasters in Cameroon. Most of this information is limited to relief and rescue operations. It was therefore very difficult to get published information on recent socio-cultural issues associated with disasters in the country. Although this enhances the

credibility and originality of this research, this situation does not offer a sound platform on which subsequent research can build. The government could jump-start socio-economic and socio-cultural research on natural disasters in the country by creating a national institute for social science research to run parallel with the NIGMR, which currently carries out research on scientific/technical aspects of natural hazards. The two research institutes could carry-out interdisciplinary research to study the interactions of physical and human systems in the creation of natural disasters - an approach that is widely accepted in the global disaster research community.

Findings about the social management of the LNM disasters bring to light several problems with the Cameroon government's longer-term DM. More studies of how governments respond to disaster are needed, especially in developing countries where disaster affected communities often have low resilience and limited coping strategies. Research that investigates how and when major decisions are made from the impact/crisis phase to the recovery phase and plans for resource allocation between relief and rehabilitation phases will provide lessons that could be used to improve good DM practice and sustain good governance.

This research has also revealed the long-term impact of disasters on the local economy, which has major implications for the resilience and recovery of households and the disaster-affected community. Disaster statistics often capture impacts on the well-defined sectors of the national economy, but more research is needed to explore longer-term development and poverty processes at the micro-economic scale. This should recognize that the implications of disaster for poverty include not only direct impacts on those affected but also secondary economic effects transmitted through the wider community.

The key research finding in this thesis is that relocation to the disaster zone is a livelihood coping strategy that has been adopted by the LND survivors. Relocation has been explored in relation to risk perception, disaster management and vulnerability drivers in this study. Research into the continued linkages and integration between relocated people and their former households and community is required. How this activity influences the relocation of other family members and the former community needs to be explored. Research could focus on the strength of social networks and its impact on the socio-economic status of households. Another research direction could be the impact of relocation on the micro or local economy and its effects as a pull factor for more in-migration into the area. Such studies may help governments and other stakeholders in disaster management to anticipate potential demographic changes associated with

relocations. These future research directions could have wide application in natural hazard and disaster research across many developing countries.

## **10.5 POLICY RECOMMENDATIONS**

Based on the analysis and results from the main analytical Chapters, it is possible to draw out a series of policy recommendations for future DRR in Cameroon that highlight the need to integrate “natural” disaster mitigation with the development process in the country. These relate to the main instruments and enabling procedures for policy, the managerial and institutional arrangements for practical implementation, and the actions relevant to disaster situations that can be integrated within disaster planning for long term development gains. The policy recommendations are set out in detail in Appendix 14 and relate to the following main areas:

- 1) Government policy on integrating natural hazard/disaster risk reduction with development planning in the country
- 2) Legislative and institutional framework of disaster management in the country
- 3) Administrative process of disaster management
- 4) Knowledge, skills and expertise in the country’s disaster management staff
- 5) Information, communication and education
- 6) Natural disaster research and academic engagement with the international community

The recommendations are based on key findings from the research questions. Results from question one reveals inadequate DM policies, poor coordination between DM institutions at the national level, the lack of trained disaster managers, a skewed DM system and a top-down hierarchical structure within Cameroon’s DM framework. The recommendations aim to correct these limitations. Recommendations also address key findings from question two that adversely affect the disaster survivors. These include the socio-economic problems caused by displacement and resettlement, and also the vulnerability to the risk of another gas explosion and flooding due to relocation in the disaster zone. The recommendations also consider key findings from question three, which have shown that disaster manager’s perception of risk is highly polarized towards technical mitigation measures, while past knowledge, public perception and history of the disaster areas are influencing the risk perception of the affected populations and consequently their actions. The dire socioeconomic conditions in the resettlement camps, cultural factors and better livelihood prospects in the disaster zone, which have attracted survivors back to the risky area (Nyos) or to stay there (Njindoum) thereby increasing their vulnerability to the physical risk from

the lakes are key findings from question four. These have also been considered in the recommendations.

A review of natural DM policy in the country, which takes into account these recommendations, is necessary to enhance the robustness of Cameroon's DM framework. The skewed DM approach in the country, the socio-cultural conditions of disaster survivors and motives for relocation indicate that integrating natural hazard risk reduction with development planning hinges around a strong institutional framework for DM and resource allocation that is underpinned by good governance. The recommendations adopt a holistic approach for hazard/disaster mitigation strategies, which incorporates technical and socio-economic considerations, thereby bringing inter-disciplinary perspectives together to solve complex problems caused by natural hazards. Lessons must be drawn from the past: in this case from the experience of the LNM disasters, the management of which has brought long-term changes in the socio-economic and socio-cultural condition of survivors, and has ultimately motivated a relocation process that has made communities vulnerable once again to physical risk from the lakes.

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## APPENDIX 1

### OCCURRENCE OF NATURAL HAZARDS/DISASTERS IN CAMEROON

The occurrence of natural hazards in Cameroon is intimately linked to geology and geography. Natural geologic factors are responsible for volcanic activity, earthquakes and external structural features like mountains, valleys and major faults on the earth's surface.

#### CAMEROON'S TECTONICS

Cameroon's tectonic history is largely responsible for the geologic and structural features which make the country prone to natural hazards. Cameroon's physical features form part of the complex history of plate tectonics that led to the fragmentation of the supercontinent Gondwana since the Mesozoic Era (Binks and Fairhead, 1992). This rifting of continental plates along the margin of the South Atlantic is contemporaneous with intra-continental rifting generating both strike-slip and extensional basins within West and Central Africa. A set of the strike-slip faults extends from the Gulf of Guinea northeastward through Cameroon, southern Chad and the Central African Republic into west-central Sudan (Fairhead and Green, 1989). These extensive faults and shear zones are known in Cameroon as the Foumban Shear Zone (FSZ) which extends northeastward into Chad where it is known as the Central African Shear Zones (see figure below)

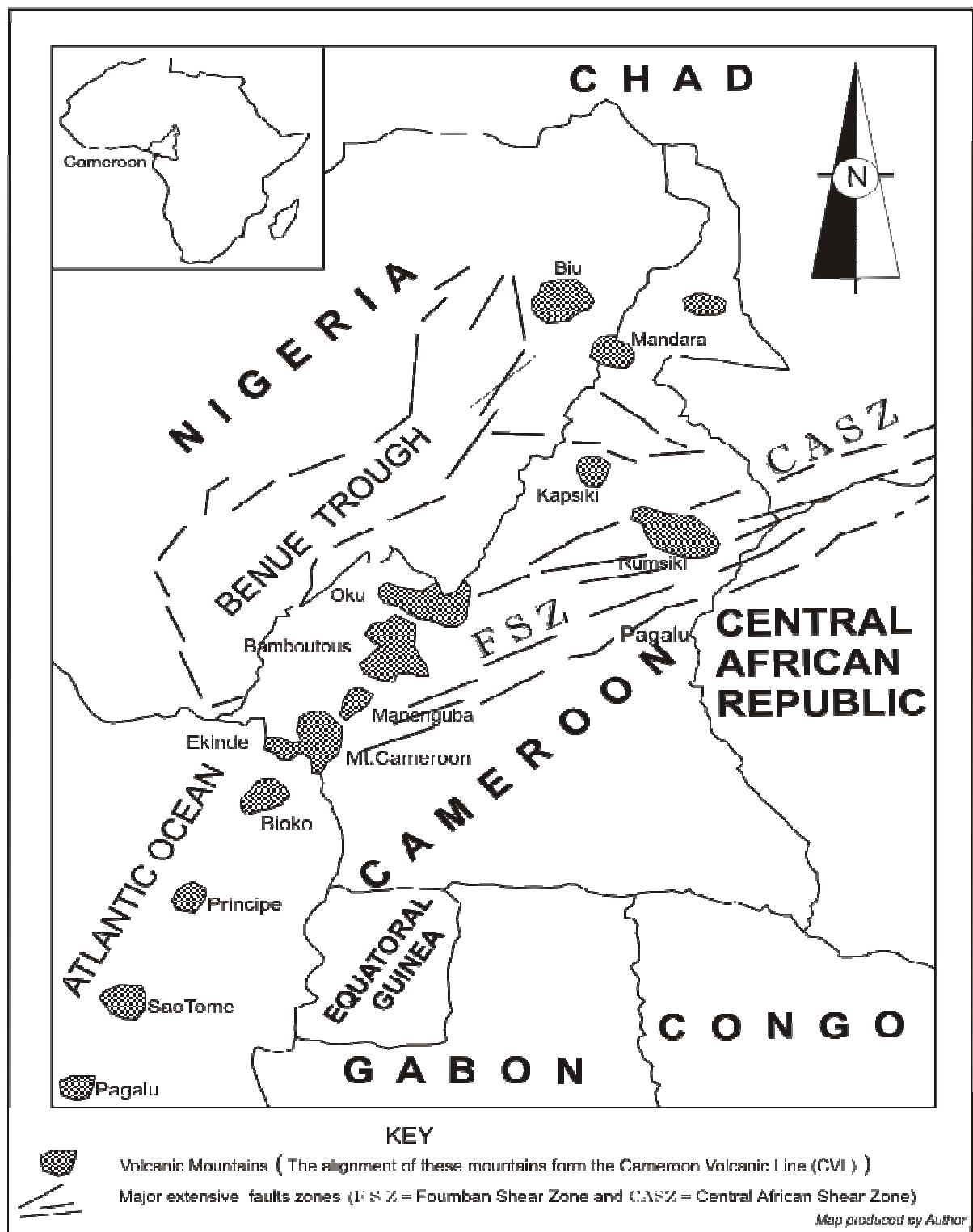
These faults and shear zones are zones of weaknesses that extend into the earth's interior and have been responsible for volcanic and seismic activity ever since their formation. The most active volcanoes in Africa are found in Cameroon and these are a product of hot-spot volcanic activity that is exploiting the shear zones due to the dynamic nature of the African continental plate (Coulon et al., 1996). These volcanoes constitute a major Y-shaped elongated volcanic mountainous range in the country called the Cameroon Volcanic Line (CVL), which is responsible for most of the natural hazards in the country (Dumort 1968; Hedberg 1968; Nni 1984). The CVL is an alignment of oceanic and continental volcanoes trending averagely N30°E and stretching for over 1500 km through the country (figure 7.1). The continental sector (Mt. Etinde, Mt. Cameroon, Manegouba, Bamboutous, Oku, Rumsiki, Kapsiki through the Adamoua Plateau to the Mandara mountains) is prone to landslides, earth tremors and landslides, many of which have caused fatalities and damage to property.

#### FREQUENCY OF NATURAL HAZARDS IN CAMEROON

Most natural hazards in Cameroon occur in the CVL. This mountain range is prone to volcanic eruptions, toxic gas emissions from crater lakes, landslides, earth tremors and flash floods, usually with devastating consequences. Volcanic activity and the release of poisonous gases are confined to the volcanic mountains and their associated crater lakes. Another key site of volcanic activity is Mt Cameroon, the highest peak on the CVL (4095m) and second highest mountain in Africa. It is the most active volcano in Africa. Mt. Cameroon has a documented recent eruptive history of 13 eruptions of about 15 year's interval for the past 200 years (Zogning, 1988). Within the last century, it has erupted seven times - 1909, 1922, 1954, 1959, 1982, 1999 and 2000. These eruptions pose major threats to the agrarian economy in the region and the communications infrastructure around the mountains. The most recent 1999 (28 March–22 April) and 2000 (28 May–19 June) violent eruptions produced lava that destroyed the natural ecological habitats, forests and palm plantations around the mountain. The lava also truncated a major highway that links some major urban towns in the region and the threat eventually led to the displacement of an entire village (Deruelle et al., 2000; Suh et al., 2003).

Also linked to the CVL and the climate of the country are flash floods and landslides which occur on an almost annual basis. Landslides and floods have been linked to the steep topographic gradients of the CVL, together with meteorological and seismic

events (Lambi; 1989, 1991). The annual climate of Cameroon is made up of dry and wet seasons, with the latter (usually from May to September) often occurring as intense showers and storms often causing huge runoff and gully erosion on the plateau and steep



Tectonic features showing the Cameroon Volcanic Line and major shear zones associated with natural hazards in Cameroon. *Source: Author*

gradients of the volcanic mountains (Neba, 1999). High rainfall is often worsened by the steep slopes of the CVL leading to flash floods and landslides in many areas of the country during this period. The highlands along the CVL, especially between latitudes 4 and 7 north, where annual rainfall ranges from 2000 to 9000 mm are prone to occasional

landslides leading to the destruction of farmlands, houses and roads and occasional deaths (Ayonghe et al., 1999). Another factor that exacerbates landslides is intensive anthropogenic activities<sup>27</sup> associated with population increases and agricultural intensification on the fragile slopes of the CVL.

In recent times, floods and landslides have caused considerable damages to the population. In 2001, heavy rains triggered flash floods, mudflows and landslides in the coastal city of Limbe that resulted in 24 deaths, rendered over 1500 people homeless and left a vast trail of destruction to infrastructure (IFRC, 2001b; Ayonghe et al., 2004). In July and August of 2003, following heavy storms, floods and landslides affected several villages in the Bamboutous plateau and destroyed 309 houses, killed 46 people and displaced more than 1700 others (Par Bleu, 2004; Zogning et al., 2007). It should be noted however that most of these hazards often go unrecorded, except those which cause appreciable damage to property and loss of lives.

The tectonic rift structures and fracture zones have been associated with earth tremors and earthquakes, indicating that these fracture zones are weak and still able to dissipate stress into the adjacent continental areas (Binks and Fairhead, 1992). Zogning (1988) mentions 21 epicenters of earthquake activity in Cameroon between 1952 and 1987 and describes nine extensive rift axes that control seismic activity in Cameroon. On the 19<sup>th</sup> of March 2005, an earthquake measuring 4.4 on the Richter scale hit the Central and Littoral Provinces causing damage to physical property and serious panic and confusion to the entire population (MINATD/DPC, 2005). On March 28<sup>th</sup> 1999, an earthquake with intensity of VI-VII was felt over a radius of over 100km from Mt Cameroon. This caused the destruction of buildings and marked the on-set of the 1999 eruption (Suh et al., 2003).

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<sup>27</sup> Houses are dug into hillside, cattle tracts terrace the hillside and poor farming techniques increase deforestation and soil erosion and assist the natural factors in destabilising slopes facilitating landslides.

**APPENDIX 2**  
**SOME WAYS IN WHICH DISASTER IMPACTS ON EFFORTS TO MEET THE  
 MILLENIUM DEVELOPMENT GOALS**

MDG	DIRECT IMPACTS	INDIRECT IMPACTS
<b>1. ERADICATE EXTREME POVERTY AND HUNGER</b>	➤ Damage to housing, service infrastructure, savings, productive assets and human losses reduce livelihood sustainability.	➤ Negative macroeconomic impacts including severe short-term fiscal impacts and wider, longer-term impacts on growth, development and poverty reduction. ➤ Forced sale of productive assets by vulnerable households pushes many into long-term poverty and increases inequality.
<b>2. ACHIEVE UNIVERSAL PRIMARY EDUCATION</b>	➤ Damage to education infrastructure. ➤ Population displacement interrupts schooling.	➤ Increased need for child labour for household work, especially for girls. ➤ Reduced household assets make schooling less affordable, girls probably affected most
<b>3. PROMOTE GENDER EQUALITY AND EMPOWER WOMEN</b>	➤ As men migrate to seek alternative work, women/girls bear an increased burden of care. ➤ Women often bear the brunt of distress 'coping' strategies, e.g. by reducing food intake.	➤ Emergency programmes may reinforce power structures which marginalise women. ➤ Domestic and sexual violence may rise in the wake of a disaster. <sup>25</sup>
<b>4. REDUCE CHILD MORTALITY</b>	➤ Children are often most at risk, e.g. of drowning in floods. ➤ Damage to health and water & sanitation infrastructure ➤ Injury and illness from disaster weakens children's immune systems.	➤ Increased numbers of orphaned, abandoned and homeless children. ➤ Household asset depletion makes clean water, food and medicine less affordable.
<b>5. IMPROVE MATERNAL HEALTH</b>	➤ Pregnant women are often at high risk from death/injury in disasters ➤ Damage to health infrastructure. ➤ Injury and illness from disaster can weaken women's health.	➤ Increased responsibilities and workloads create stress for surviving mothers. ➤ Household asset depletion makes clean water, food and medicine less affordable.
<b>6. COMBAT HIV/AIDS, MALARIA AND OTHER DISEASES</b>	➤ Poor health & nutrition following disasters weaken immunity. ➤ Damage to health infrastructure. ➤ Increased respiratory diseases associated with damp, dust and air pollution linked to disaster.	➤ Increased risk from communicative and vector borne diseases, e.g. malaria and diarrheal diseases following floods. ➤ Impoverishment and displacement following disaster can increase exposure to disease, including HIV/AIDS, and disrupt health care.
<b>7. ENSURE ENVIRONMENTAL SUSTAINABILITY</b>	➤ Damage to key environmental resources and exacerbation of soil erosion or deforestation ➤ Damage to water management and other urban infrastructure. ➤ Slum dwellers/people in temporary Settlements often heavily affected.	➤ Disaster-induced migration to urban areas and damage to urban infrastructure increase the number of slum dwellers without access to basic services and exacerbate poverty.
<b>8. DEVELOP A GLOBAL PARTNERSHIP FOR DEVELOPMENT</b>	➤ Impacts on programmes for small island developing states from tropical storms, tsunamis etc	➤ Impacts on commitment to good governance, development and poverty reduction nationally and internationally.
<b>ALL MDGS</b>		➤ Reallocation of resources – including ODA from development to relief and recovery.

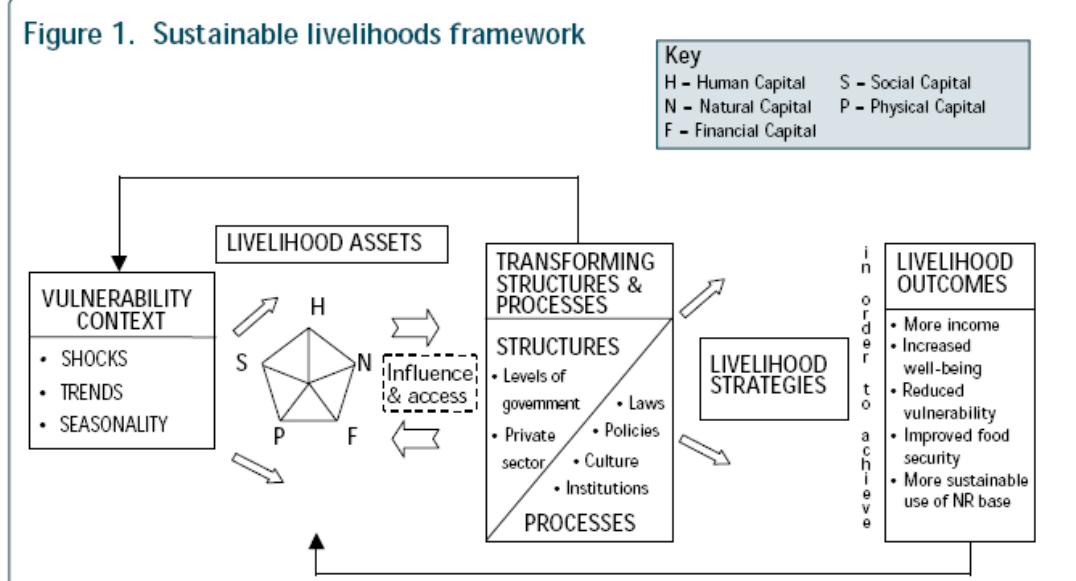
*Source: White et al. (2004:20)*

## APPENDIX 3

### SUSTAINABLE LIVELIHOOD FRAMEWORKS

The SLF originated as a result of the 1997 UK government's white paper on international development which committed the UK to the international development target of reducing by one-half the proportion of people living in extreme poverty by 2015. The main themes include the concepts of vulnerability context, livelihood assets, transforming structures and processes, and livelihood strategies as shown in the diagram below.

**Figure 1. Sustainable livelihoods framework**



The sustainable livelihood framework: *Source: Ashley and Carney (1999)*

#### **Vulnerability Context**

The central feature of the approach is that it views people as operating in a context of vulnerability. The factors that make up the vulnerability context are important because they have a direct impact upon people's assets and the livelihood options that are open to them. The framework presents three main categories of vulnerability: trends, shocks and seasonality.

Trends are long-term and usually large scale. They include population trends, resource trends (including conflict over resources), economic trends (national and international), trends in governance and politics, and technological trends. Seasonality is expressed through seasonal shifts in prices, production, food availability, employment opportunities and health. Shocks include human health shocks (epidemics), natural shocks (e.g. natural hazard-induced disasters), economic shocks (e.g. rapid changes in exchange rates), conflict shocks and crop/ livelihood shocks. They can destroy assets directly (e.g. in the case of floods and storms), and they can also force people to dispose of assets as part of coping strategies. Resilience to external shocks and stresses is an important factor in livelihood sustainability. The toxic release of the poisonous gasses that caused the Lake Nyos and Monoum disasters fits the shocks vulnerability context in this framework.

#### **Livelihood Assets**

The SLF takes a broad view of people's strengths/capacities in the form of livelihood assets. This is expressed visually as an asset pentagon showing the different types of asset and the important inter-relationships between them. The model breaks capital into five categories namely human, social, natural, financial and physical capital as shown in Box 1.1.

### Box 1.1: TYPES OF CAPITAL

**Human:** skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives. At a household level human capital is a factor of the amount and quality of labour available; this varies according to household size, skill levels, leadership potential and health status

**Social:** the social resources upon which people draw in pursuit of livelihood objectives (e.g. networks and connections, membership of groups, relationships of trust, reciprocity and exchanges)

**Natural:** the natural resource stocks from which resource flows and services (e.g. land, forests, marine/wild resources, water, protection from storms and erosion) useful for livelihoods are derived.

**Physical:** the basic infrastructure and producer goods needed to support livelihoods. Infrastructure consists of changes to the physical environment that help people to meet their basic needs and to be more productive. Infrastructure components include affordable transport, secure shelter, adequate water supplies and sanitation, access to information.

**Financial:** the financial resources that people use to achieve their livelihood objectives. This includes savings and credit, inflows of money other than earned income (e.g. pensions, remittances).

*Source: Ashley and Carney (1999)*

When looking at a household, community and other groups, the model can be used to show the strengths and weaknesses of different types of asset, their relative importance and the linkages between them. This helps in identifying entry points for strengthening livelihood security. Assets can be destroyed and created as a result of the trends, shocks and seasonality of the vulnerability context. As will be shown, the victims of the Nyos disaster lost almost all the various types of capital and this was exacerbated by their relocation and resettlement.

### **Transforming Structures and Processes**

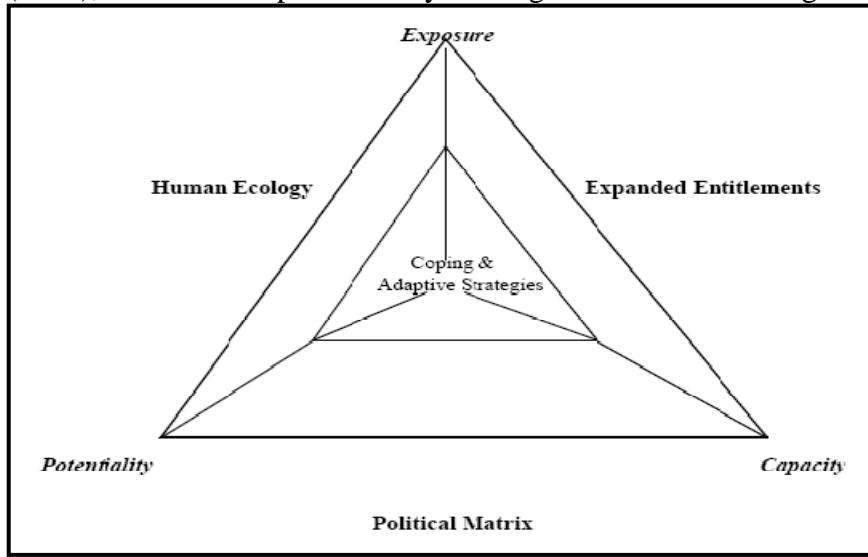
These are the institutions, organizations, policies and legislation that shape livelihoods. They operate at all levels, from the household to the international arena and in all spheres, from private to public. Their importance cannot be overemphasized. They determine the five different types of capital, livelihood strategies and decision makers' terms of exchange between the different types of capital and economic and other returns from livelihood strategies. They can reduce or worsen the impact of external shocks on vulnerable people. Transforming structures are organizations that set and implement policy and legislation, deliver service, purchase trade and perform many other functions that affect livelihoods. Public sector, private sector and civil society organizations are all included. Transforming processes determine the way in which structures and individuals operate and interact. They include policies, legislation and other rules that regulate access to assets, markets, and culture and power relations in society. Within the context of this research, the transforming structures and processes are the various policies, institutions and administrative processes that influence disaster management. This is discussed in more detail in chapter 5.

### **Livelihood Strategies**

Operating within the vulnerability context, using their livelihood assets and under the considerable influence of transforming structure and processes, poor people choose and implement livelihood strategies. These are often complex and may change rapidly in response to the external context. The SLF seeks to understand the many factors influencing people's choice of livelihood strategy and then to reinforce the positive aspects (factors that promote choice and flexibility) and mitigate the constraints.

## **UNDP SUSTAINABLE LIVELIHOODS AND VULNERABILITY**

The analytical framework used by the UNDP consists of a livelihood system that comprises three distinct processes. This conceptual framework is described by Hoon et al. (1997), and can be represented by a triangle as shown in the figure below.



The UNDP Livelihood Framework *Source: Hoon et al. (1999)*

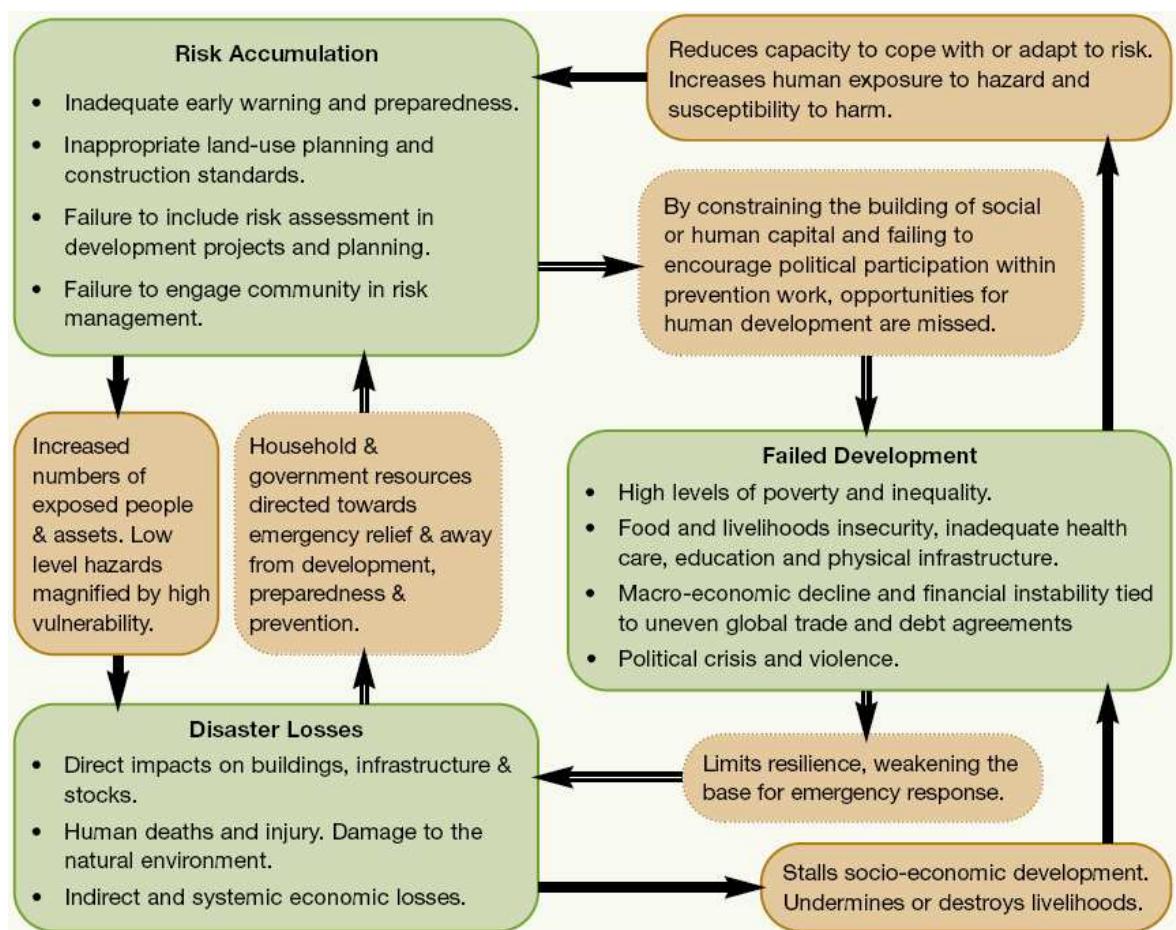
In the UNDP's conceptual framework, the livelihood system is defined by three distinct processes that are linked through a tripartite structure. The three sides of the analytical triangle are Human Ecology, Expanded Entitlements and Policy Matrix. The human ecology side refers to the relations between the natural resource base and human society. The policy matrix side refers to the relationship between policy and livelihood systems. Patterns of entitlement, distributions of assets and livelihood strategies are embedded in a policy structure at macro-and micro-level. The expanded entitlement side comprises commodities, social support structures and capacity to make use of environmental resources. The core of the triangle comprises the coping and adaptive strategies of the livelihood group. Each point of the triangle represents a network of interconnected ideas and indicators that can be categorized on the basis of processes, structures, values and decisions.

## APPENDIX 4

### SPIRALS OF DEVELOPMENT AND DISASTER RISK

#### A) 'VICIOUS' SPIRALS OF FAILED DEVELOPMENT AND DISASTER RISK

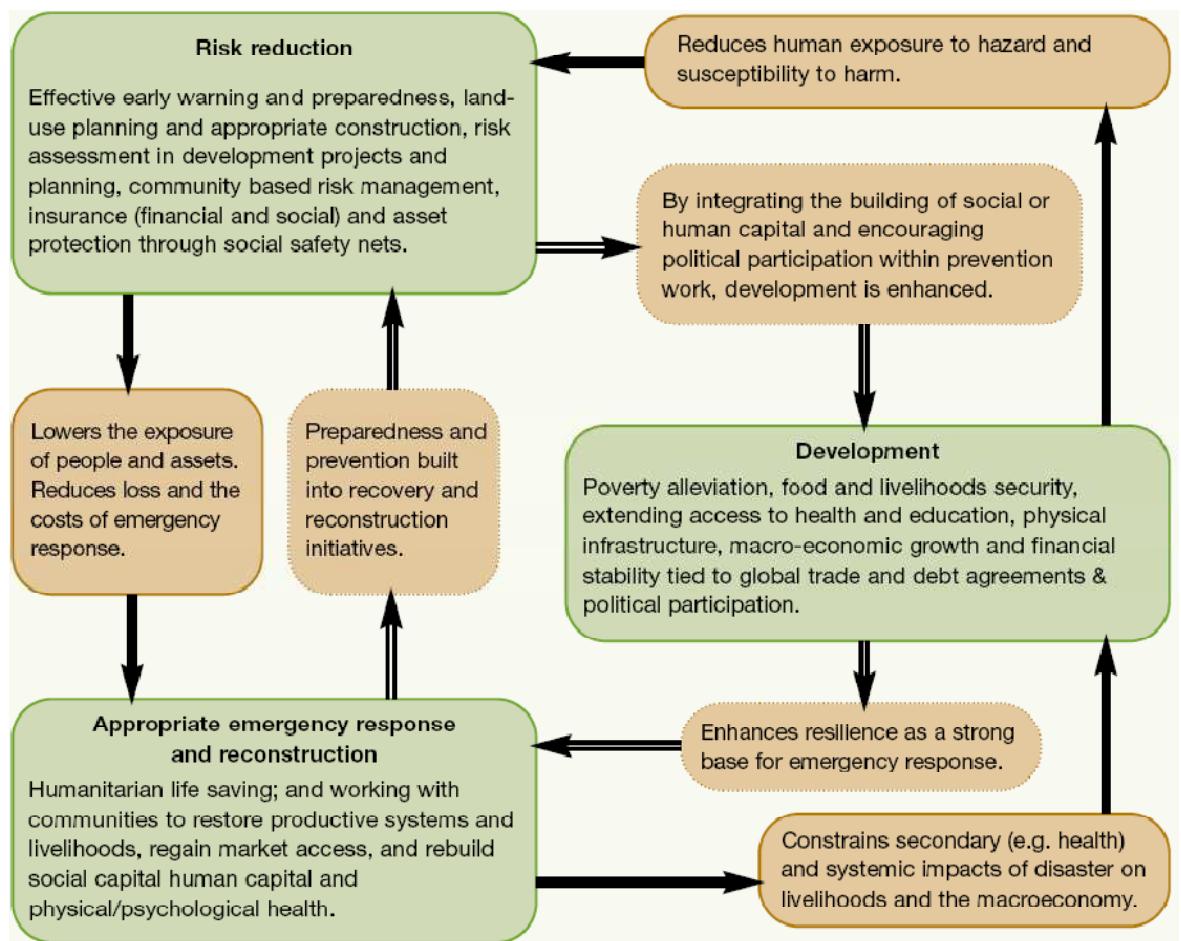
A two way link between disasters and development, expressed as 'vicious spirals' has also been acknowledged (White et al., 2004). Figure 2.4 shows 'vicious spirals' of failed development and disaster risk. The anticlockwise spiral shows development failures that undermine coping strategies and exacerbate hazard exposure. In the clockwise spiral, development failures undermine the national capacity to respond to disasters (White et al., 2004).



'Vicious spirals' of disaster risk and development failures *Source: White et al. (2004)*

## B) 'VIRTUOUS SPIRALS' OF DEVELOPMENT AND DISASTER RISK REDUCTION.

Development processes help to reduce disaster risk in the anti-clockwise circuit so that exposure and susceptibility to harm are minimized and losses contained. The clockwise loop shows how development provides a basis for strong emergency response, and a unique opportunity to reinforce disaster risk reduction in the process of reconstruction.



'Virtuous spirals' of development and disaster risk reduction. *Source: White et al. (2004)*

## APPENDIX 5

### RESEARCH QUESTIONNAIRES FOR CASE STUDY POPULATIONS IN ENGLISH

Questionnaire Number	
Place	
Date	
Interviewer	
Household Identifier	

#### A GENERAL DEMOGRAPHIC AND VULNERABILITY DATA FOR RESPONDENT OR HOUSEHOLD

---

1 How long have you lived in this house?.....

2 Are you the head of the Household? Yes:  No:  If not what is your relationship to head?

3 Sex: Male  Female

4 Age: < 20 20-29 30-39 49- 49 50-59 > 60

5 Number in Household: Adult: 18-30 yrs \_\_\_\_\_ 30-40yrs \_\_\_\_\_ Above 40yrs \_\_\_\_\_  
Children: < 10yrs, 10- 18yrs

6 Type of household: Lone  Couple with Kids  Couple No Kids,  Single parent

7 Are you employed: Yes  No

8 What is your main occupation?.....

9 Please indicate the sources of your monthly household income below.

Income Sources	Amount
Farming	
Cattle Rearing	
Salary or Wages	
Monies regularly given by relatives in Cameroon	
Other Remittances from abroad	
Other sources/activities (Please specify)	

10 Does anyone in household have any disability or chronic illness that affects your income generating activities?  Yes  No If yes specify .....  
.....

11 Is the house where you live owned by you? Yes  Private rental   
Government provided or camp

12 Do you have insurance for any of your property? House  Farm  Cattle   
Other (Specify)..... None

---

#### B KNOWLEDGE/EXPERIENCE WITH NATURAL HAZARDS

---

13 What natural event has affected you (directly or indirectly)? Bush fire  landslide and Soil erosion  Floods and heavy rain  Epidemics  Volcanic  eruption  
Drought s eruption  None

Event (type and name)	When	How	How did this affect you and or what were the main effects?


**14** Has any member of this household died as a result of any of the hazards you named above? Yes  No

**15** If Yes, how and where did they die.....

**16** Were you warned about the event before it happened? Received no warning:   
Radio:  Neighbor   
Other.....

**17** How have any of these natural events affected your ability to earn a living?  
.....  
.....

**18** If applicable, how have they affected your ability to provide for your family?  
.....  
.....

**19** Which event costed you the most?  
.....  
.....

---

#### **C EXPERIENCE OF 1984/86 GAS DISASTER**

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**20** Were you affected by the Nyos/Monoum gas disaster? Yes  No

**21** When the Nyos/Monoum disaster occurred did you leave your home? Yes  No

**22** If you were displaced by the disaster where did you go to and why? Friends and Relatives  Emergency shelter   
Reason.....  
.....

**23** Did you get help from Relatives, friends and neighbors:  Government   
NGOs  What help?  
.....

**24** Are you now fully recovered from the disaster?.....  
.....

**25** After the disaster, I have: Relocated to the disaster site  staying within the disaster zone  Living where I was resettled  Others  
Please give reasons for your choice above?  
.....  
.....  
.....  
.....

---

#### **D FUTURE RISK**

---

**26** What hazard are you mostly afraid of? Bush fire  landslide and Soil erosion   
Floods and heavy rain  Epidemics  Volcanic eruption   
Gas eruption  None

**27** How soon do you think there will be another gas eruption from the lake? Less than 5 years   
About 10 years time  About 20 years time  Not Sure  Other   
Please specify.....

**28** What do you fear most from any subsequent gas emission or eruption? Loss of Life   
Death or loss of livestock  Sickness  Others

Please indicate.....

**RESEARCH QUESTIONNAIRES FOR CASE STUDY POPULATIONS  
TRANSLATED INTO FRENCH**

**SONDAGE REALISE SUR LE THE ME «LES RISQUES ET VULNERABILITE  
LIES AUX CATASTROPHES NATURELLES: LEUR IMPLICATION DANS LA  
REDUCTION DES RISQUES ET DES PROGRAMMES DE DEVELOPPEMENT AU  
CAMEROUN »**

Numéro du questionnaire	
Lieu du sondage	
Date du sondage	
Enquêteur	
Identificateur du ménage	

**Données démographiques et de vulnérabilité de l'enquêté ou du ménage**

1-Depuis combien de temps vivez-vous dans cette maison?.....

2- Etes-vous chef de cette famille? Oui  Non  si non, quelles sont vos relations avec le chef de famille?

3- Sexe: masculin  féminin

4- Age: moins de 20  20-29  30-39  39-49  49-59  plus de 60

5- Taille de la famille: adultes: 18-30 ans \_\_\_\_\_ 30-40 ans \_\_\_\_\_ plus de 40 ans \_\_\_\_\_

Enfants: moins de 10 ans \_\_\_\_\_ 10-18 ans \_\_\_\_\_

6- Statut de la famille: seul  couple avec enfants  couple sans enfants  Parent célibataire

7- Avez-vous un emploi? Oui  non

8- Quelle est votre occupation principale?.....

9- Veuillez indiquer les sources de vos revenus mensuels dans le tableau ci-dessous.

Sources des revenus	Montant
Agriculture	
Elevage	
Salaire	
Argent provenant des familles résidant au Cameroun	
Revenus provenant des à l'étranger	
Autres sources ou activités (bien vouloir les spécifiées)	

10- Un membre de la famille est-il atteint d'une maladie ou d'un handicap entravant vos activités génératrices de revenus? Oui  non

Bien vouloir spécifier :

.....

11- Votre maison est-elle votre propriété? Oui  si non, est-ce: une maison en location  Fournie par l'Etat ou un camp:

12- L'un de vos biens est-il assuré: maison  plantation  bétail  Aucun

Autres (bien vouloir spécifier): .....

## B- Connaissances et expériences en matière de catastrophes naturelles

13- Quel type de catastrophes naturelles vous a affecté de façon directe ou indirecte?

Feux de Brousse  Glissement de terrains ou érosion  Inondations et fortes pluies   
Epidémies  Eruption volcanique  Sécheresse  Eruption de gaz  
Aucune

Type et nom de la catastrophe	Quand s'est-elle passée ?	Comment est-elle arrivée ?	Comment vous a-t-elle affectée et quels en sont les principaux effets ?

14- Des membres de la famille sont-ils décédés suite à l'une des catastrophes nommées plus haut ?

Oui  non

15- Si oui, où et quand sont-ils morts ?.....

16- Avez-vous été prévenu avant le déclenchement de la catastrophe? Pas d'avertissement   
Averti par la radio  Par un voisin   
Autres.....

17- Quelle a la portée de cet événement dans votre capacité à gagner votre vie?

18- Le cas échéant, comment a-t-il affecté votre capacité à survenir aux besoins de votre famille?

19- Quelle catastrophe vous a le plus affecté?.....

## C- A PROPOS DE L' ERUPTION DE GAZ DE 1984

20- avez-vous été affecté par l'éruption de gaz du lac Monoum ? Oui  Non

21- avez-vous quitté votre maison suite à l'éruption de gaz du lac Monoum ? Oui  non

22- si cette catastrophe a provoqué votre déplacement, où êtes-vous parti ? Avec des amis et connaissances  campement d'urgence

Pour quelles raisons ?.....

23- Avez-vous reçu de l'aide de la part des amis et connaissances ? Gouvernement   
ONG  Quel genre d'aide ? .....

24- Vous êtes-vous totalement remis de la catastrophe ? .....

25- Après la catastrophe, j'ai dû : être transféré au lieu de la catastrophe  continuer de rester dans la zone du désastre  vivre là où j'ai été déménagé Autres   
Bien vouloir justifier votre choix :

.....  
.....  
**D – DANS LE FUTUR**

26- Quel événement vous effraie le plus? Feux de Brousse  Glissement de terrains ou érosion  Inondations et fortes pluies  Epidémies  Eruption volcanique  Sécheresse  Eruption de gaz  Aucune

27- Dans combien de temps prévoyez-vous une prochaine éruption de gaz dans le lacMonoum:

moins de 5 ans  dans 10ans  dans 20 ans  pas sûr  Autres   
Veuillez préciser:

.....  
.....

28- Qu'est-ce qui vous ferai le plus peur dans une prochaine éruption de gaz?

Pertes en vies humaines  pertes en bétail  maladies  autres

Bien vouloir spécifier :.....

.....

## APPENDIX 6

### SEMI STRUCTURED INTERVIEWS WITH KEY OFFICIALS IN DISASTER MANAGEMENT

---

#### **A INFORMATION TO OBTAIN BEFORE INTERVIEW**

---

PLACE OR LOCATION\_\_\_\_\_

POSITION HELD\_\_\_\_\_

INTERVIEW DATE\_\_\_\_\_

WERE ANY DOCUMENTS RECEIVED FROM THE INFORMANT PRIOR TO THE INTERVIEW? YES

NO

#### LIST OF DOCUMENTS

1)\_\_\_\_\_

2)\_\_\_\_\_

3)\_\_\_\_\_

4)\_\_\_\_\_

---

#### **B GENERAL QUESTION ON DISASTER MANAGEMENT IN CAMEROON**

---

- 1 Do you know of any government laws, or regulations relating to hazard management?
- 2 What is your own assessment of Cameroon's overall natural hazard mitigation program or how would you rate the success of disaster mitigation or management in Cameroon?
- 3 Do you use information on Nyos/Monoum hazards in planning decisions?
- 4 How would you rate the risk for natural hazards in Cameroon?
- 5 How would you rate the country's level of vulnerability preparedness and resilience?

---

#### **C STRATEGIES/POLICIES/PLANS**

---

- 6 Are you aware of any disaster mitigation /management plan for the Nyos/Monoum area?
- 7 Do you think the government is doing enough scientifically to reduce the threat that the lakes pose in the area?
- 8 Is there a management Plan for the displaced or affected victims of the Nyos disaster? Is the programme effective?
- 9 What do you think are the main constraints or problems with the management of the Lake Nyos victims?
- 10 Is the affected community incorporated into any disaster mitigation programmes or projects? What is the level of their participation?
- 11 To What extent is disaster management incorporated into development policies/plans or projects?

---

#### **D PAST EXPERIENCE WITH LAKE NYOS AND MONOUM DISASTERS**

---

- 12 What were the social and economic impacts of the lake Nyos disaster on your sector?
- 13 Do you think that the disaster was well managed?
- 14 What could have been done differently?
- 15 What prevented these actions from being taken?
- 16 How can these experiences be used for future planning?

**RESEARCH INTERVIEWS QUESTIONS FOR DISASTER MANAGERS  
TRANSLATED INTO FRENCH**

**ENQUÊTES SEMI STRUCTUREES MENEES AVEC LES  
PRINCIPAUX RESPONSABLES DE LA GESTION DES  
CATASTROPHES**

---

**A. INFORMATION A OBTENIR AVANT L'ENQUÊTE**

---

LIEU OU

LOCALITE\_\_\_\_\_

FONCTION\_\_\_\_\_

DATE DE L'ENQUÊTE \_\_\_\_\_

L'ENQUÊTE A -T -IL FOURNI DES DOCUMENTS AVANT L'E ENQUÊTE? OUI  NON   
LES QUELS?

1) \_\_\_\_\_

2) \_\_\_\_\_

3) \_\_\_\_\_

4) \_\_\_\_\_

---

**B GENERALITES SUR LA GESTION DES CATASTROPHES AU CAMEROUN**

---

- 1 Connaissez vous une loi ou un règlement relative à la gestion des catastrophes?
- 2 Quelle est votre propre évaluation des programmes de contrôle des catastrophes au Cameroun en général, et quelle est votre appréciation des succès réalisés dans le cadre de la réduction ou de la gestion des catastrophes au Cameroun?
- 3 Exploitez vous les informations provenant des catastrophes de Nyos/Monoum dans la prise de décision?
- 4 Quelle est votre évaluation des risques liés aux catastrophes au Cameroun?
- 5 Quel est, selon vous, le niveau de vulnérabilité, de préparation et de récupération?

---

**C. STRATEGIES/POLITIQUES/PROGRAMMES**

---

- 6 A votre connaissance, existe-il un programme de réduction ou de gestion des catastrophes dans les localités Nyos/Monoum?
- 7 Croyez vous que le gouvernement oeuvre assez sur le plan scientifique en vue de la réduction de la menace que représentent ces lacs pour ces localités?
- 8 Existe-il un programme de gestion pour les déplacées et victimes de la catastrophe du lac Nyos? Ce programme est-il efficace?
- 9 Selon vous, quels sont les principaux obstacles liés à la gestion de victimes du lac Nyos?
- 10 Les populations touchées sont-elles impliquées dans les programmes ou projets de réduction de catastrophe? Quel est leur niveau de participation?
- 11 Quel intérêt les politiques, programmes ou projets de développement accordent-ils à la gestion des catastrophes?

---

**D. ANTECEDENTS LIES AUX CATASTROPHES DE LACS NYOS ET MONOUM**

---

- 12 Quels étaient les impacts de la catastrophe du lac Nyos sur la situation sociale et économique de votre secteur ?
- 13 Pensez- vous que la catastrophe a été bien gérée?

- 14 Pensez-vous qu'on aurait dû la gérer autrement?
- 15 Qu'est-ce qui a entravé la prise de décision?
- 16 Comment ces antécédents pourraient-ils servir dans l'élaboration des futurs programmes?

## **SEMI STRUCTURED INTERVIEWS WITH NYOS AND MONOUM HOUSEHOLD RESIDENTS**

---

### **A INFORMATION TO OBTAIN BEFORE INTERVIEW**

---

PLACE OR  
LOCATION \_\_\_\_\_

POSITION \_\_\_\_\_

HELD \_\_\_\_\_

INTERVIEW DATE \_\_\_\_\_

WERE ANY DOCUMENTS RECEIVED FROM THE INFORMANT PRIOR TO THE INTERVIEW? YES   
NO

LIST OF DOCUMENTS

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_

---

### **A HISTORY OF WHERE LIVED IN RELATION TO HAZARDS**

---

- 1 What impact or effect has relocating to another place after the disasters have on your life?
- 2 Do you think your life would have been better if you were settled elsewhere or had the opportunity to choose where to live after the disaster?
- 3 What is your overall assessment of the Government's management of the disaster?
- 4 Can you explain why you either intend to relocate or not to relocate from where you are presently living?

---

### **B INTRAHOUSEHOLD RISK PERCEPTION**

---

- 5 Which hazard do you think will have the most serious consequences on your household?
- 6 What do you think is the greatest threat of another gas eruption to your household?
- 7 How prepared are you and your household for any subsequent gas eruption?
- 8 How confident are you in government officials' ability to provide accurate information about the risk posed by the lakes in your area?
- 9 Do you think the government is doing enough to provide you with adequate information that can help you and your household plan for any future gas eruption?
- 10 Are you prepared to follow any advice or orders from the government?

## APPENDIX 7

### INSTITUTIONS/ORGANISATIONS INTERVIEWED AND FROM WHERE SECONDARY INFORMATION WAS COLLECTED

- Buabua-Kimbi Lake Nyos Cultural and Development Association
- Cameroon Post news paper
- Cameroon Tribune news paper
- Cameroon Red Cross
- Department of Civil Protection
- Fon's Palace of Njindoum
- Helvetas, Bamenda
- Ministry of Territorial Administration and Decentralisation
- Ministry of Scientific Research and Innovation
- Ministry of Agriculture and Rural Development
- Ministry of Social Affairs
- Ministry of Higher Education
- National Institute of Geological and Mining Research
- National institute of Cartography
- North West Provincial Delegations of Town Planning
- North West Provincial Delegation of Public Health
- North West Provincial Delegation of Social Affairs
- Office of the Divisional Officer for Wum
- Office of the Divisional Officer for Fungom
- Office of the Divisional Officer of Noun
- South West Provincial Delegation of Culture
- Plan International Bamenda
- The Herald News paper
- UNDP regional office in Yaounde
- Wum rural council

## APPENDIX 8

### SUMMARY OF MAIN RESEARCH TECHNIQUES FOR EACH QUESTION

A) Case study populations, sub-themes of question one, research tasks and techniques for question one

CASE STUDY GROUP/ISSUE	QUESTION THEMES	RESEARCH TASK	RESEARCH TECHNIQUES
Disaster Management (Risk Reduction) in Cameroon	Government structure to cater for Disaster Management	<ul style="list-style-type: none"> <li>➤ Analysis of Legislative, Institutional and Administrative framework of disaster management and risk reduction in Cameroon</li> </ul>	<ul style="list-style-type: none"> <li>➤ Secondary information</li> <li>➤ Situation specific documents</li> </ul>
	Cameroon's vulnerability to Natural Hazards	<ul style="list-style-type: none"> <li>➤ Level of Cameroon's vulnerability to natural hazards and the degree of preparedness for hazards/ disasters</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews with disaster managers,</li> <li>➤ Secondary information</li> </ul>
	Management of the Lake Nyos and Monoum disasters	<ul style="list-style-type: none"> <li>➤ Determination of the Long and Short term management of the both disasters involving the social and physical management aspects.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews with key informants or disaster managers,</li> <li>➤ Secondary information</li> </ul>
Displaced Nyos survivors in camps  Nyos Survivors who have returned to the disaster zone  Non-displaced Njindoum residents	Government assistance to survivors	<ul style="list-style-type: none"> <li>➤ Determination of the level of help or assistance that have been provided to survivors since the disasters occurred more than two decades ago</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Secondary information</li> </ul>
	Feeling about Governments management of the disasters	<ul style="list-style-type: none"> <li>➤ Perception of Governments management of the disasters with focus on the social and physical management aspects</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Secondary information,</li> <li>➤ Personal Observation</li> </ul>
	Risk and/or hazard preparedness	<ul style="list-style-type: none"> <li>➤ Analysis of survivors' knowledge of hazard/risk preparedness and their level of preparedness for subsequent hazards.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Questionnaire survey</li> </ul>
	Knowledge/information and reaction to subsequent advice/orders about hazards.	<ul style="list-style-type: none"> <li>➤ Analysis of hazard/risk information dissemination to survivors and how they are prepared to react to subsequent hazard/disaster/risk advice or orders.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Questionnaire survey</li> </ul>

B) Case study populations, sub-themes of question two, research tasks and techniques for question two.

CASE STUDY GROUP	QUESTION THEMES	RESEARCH TASK	RESEARCH TECHNIQUES
Displaced Nyos Survivors In Camps	Impact of the Lake Nyos disaster	➤ Analysis of social vulnerability due to the effects of the disaster. Determination of disaster impact on various types of capital.	➤ Semi-structured Interviews ➤ Key informants ➤ Nyos disaster literature
	Level of engagement in livelihood activities	➤ To make an analysis of the level of recovery more than two decades after the disaster	➤ Semi-structured Interviews ➤ Nyos disaster literature ➤ Questionnaire survey
	Financial capability, access to social facilities and perception of disaster management	➤ Analysis of social vulnerability related to political ecological factors	➤ Semi-structured Interviews ➤ Questionnaire survey ➤ Secondary literature
Nyos Survivors who have returned to the disaster zone	Impact of the Lake Nyos Disaster	➤ Analysis of social vulnerability due to the effects of the disaster. Determination of disaster impact on various types of capital	➤ Semi-structured Interviews ➤ Key informants ➤ Nyos disaster literature
	Financial ability and Level of engagement in livelihood activities	➤ Analysis of the level of recovery in disaster zone	➤ Semi-structured Interviews ➤ Questionnaire survey ➤ Personal Observation
	Present risks in disaster zone.	➤ Analysis of survivors physical vulnerability to subsequent hazards	➤ Semi-structured Interviews ➤ Personal Observation ➤ Secondary literature ➤ key informants
Non-displaced Njindoum residents	Impact of Lake Monoum disaster	➤ Analysis of the effect of the disaster on survivors	➤ Semi-structured Interviews ➤ Key informants
	Present risk around Lake Monoum	➤ Analysis of physical vulnerability in area	➤ Semi-structured Interviews ➤ Key informants ➤ Secondary Literature

C) Case study populations, sub-themes of question three, research tasks and techniques for question three.

CASE STUDY GROUP/ISSUE	QUESTION THEMES	RESEARCH TASK	RESEARCH TECHNIQUES
Displaced Nyos survivors in camps and Non-displaced Njindoum residents	Expressed Perception	Past experience or knowledge of natural hazards or disasters in their area	➤ How respondents had been affected by past hazards
		Opinion on present and future hazard/risk	➤ Respondent's perception of hazard types and their magnitude
		Expected behaviour in response to present or future risk	➤ Survivors' future response or behaviour in relation to their perception of hazards/risks in the environment.
	Revealed Perception	Relocation Behaviour following the Lake Nyos and Monoum disasters	➤ Examination of disaster survivors livelihoods and living conditions in proximity with Lake Nyos and Monoum
Nyos Survivors who have returned to the disaster zone	Expressed Perception	Past experience or knowledge of hazards/disasters in their area	➤ Determination of the level of help or assistance that had been provided to survivors
		Opinion on present and future risk in disaster zone	➤ Analysis of how returnees perceive the risk in the disaster zone ➤ Reasons for living in the disaster zone
		Relationship between past disaster impact and present behaviour or attitude towards risk/hazard	➤ Analysis of factors related to past disaster impact or living conditions prior to the disaster that influence risk perception
	Revealed Perception	Relocation Behaviour following the Lake Nyos and Monoum disasters	➤ Examination of displaced survivors relocating to the restricted risky disaster zone.
Disaster managers	Expressed Perception	Cameron's natural hazard mitigation program.	➤ Understanding of how disaster managers perceive the success of risk reduction programmes in the country
		Cameroon's disaster risk assessment	➤ Analysis of disaster manager's rating of Cameroon's proneness to natural hazards/disasters
		Cameron's vulnerability preparedness and resilience	➤ Analysis of disaster manager's perspective of the state of Cameroon's preparedness to mitigate risks in the country
	Revealed Perception	How the Disaster Management Framework of the country is structured to counter risk	➤ Examination of the framework for Cameroon's "natural" disaster risk mitigation program (Analysis in chapter 5)
		How the Lake Nyos and Monoum Disasters were managed	➤ Examination of the management of risks following the Lake Nyos and Monoum (LNM) Disasters (Analysis in chapter 6) ➤ Physical & documentary evidence of risk reduction programs after the (LNM) disasters.

D) Case study populations, sub-themes of question four, research tasks and techniques for question four.

CASE STUDY GROUP/ISSUE	QUESTION THEMES	RESEARCH TASK	RESEARCH TECHNIQUES
Displaced Nyos survivors in camps	Impact of relocation and preferred relocation site	<ul style="list-style-type: none"> <li>➤ Analyse the impact of forceful relocation to camps</li> <li>➤ Reasons for their preferred relocation sites</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Questionnaire survey</li> </ul>
	Plans to relocate/not relocate from present location in camps	<ul style="list-style-type: none"> <li>➤ Investigate how survivors feel about their present resettlement sites and their future plans vis-à-vis migrating and possible migration directions.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Questionnaire survey</li> <li>➤ Secondary information</li> </ul>
Non-displaced Njindoum residents	Preferred relocation site if forced to be displaced due to hazard/disaster	<ul style="list-style-type: none"> <li>➤ Investigate the choice of relocation sites when faced with inevitable displacements</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Questionnaire survey</li> </ul>
	Motives for not relocating from disaster zone	<ul style="list-style-type: none"> <li>➤ Investigate motives for not relocating from dangerous or hazardous sites or areas</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Questionnaire survey</li> <li>➤ Secondary information</li> </ul>
Nyos Survivors who have returned to the disaster zone	Preferred relocation sites and reasons for migrating from the resettlement camps	<ul style="list-style-type: none"> <li>➤ Determine the preferred relocation site of these people and their reasons for leaving the resettlement camps</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Questionnaire survey</li> </ul>
	Reasons for migrating back to the disaster zone	<ul style="list-style-type: none"> <li>➤ Investigate the motives for migrating back to the disaster zone and not elsewhere</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Secondary information</li> <li>➤ Questionnaire survey</li> </ul>
	Impact of migrating back to the disaster zone	<ul style="list-style-type: none"> <li>➤ Make an analysis of the changes they have encountered after migrating back to the disaster zone</li> </ul>	<ul style="list-style-type: none"> <li>➤ Semi-structured Interviews</li> <li>➤ Questionnaire survey</li> </ul>

## APPENDIX 9

### TRANSCRIPT CODING METHOD

CODES	MEANING
U	Displaced Upkwa camp study population
M	Non-displaced lake Monoum or Njindoum study population
N	Returnees to Nyos study population
D	Disaster Managers
First two numbers	Interviewee identity e.g. 01, 06, 10, 12 etc
Capital letters	Main Categories in various interview groups e.g. LDM or RL
Small letters	Subcategories for main categories e.g. vic, enf, dis etc.
U01LDMvic	Example of complete coding indicating study group, interviewee identity, main and sub-categories.

## STUDY POPULATIONS

### CODES OF MAIN CATEGORIES FOR STUDY POPULATIONS

MAIN CATEGORIES	CODES
Impact of disasters to households	DI
Effects or Impact due to Relocation	RL
Motive for relocation back to Nyos	MR
Motive for non-relocation from Monoum	MR
Preferred Relocation site	PR
Assessment of Government's Management of the Disasters	GM
Intention to Relocation from present location	RI
Most dangerous hazard or hazard most afraid of	HA
Impact of another hazard	EH
Level of Disaster Preparedness	DP
Confidence in Government Information on risk	CI
Government's Information on Risk	GI
If Government Advice on risk can be taken	GA

## EXPLANATION OF CODES FOR MAIN CATEGORIES FOR DISASTER MANAGERS

<b>MAIN CATEGORIES</b>	<b>CODES</b>
Awareness of government laws and regulations on Disaster Management	LDM
Assessment of Cameroon's overall natural hazard mitigation program	AHM
Use of information on Nyos/Monoum disaster in decision making	UNM
Cameroon's natural hazard risk assessment	HRA
Level of Cameroon's vulnerability preparedness and resilience	VPR
Awareness of disaster mitigation /management plan for the Nyos/Monoum area	NMM
Scientific effort to reduce the threat of the lakes	TML
Management Plan for the displaced or affected victims of the Nyos disaster	VMP
Main constraints with the management of the Lake Nyos victims	CMV
Disaster victims participation in disaster mitigation projects	VDM
Extend to which disaster management is incorporated into development policies/plans or projects	DMD
Social and economic impacts of the lake Nyos disaster	SEI
Management of Nyos and Monoum disasters	MNM
How Nyos/Monoum disaster management could have been improved	IDM
Possible constraint to Nyos/Monoum disaster management	CDM
How Nyos/Monoum disaster experience can be useful for future planning	EFP

## APPENDIX 10

### CODED TRANSCRIPTS FOR STUDY GROUPS

#### CODED TRANSCRIPTS FOR DISASTER MANAGERS

CODES FOR MAIN CATEGORIE S	MAIN CATEGORIES	SUB CATEGORIES	CODED TRANSCRIPTS FOR DISASTER MANAGERS
LDM	Awareness of government laws and regulations on Disaster Management (DM)	Aware “Aware of existence of laws”	D01LDM awe; D02LDMawe; D03LDMawe; D04LDMawe; D05LDMawe; D06LDMawe; D07LDMawe; D08LDMawe; D09LDMawe; D10LDMawe; D11LDMawe; D13LDMawe; D15LDMawe; D17LDMawe; D18LDMawe
		Unaware “Unaware of existence of laws”	D20LDMawe;
		Book “booklet on civil protection by MTAD”	D04LDMbook; D10LDM book; D11LDM book; D13LDMbook;
		Guidance “information that guides DM”	; D02LDMgid; D03LDMgid; D12LDMgid; D16LDMgid;
AHM	Assessment of Cameroon’s overall Hazard Mitigation Program	Poor “management is not good”	D0AHMpor; D02AHMpor; D11AHMpor; D12AHMpor; D20AHMpor;
		Success “success rate of program”	D03AHM suc; D04 AHM suc; D07AHMsuc; D10AHMsuc; D11AHMsuc; D12AHMsuc; D13AHMsuc; D17AHMsuc; D17AHMsuc
		Enforcement “Enforcement of policies”	D01 AHM enf; D02AHMenf; D08AHMenf; D11AHMsuc; D14AHMimp
		Investment “More investment into program”	D06 AHMinv; D08AHMinv; D10AHMinv;
		Improvement “program is improving”	D05AHM imp; D06AHMimp; D09AHMimp; D10AHMimp; D14AHMimp; D14AHMimp; D19AHMimp
		Limitations “constraints to implementation of program”	D04AHM lim; D20AHMlim; D10AHMlim
		Victims “government assistance to victims”	D03 AHM vic; D19AHMimp; D11AHMlim; D08AHMlim
UNM	Use of information on Nyos/Monoum disaster in decision making	Degassing	D05 UNM dgas; D07 UNMdgas; D09UNMgas; D10 UNMgas; D12UNM dgas; D13UNM dgas;
		assistance “assistance to victims”	D01UNMass; D01UNMass; D11 UNMass; D15UNM ass; D178UNMass;
		council “role of wum council”	D01UNMcoun; D04 UNM road; D01UNMcoun; D16 UNMcoun;
		Preference “No preference to Nyos/monoum disaster”	D03UNMpref; D05UNMpref; D17 UNMpref; D19 UNMpref; D20 UNMpref
		Road	
HRA	Cameroon’s Natural Hazard Risk assessment	high “grade NH risk as high”	D01 HRA high; D02 HRA high; D03 HRAhigh; D04 HRAhigh; D05HRAhigh; D06HRAhigh; D07HRAhigh; D08HRAhigh; D09HRAhigh; D12HRAhigh; D17HRA high; D19HRA high; D20HRA high;
		frequency “frequency of occurrence”	D01 HRA freq; D01HRAfreq; D05HRAfreq; D08HRAfreq; D12HRAfreq;
		moderate “grade risk as moderate”	D10HRAmod; D11HRAmod; D13HRA; D15 HRA
VPR	Level of Cameron’s Vulnerability preparedness and resilience	low “grade preparedness level as low”	D01VPR low; D02VPR low; D20VPRlow
		Scientific “scientific means of preparedness”	D05VPR sci; D06VPRsci; D08VPRsci; D11VPRsci; D16VPRsci; D12VPRsci; D18VPRsci;
		plan “vulnerability preparedness plan”	D01VPR plan; D02VPRplan; D02VPRplan;
		progress “progress in vul reduction”	D03VPRprog; D06VPRprog; D07VPRprog; D08VPRprog; D10VPRprog; D15VPRprog; D17VPRprog; D19VPRprog;
		high “grade preparedness level as high”	D05VPR high;

NMM	Awareness of disaster mitigation /management plan for the Nyos/Monoum area	Resettlement “resettlement of victims”	D03NMMres; D04NMMres;
		Implementation “implementation of policies”	D10NMMimp; D19NMMimp;
		Degassing “degassing projects”	D05NMMdgas; D06NMMdgas; D07NMMdgas; D08NMMdgas; D09NMMdgas; D10NMMdgas; D11NMMdgas; D12NMMdgas; D13NMMdgas; D14NMMdgas; D15NMMdgas; D16NMMdgas; D20NMMdgas;
		Social concerns “social concerns for victims”	D16NMMsocons; D17NMMsocons; D20NMMsocons
		No “ Not aware of any management plan”	D01NMMno;
TML	Scientific effort to reduce the threat of the lakes	yes “aware of management plan”	D03NMMyes; D05NMMyes; D06NMMyes; D07NMMyes
		Opinion “perception of technical management”	D01TM Lopin;
		equipments “technical equipments”	D04TMLequip; D06TMLequip; D07TMLequip; D08 TMLequip; D09 TMLequip; D10TMLequip; D11TMLequip; D12TMLequip; D13TMLequip; D14TMLequip; D15 TMLequip; D16TMLequip; D17TMLequip; D18TMLequip; D19TMLequip;
		Foreign “foreign technical assistance”	D03 TMLforass; D05TMLforass;
VMP	Management Plan for the displaced or affected victims of the Nyos disaster	neglect “ neglect of victims”	D06TMLforass;
		Promises “promises made”	D03VMPpro; D09VMPres; D15VMPres;
		Resettlement “relocation of victims”	D04VMPres; D05VMPres; D06VMPres; D07VMPres; D008VMPres; D13VMPres; D16VMPres; D17VMPres; D18VMPres; D19VMPres;
		No “Don’t know of any plans”	D01VMPno; D14VMno; D20VMPno;
CMV	Main constraints or problems with the management of the Lake Nyos victims	problems “problems faced by victims”	D12VMvic
		Governance “Poor governance”	D01CMVgov; D05CMVgov; D14CMVgov; D16CMV
		Negligence “neglect of victims”	D01CMVneg; D05CMVneg; D08CMVneg;
		Embezzlement “Use of victims money”	D01CMV emb; D15CMVemb; D17CMVemb; D20CMVemb;
		Planning “Poor planning”	D06CMVplan; D12CMVplan; D14CMVplan; D15CMVplan; D17CMVplan; D19CMVplan; D20CMVplan;
VDM	Disaster victims participation in disaster mitigation projects	victims “Victims complain”	D02CMV vic; D04CMVvic; D11CMVvic; D12CMVvic; D11CMVvic; D14CMVvic; D16CMV;
		Ignorance “knowledge of programs”	D0VDMign; D03VDMign; D14VDMign; D19VDMign; D20VDMign;
		Plan “future plan for victims”	D04VDM plan; D06VDMplan; D13VDMplan;
		functional “functionality of program”	D10VDMfunc; D12VDMfunc; D15VDMfunc; D16VDMfunc; D17VDMfunc;
		Representatives “Community representatives”	D18VDMrep
DMD	Extend to which disaster management is incorporated into development policies/plans or projects	Victims “Victims sufferings”	D0VDMvic;
		Opinion “doubt if DM is incorporated into Dev planning”	D01DMDopin; D02DMDopin; D04DMDopin; D14DMDopin; D15DMDopin; D20DMD
		Road “ transport to Nyos”	D02DMDroad; D06DMDroad; D07DMDroad;
		Risky dwellings “constructions in risk prone areas”	D11DMD risk; D12DMDrisk;
		Focus “present gov’t	D02DMDfoc; D13DMDfoc; D16DMDfoc;

		interest”	D17DMDfoc; D18DMDfoc; D19DMDfoc;
		Enforcement “lack of enforcement”	D02DMDenfor; D12DMDrisk; D14DMDenfor; D18DMDenfor;
		Incorporated “ DM incorporated into Dev planning”	D03DMDicop; D11DMDicop;
SEI	Social and economic impacts of the lake Nyos disaster	Misery “Misery of Upkwa camp victims”	D01SEI mis; D03SEImis; D04SEImis; D11SEImis; D13SEImis; D18SEI; D20SEImis;
		Projects “ Priority to scientific projects”	D07SEIprio;
		land Use “ land for camp construction”	D11SEIlanuse;
		fishing “fishing in lakes”	D12SEIfis;
		Displacement “resettlement of victims”	D18SEIdis
		Poverty	D02SEIpov; D15SEIpov;
		Benefits “ Future developments”	D17SEIben;
MNM	Management of Nyos and Monoum Disasters	Victims “Treatment of victims”	D02MNMsic; D11MNMsic D12MNMsic;
		opinion “ immediate post disaster management ”	D06MNMsopin; D11MNMsopin; D12MNMsopin; D13MNMsopin; D15MNMsopin; D17MNMsopin; D18MNMsopin; D20MNMsopin;
		Plans “future plans”	D06MNMsplan; D17MNMsplan;
		technical “technical management”	D08MNMs tech; D19MNMs tech;
		poor “ Not properly managed”	D01MNMs poor; D02MNMs poor; D20MNMs poor
		well “ properly managed”	D03MNMs well; D04MNMs well; D07MNMs well; D11MNMs well; D12MNMs well; D18MNMs well; D19MNMs well;
SDM	How Nyos/Monoum disaster management could have been improved	Monitoring “constant monitoring of victims”	D01SDMmon; D02SDMmon; D20SDMmon
		Rehabilitation “ Nyos rehabilitation program”	D19SDMrehab;
		livelihood “Socioeconomic improvement of victims”	D05SDMlivli; D12SDMlivli;
		Local scientist “involvement of local scientists”	D05SDMlocsci; D08SDMlocsci;
		Return “knowledge of returnees to disaster site”	D03SDM ret; D04SDMret;
CDM	Possible constraint to Nyos/Monoum disaster management	Governance “ governance problems”	D01CDMgov; D02CDMgov; D05CDMgov D08CDMgov; D20CDMgov.
		Corruption “corruption and embezzlement”	D02CDMcorrup; D15CDMcorrop
		Experience “lack of past experience”	D06CDM exp
		Poverty “Poor economic situation of Cameroon”	D04CDM poor; D12CDM poor; D15CDM
EFP	How Nyos/Monoum disaster experience can be useful for future planning	Government “Government change”	D01EFPgov; D02EFP
		attitudes “attitudes of managers”	D01EFPatti; D06EFPatti;
		priorities “ equal proactive and reactive measures”	D18EFPprio; D10EFPprio; D19EFPprio;
		Enforcement “ implementation of policies and programs”	D03EFPenfo; D08EFPenfo; D15EFPenfo;
		victims “ More attention to social problems of victims	D04EFPvic; D02EFPvic; D01EFPvic; D05EFPvic; D10EFPvic; D11EFPvic; D12EFPvic; D19EFPvic; D20EFP

## CODED TRANSCRIPTS FOR DISPLACED UKPWA CAMP VICTIMS

CODES FOR MAIN CATEGORIES	MAIN CATEGORIES	SUB CATEGORIES	CODED TRANSCRIPT FOR SUB-CATEGORIES
RL	Effects or Impact due to Relocation	Livelihood “livelihood loss and change”	U08RLlivhd; U16RL livhd; U15RLlivhd;
		Housing “change of housing conditions”	U02RL hous; U04RLhous; U09RLedu; U12RLhous; U23RLhous
		Income “loss of income”	U01RL inc; U02RL hinc; U20RLhinc;
		Family “loss of family and lonely”	U10RLfamly; U11RLfamly;
		Community Cohesion	U03RLcomcoh; U04RLcomcoh; U04RLcomcoh;
		Education “education of children”	U01RLedu; U03RLedu; U04RLedu; U04RLedu; U09RLedu; U13RLedu; U19RLedu; U20 RLedu;
		Water “good water”	U03RLwat;
		Crime “effect on crime”	U04RLcri; U13RLcri; U17RLcri; U24RLcri;
		Culture “effect on culture”	U04RLcul; U12RLcul; U22RL; U23RLcul;
		Land size “landsize available for use”	U25RLlansiz;
		Inheritance “inheritance of property”	U18RLinher;
		stranger “feeling like stranger”	U14RLstran; U15RLstran;
PR	Preferred Relocation site	Fertility “more fertile soils”	U01PRfer; U06PRfer; U07PRfer; U09PRfer; U17PRfer; U20PRfer; U22PRfer; U25PRfer;
		Culture “similar culture”	U03 PRcul; U07PRcul; U06PRcul; U09PRcul; U14PRcul; U15PRcul; U24PRcul;
		Urban “live in town or Urban area”	U09PRnyos; U12PRurb; U13PRurb; U21PRurb
		Land size “size of cultivable land”	U09PRlansiz; U17PRlansiz; U21PRlansiz
		better “life better elsewhere”	U01PRbet;
		indifference “not sure”	U03PRind; U04PRind; U05PRind; U10PRind;
		Nyos “returned to Nyos”	U06PRnyos; U07PRnyos; U14PRnyos; U15PRnyos; U16PRnyos; U18PRnyos; U20PRnyos; U22PRnyos; U24PRnyos
GM	Assessment of Government’s Management of the Disasters	Grade “grade as fair”	U01GMgra;
		Poor “poor management”	U02GMpor; U02GMpor; U15 GMpor
		Comparism “Nyos DM compared to others”	U01GMcom; U19GMcom; U20GMcom; U25GM
		Victims “treatment of victims”	U02GMvic; U03GMvic; U11GMvic; U12GMvic; U14 GMvic; U15GMvic; U17GMvic; U18GMvic; U19GMvic; U20 GMvic; U23GMvic;
		Assistance “government’s assistance”	U02GM ass; U05GMass; U07GMass; U08GMass; U09GMass; U10GMass; U12GMass; U13GMass ; U21 GMass;
		Opinion “immediate post disaster management”	U03GM opin; U04GMopin; U06GMopin; U10GMopin; U11GMopin; U12GMopin; U14GMopin; U18GMopin; U18GMopin; U20GMopin; U22GMopin; U25GMopin
		Periodic assistance	U10GMperass; U17GMperass;
		NGO “help from NGOs”	U04GMngo
		Corruption “corruption by officials”	U18GMcor;
RI	Intention to Relocate from present location	Education “educational reasons”	U05RIedu; U06RIedu; U14RIedu; U19RIedu; U21RIedu; U22RIIedu;
		Adaptation “adapted to present location”	U01RIadap;
		Age “Old to relocate”	U02RIage; U08RIage; 18RIage; 23RIage; 24RIage;
		land size “large land”	U20RIlansiz;
		Fertility “land or soil fertility”	U14RI fer; U20Rifer;

		Cultural “ cultural reasons”	U02RICul; U04RICul; U15RICul; U23RICul; U24RICul;
		livelihood “ livelihood reasons”	U01RIlivhd; U11RIlivhd; U12RIlivhd; U14RIlivhd; U17RIlivhd; U20RIlivhd; U21RIlivhd;
		Forced “ Move if instructed”	U09RIfor;
		No “ No intention to relocate”	U01RIno; U03RIno; U04RIno ; U06RIno;U08RIno; U10RIno;
		Yes “ Willing to relocate”	U02RIyes; U11RIyes; U12RIyes; U14RIyes; U15RIyes; U17RIyes; U18RIyes; U19RIyes; U20RIPprof; U21RIyes; U22RIyes; U23RIyes; U24RIyes;
HA	Most dangerous hazard or hazard most afraid of	Gas “ afraid of gas eruption”	U01HA gas; U02HA gas; U03HA gas; U06HA gas; U08HA gas; U09HA gas; U10HA gas; U11HA gas; U14HA gas; U17HA gas;
		Lakes “ afraid of crater lakes”	U12HA olaks; U15HAolaks;
EH	Impact of another hazard to household	Death “ Death of people and livestock”	U01EHdets; U02EHdets; U03EHdets; U04EHdets; U05EHdets; U06EHdets; U08EHdets; U09EHdets; U15EHdets;
		Assistance “ assist in preparing”	U02DPass; U08DPass; U09DPass; U12DPass;
		Local “ local knowledge of preparedness”	U15DPloc; U15DPloc;
		Religion “ religious believe”	U04DPrel;
		Not “ Not prepared”	U01DPnot; U01DPnot; U03DPnot; U04DPnot; U05DPnot; U06DPnot; U08DPnot; U09DPnot; U12 DPnot;
CI	Confidence in Government Information on risk	Not Confidence	U01CInconf; U02CIncof; U03CIncof; U04CIncof; U05CIncof; U06CIncof; U08CIncof; U11CIncof; U14CIncof; U15CIncof; U17CIncof; U18CIncof; U23CIncof
		Confidence	U10CIconf; U16CIcof; U25CIcof
		Suspicious	U02CIsus; U02CIsus; U04CIsus; U13CIsus; U17CIncof
		Others “ Other sources”	U01CIodsor; U03CInodsor;
GI	Government’s Information on Risk	Other “Other sources”	U01GIodsor; U11GIodsor;
		None “inadequate Information”	U01GIninfos; U03GIninfos; U05GIninfos; U06GIninfos; U07GIninfos; U11GIninfos; U13GIninfos; U14GIninfos; U17GIninfos; U20GIninfos;
GA	Willingness to follow government advice	Conditional “ follow if advice is good”	U01GAcon; U04GAcon; U05GAcon; U06GAcon; U07GAcon; U11GAcon; U13GAcon; U18GAcon; U21 GAcon;
		Doubt “ doubt if gov’t advice can be good”	U07GAdobt; U08GAdobt; U17GAdobt;
		Enforcement	U02GAenfor; U04GAenfor; U08GAenfor; U12GAenfor; U13GAenfor; U19GAenfor; U22GAenfor;
		Others “ advice from other sources”	U07GAodsor; U11GAodsor;
		Yes “ willing to follow advice”	U02GAYes; U03GAYes; U04GAYes; U09GAYes; U10GAYes; U11GAYes; U12GAYes; U13GAYes; U156GAYes; U18GAYes; U19GAYes; U22GAYes; U25GAYes;
		trust “ trust in gov’t”	U01GA trust; U02GAtrust; U20GAtrust; U23GAtrust; U24GAtrust;
		No “ not follow advice”	U08GAno; U14GAno; U15GAno; U17GAno; U20GAno; U23GAno; U24GAno

## CODED TRANSCRIPTS FOR RETURNEES TO DISASTER ZONE STUDY

CODES FOR MAIN CATEGORIES	MAIN CATEGORIES	SUB CATEGORIES	CODED TRANSCRIBED SUB-CATEGORIES
MR	Motive for relocation back to Nyos	Cultural “ Native land or cultural reasons”	N01MRcul; N03MRcul; N07MRcul; N10MRcul; N11MRcul; N15MRcul
		Fertility “ To farm the fertile soils”	N01MRfer; N02MRfer; N03MRfer; N04MRfer; N05MRfer; N06MRfer; N07MRfer; N08MRfer; N09MRfer; N10MRfer; N11MRfer; N12MRfer; N14MRfer; N15MRfer; N16MRfer; N17MRfer; N20MRfer
		Poverty	N06MRpov; N12MRpor
		Hunger	N05MRhun; N11MRhum; N14MRhum;
		Property	N01MRprop; N19MRprop
		Inheritance	N02MRinher; N05MRinher; N06MRinher; N14MRinher
		Rearing space	N08MRrearsp; N09MRrearsp; N13MRrearsp; N18MRrearsp; N19MR
		Independence	N18MRind
PR	Preferred Relocation site	sale “problem with sale of products”	N16MRsale
		Fertility “ more fertile soils”	N02PRfer; N04PRfer; N05PRfer; N06PRfer; N08PRfer; N09PRfer; N10PRfer; N11PRfer; N18Pfer; N21PRfer; N22PRfer; N24PRfer;
		Culture “ similar culture”	N02PRcul; N04PRcul; N05PRcul; N06PRcul; N07PR cul; N11PRcul; N19PRcul; N21PRfer; N22PRfer; N24PRcul
		Road “ poor road condition”	N16PR road ; N21PR road ; N22PR road ; N24PR road ;
		Land size “ size of cultivable land”	N02PRlansiz; N05PRlansiz; N10PRlansiz; N11PRlansiz; N13PRlansiz; N05PRlansiz; N18PRlansiz; N22PRlansiz;
GM	Assessment of Government’s Management of the Disasters	indifference “ not sure ”	N12PRind;
		Periodic assistance	N01GMperass; N02GMperass; N009GMperass; N13GMperass; N16GMperass;
		Poor “poor management”	N04GM por; N05GMpor;
		Victims “treatment of returnees”	N12GMvic;
		Assistance “ limited government’s assistance”	N01GMass; N02GMass; N05GMass; N07GMass; N09 GMass; N10GMass; N05GMass; N13GMass; N14GMass; N15GMass; N16GMass; N17GMass; N18GMass; N19GMass;
		Promises “failed promises”	N17GMpro; N20GMpro;
		Opinion “ immediate post disaster management”	N04GM opin; N05GMopin; N06GMopin; N07GMopin; N09GMopin; N11GMopin; N13GMopin;
		Plan “ post disaster planning”	N08GMpln
		NGO “ help from NGOs”	N10GMngo; N12GMngo; N13GMngo; N16GMngo; N19GMngo; N22GMngo; N24GMngo
RI	Intention to Relocate from present location	Risk “perception of risk”	N07Rriskper
		Cultural “ cultural reasons”	N07Ricul;
		Forced “ Move if instructed”	N06RIfor; N08RI no;
		No “ No intention to relocate”	N01RI no; N03RI no; N04RI no; N06RI no; N07RIno; N08RI no; N09RI no; N10RI no; N11RI no; N12RI no; N13RI no; N14RI no; N17RI no; N18RI no; N19RI no;
		Yes “ Willing to relocate”	U02RIyes; U15RIyes; U20RIyes; U21RIyes
HA	Most dangerous hazard or hazard most afraid of	Gas “afraid of gas eruption”	N01HA gas; N12HAgas; N13HAgas; N14HAgas;
		Lakes “afraid of crater lakes”	N02HA olaks; N03HAolaks; N09HAolaks;
		Plant diseases “afraid of	N09HApIndie

		plant diseases”	
		Not “ Not afraid”	N01HAnot; N05HAnot; N06HAnot; N08HAnot; N11HAnot; N16HAnot; N17HAnot; N20HAnot;
EH	Impact of another hazard to household	Death “ Death of people and livestock”	N01EHdets; N02EHdets; N03EHdets; N04EHdets; N05EHdets; N07EHdets; N10EHdets; N12EHdets; N13EHdets; N16EHdets; N19EHdets; N21EHdets; N23EHdets;
		Displacement	N01EHdis; N10EHdets; N12EHdets; N13EHdets; N16EHdets; N21EHdets; N23EHdets;
DP	Level of Disaster Preparedness	Assistance “ no assistance in preparing”	N11DPass; N15DPass; N20DPass;
		Scientific	N02DPsci; N04DPsci; N22DPsci; N23DPsci; N12 DPsci
		Local “ local knowledge of preparedness”	N02DPloc; N11DPloc; N22DPloc; N24DPloc;
		Religion “ religious believe”	N05DPrel; N07DPrel; N09DPrel; N10DPrel; N13DPrel; N16DPrel; N20DPrel;
		Not “ Not prepared”	N15DPrel;not;
CI	Confidence in Government Information on risk	Not Confident	N06CInconf; N07CInconf; N10CInconf; N13CInconf;
		Confidence	N01CIconf; N02CIconf; N08CIconf; N11CIconf; N14CIconf;
		Suspicious	N04CIsus; N06CIsus; N07CIsus; N06CIsus; N12CIsus; N17CIsus; N18CIsus; N19CIsus; N20CIsus;
		Others “ Other sources”	N11CIodsor; N13CIodsor; N15CIodsor; N18CIodsor;
GI	Government’s Information on Risk	Scientific	N04GIsci; N05GIsci; N09GIsci; N13GIsci; N19GIsci
		None “inadequate Information”	N01GIinfos; N02GIinfos; N03GIinfos; N04GIinfos; N05GIinfos; N06GIinfos; N09GIinfos; N12GIinfos; N13GIinfos; N14GIsci; N15GIsci; N16GIsci; N18GIsci;
		Other “Other sources”	U0GIodsor; N19GIodsor;
GA	Willingness to follow government advice	Conditional “ follow if advice is good”	N12GAcon; N17GA con; N21GAcon; N22GA con; N24GA con;
		Enforcement	N07GAenfor; N11GAenfor; N18GAenfor;
		Yes “ willing to follow advice”	N02GA yes; N03GA yes; N04GA yes; N05GA yes; N07GA yes; N11GA yes; N14GA yes; N15GA yes; N18GA yes; N19GA yes; N20GAYes;
		No “ not follow advice”	N01GA no; N06GA no; N10GAno; N12GAno; N13GA no; N17GAno;

## CODED TRANSCRIPTS FOR NJINDOUM STUDY POPULATION

CODES FOR MAIN CATEGORIES	MAIN CATEGORIES	SUB CATEGORIES	CODED TRANSCRIPT SUB-CATEGORIES
RL	If relocated when disaster happened.	Town “ temporal relocation to town”	M01RLtown; M05RLtown; M11RLtown; M15RLtown; M16RLtown; M21RLtown; M25RLtown;
		Camp “temporal relocation to emergency camp”	M08RLcamp; M10RLcamp; M18RLcamp; M23RLcamp;
		relatives “temporal relocation to relatives in Njindoum”	M03RLrel; M04RLrel; M09RLrel; M12RLrel; M13RLrel; M14RLrel; M24RLrel;
		lakeside “relocated from lakeside”	M09RLLak
		not “ did not leave his house when disaster	M02RLnot; M07RLnot; M17RLnot; M19RLnot; M20RLnot; M22RLnot;

		happened”	
MR	Motive for non-relocation from Njindoum.	Lakeside farm	M12MRLakfm;
		cultural	M08MRCul; M14MRCul; M16MRCul; M17MRCul; M18MRCul; M22MRCul; M24MRCul; M25MRCul;
		agriculture “ agriculture or livelihood reasons”	M01MRagri; M02MRagri; M06MRagri; M07MRagri; M09MRagri; M11MRagri; M13MRagri; M18MRagri; M19MRagri; M21MRagri;
		Risk “ not afraid of risk”	M04MRrisk;
GM	Assessment of Government’s Management of the Disasters	Assistance “ limited	M02GMvic; M11GMvic;
		Good “ good management”	M07GMgud; M17GMgud; M18GMgud; M22GMgud;
		Poor “poor management”	M01GMpor; M03GMpoor; M05GMpoor; M12GMpoor; M16GMpor; M19GMpor; M20GMpor;
		Comparism “ Monoum DM compared to others”	M24GMcom;
		government’s assistance”	M01GMass; M06GMass; M11GMass; M14GMass; M15GMass; M17GMass; M20GMass
		Promises “failed promises”	M01GMpro; M02GMpro; M03GMpro; M05GMpro; M14GMpro; M16GMpro;
		Opinion “ immediate post disaster management”	N04GM opin; M09GMopin;
		Periodic assistance	N01GMperass;
		scientific	M04GM sci
		Plan “ post disaster planning”	M09GMpln; M10GMpln; M15GMpln; M17GMpln;
		NGO “ help from NGOs”	N10GMngo;
		Corruption “corruption by officials”	M08GMcor; M13GMcor; M15GMcor; M16GMcor; M25GMcor;
RI	Intention to Relocate from present location	No “ No intention to relocate”	M01RI no; M02RI no; M03RI no; M04RI no; M05RI no; M06RI no; M07RI no; M08RI no; M09RI no; M10RI no; M11RI no; M12RI no; M13RI no; M15RI no; M16RI no; M19RI no; M20RI no; M21RI no; M22RI no; M23RI no; M24RI no; M24RI no;
		Risk “perception of risk”	M01RIriskper; M04RInoriskper; M08RIriskper; M13RIriskper;
		Cultural “ cultural reasons”	M01RICul; M07RICul; M09RICul; M11RICul; M15RICul; M16RICul; M22RICul; M24RICul;
HA	Most dangerous hazard or hazard most afraid of	Gas “ afraid of gas eruption”	M01HA gas; M02HA gas; M03HA gas; M04HA gas; M05HA gas; M06HA gas; M07HA gas; M08HA gas; M09HA gas; M11HA gas; M12HA gas; M16HA gas; M18HA gas; M19HA gas; M20HA gas; M21HA gas; M22HA gas; M24HA gas; M25HA gas;
		Lakes “ afraid of crater lakes”	M10HAolaks; M14HA gas;
		Plant diseases “ afraid of plant diseases”	M22HApIndie
		new “strange hazard”	M13HAnew; M17HA new;
EH	Impact of another hazard to household	Death “ Death of people and livestock”	M01EHdets; M02EHdets; M03EHdets; M05EHdets; M06EHdets; M07EHdets; M08EHdets; M09EHdets; M10EHdets; M11EHdets; M12EHdets; M13EHdets; M14EHdets; M15EHdets; M16EHdets; M18EHdets; M19EHdets; M20EHdets; M22EHdets; M23EHdets; M24EHdets; M25EHdets;
		Religion	M11EHrel
		Displacement	M14EHdis; M15EHdis; M17EHdis; M21EHdets; M22EHdets; M23EHdets;
DP	Level of Disaster Preparedness	lakeside “ relocated from lakeside”	M02DPlak; M12DPlak; M02DPlak; M18DPlak; M21DPlak
		Scientific	M01DPsci; M03DPsci; M04DPsci; M12 DPsci; M18 DPsci; M22DPsci; M25 DPsci;
		Religion “ religious believe”	M06DPrel; M08DPrel; M09DPrel; M11DPrel; M14 DPrel; M15DPrel; M24DPrel

		Uncertain	M16DPuncer; M19DPuncer; M20DPuncer; M23DPuncer;
		Not “ Not prepared”	M07DPnot;
CI	Confidence in Government Information on risk	Not Confident	M02CIInconf; M05CIInconf; M11CIInconf; M14CIconf; M16CIInconf; M17CIInconf; M18CIInconf; M18CIInconf; M21CIInconf; M21CIInconf; M24CIInconf;
		Confidence	M01CIconf; M04CIconf; M06CIconf; M10CIconf; M13CIconf; M15CIconf; M19CIconf; M20CIconf; M22CIconf; M25CIconf;
		Suspicious “ gov’t cannot be trusted”	M02CIsus; M11CIsus; M19CIsus; M20CIsus; M24CIsus; M25CIsus;
GI	Government’s Information on Risk	suspicious	M18GIsus;
		yes “ adequate information is provided”	M01GIyes; M03GIyes; M04GIyes; M05GIyes; M06GIyes; M08GIyes; M08GIyes; M09GIyes; M13GIyes; M15GIyes; M18GIyes; M19GIyes; M20GIyes; M21GIyes; M22GIyes; M25GIyes;
		None “inadequate Information”	M02GIinfos; M07GIinfos; M11GIyes; M16GIyes; M17GIinfos;
		Other “Other sources”	M16GIodsor; M17GIodsor; M24GIodsor;
GA	Willingness to follow government advice	Conditional “ follow if advice is good”	M02GAcon; M07GAcon; M12GAcon; M13GAcon; M16GAcon; M18GAcon; M19GAcon; M20GAcon; M21GAcon; M23GAcon; M24GAcon;
		Yes “ willing to follow advice”	M01GAYes; M03GAYes; M04GAYes; M05GAYes; M06GAYes; M08GAYes; M09GAYes; M15GAYes; M22GAYes; M20GAYes;
		No “ not follow advice”	M11GAno; M17GAno

## APPENDIX 11

### LEGISLATIONS ON DISASTER RISK MANAGEMENT IN CAMEROON

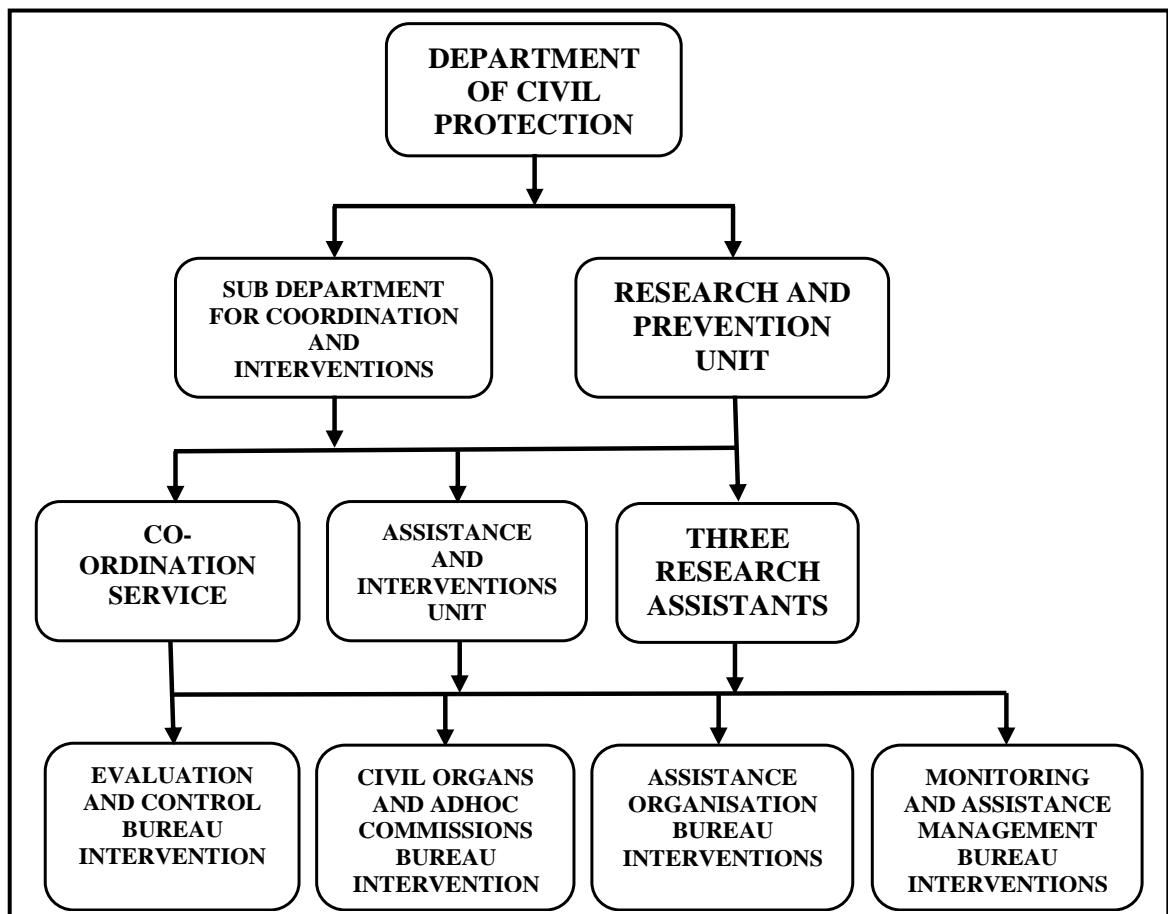
- Law N°67-LF-9 of 12 June 1967 concerning the general organization of civil defense in the country.
- Presidential Decree N°68-DF-7 of 15 January 1968 concerned the safeguard and the protection of civil installations of vital importance in the country.
- Presidential Instruction N°02/CAB/PRC of 18 January 1968 also emphasized the safeguard and protection of important civilian infrastructures in the country.
- Presidential Instruction N°16/CAB/PRC of 1st September 1972 concerned the organisation of rescue efforts in the country.
- Decree N°74/199 of 14 March 1974 was about operations concerned with the exhumation and transfer of corpses.
- Law N° 86/016 of 06 December 1986 concerning the general reorganization of Civil Protection in the country.
- Presidential Instruction N°005/CAB/PR of 24 August 1987 was on monitoring the Nation's security.
- Decree N°.96/054 of 12 March 1996 to determine the composition and duties of the National Council for Civil Protection.
- Decree N° 98/031 of 09 March 1998 relating to the organisation of emergency and relief plans.
- Decree N° 98/147 of 17 July 1998 concerning the organization of the Ministry of Territorial Administration (MTAD).
- Decree N°2002/018 of 18 January 2002 ratifying the framework convention for emergency aid in civil defense adopted at the Geneva Convention on 22 May 2000.
- Prime Ministerial decision N° 037/PM of 19 March 2003 creating a National Observatory for Risks with principal role to identify the high risk regions in the country and to take necessary measures towards disaster prevention and mitigation in these areas.
- Decree N°. 2004/320 of 8 December 2004 that placed Civil Protection as one of the three main functions of MINATD.
- Decree N°2004/009 of 24 April 2004 concerning the reorganization of the Ministry of Territorial Administration and Decentralization.
- Presidential Decree No 2005/124 of 15 march 2005 creating an emergency telecommunications service for disaster prevention and mitigation.
- Decree N°2005/327 of 6 September 2005 on the management of civil aviation security crises in Cameroon.

*Source: Author*

## APPENDIX 12

### ORGANIGRAM OF THE DCP AND THE AGENCIES THAT COORDINATE DISASTER MANAGEMENT IN CAMEROON AT THE NATIONAL LEVEL AS PRODUCED BY THE GOVERNMENT

According to the government, the DCP in MTAD has three main structures that have been designated to perform its functions of coordination, facilitation and operations of DM activities within the country. These are the Coordination and Interventions Unit, managed by the Sub-Directorate for Co-ordination of Interventions under the authority of an Assistant Director, a Research and Prevention Unit and a structure responsible for facilitation which collaborates with all local, national and international agencies involved in risk prevention (figure 5.2). These include the National Civil Defence Council (NCDC)<sup>28</sup>, the National Risks Observatory (NRO)<sup>29</sup>, National Disaster Prevention and Management Programme (NDPMP)<sup>30</sup>, UNDP, UNICEF, and WHO.



Organisational chart of the Department of Civil Protection *Adapted from Nana (2005)*

The four main organisations that facilitate the management of disasters in the country at the national level with direct supervision from the presidency are shown in figure 5.3.

<sup>28</sup> The National Civil Defence Council (NCDC) is a consultative body that works alongside the Secretary-General of the Presidency of the Republic.

<sup>29</sup> The National Risk Observatory (NRO) is responsible for collecting, processing, archiving and spreading information on risks.

<sup>30</sup> The National Disaster Prevention and Management Programme (NDPMP) is a dialogue organ set up in partnership with the UNDP with the aim of reinforcing the government's managerial, logistical and material means in terms of disaster planning, prevention and management.

Under the control of the DCP, the operational structures which are both national and international intervene within their areas of expertise to manage disasters. They include the National Fires Service (NFS), the Emergency Medical Services (EMS), the National Institute of Geological and Mining Research (NIGMR), the National Institute of Cartography (NIC) and the Cameroon Red Cross (CRC) (figure 5.4). These agencies fall within different Government Ministries and departments. However, all the government ministries that collaborate with the DCP are not mentioned in the document published by MTAD on CP in the country.

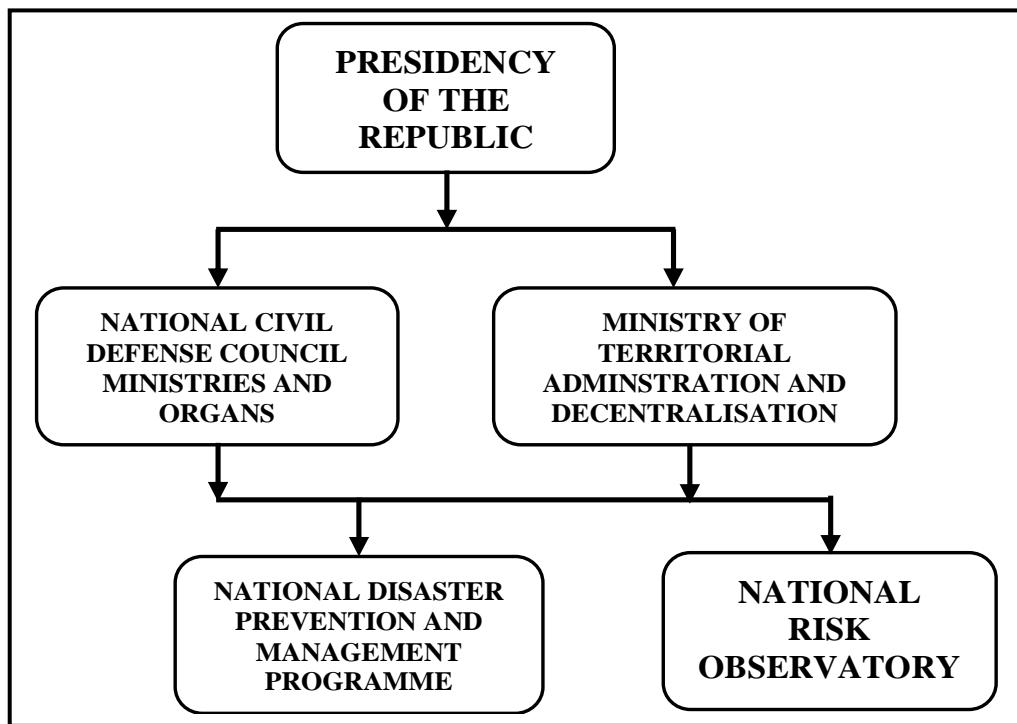


Figure 5.3: Facilitation Structures. Source: *Adapted from Nana (2005)*

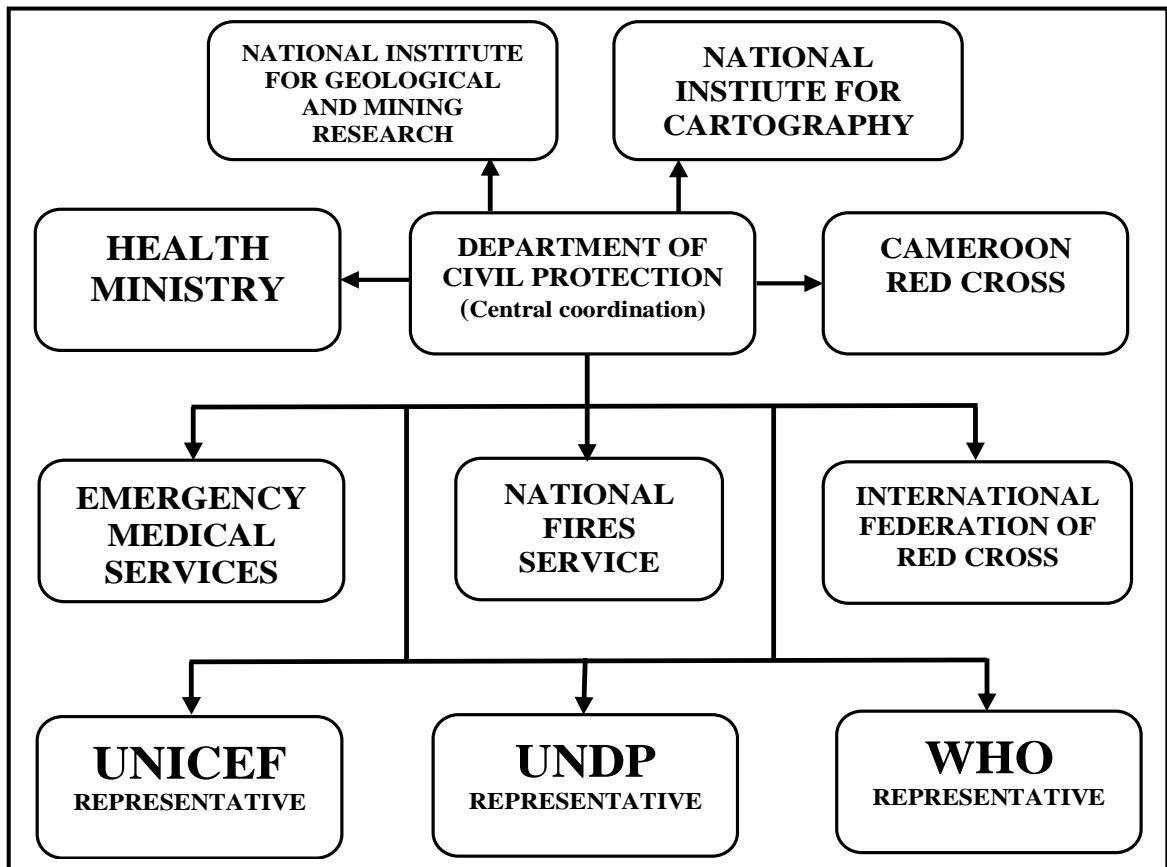


Figure 5.4: Principal emergency and disaster management intervention agencies.

*Source: Adapted from Nana (2005)*

## APPENDIX 13

### FOREIGN AND LOCAL AID DONATED TO THE NYOS DISASTER SURVIVORS.

#### Foreign relief aid for Nyos Disaster

FOREIGN COUNTRIES & INTERNATIONAL ORGANISATIONS	FINANCIAL ASSISTANCE	MATERIAL AND HUMAN ASSISTANCE
United States	5,000,000 CFA	Half a million worth of equipments, drugs, tents, gas detectors etc. Trucks for rescue operations
Gabon	100,000,000 CFA	
Canada	50,000,000 CFA	
Britain	5,000,000 CFA	
Holland	37,750,000 CFA	
Israel		Five Doctors and fifteen nurses
European Economic Community	150,000,000 CFA	Drugs and Blankets
Soviet Union		
France		Doctors and Scientist, 20,000 tonnes of baggage and drugs.
Spain		A tonne of drugs, 200.000 blankets, tents, boots and dresses.
West Germany		30.000 tonnes of humanitarian aid including camps, blankets and other rescue equipments
China	10,000,000,000 CFA	
Japan	100,000,000 CFA	

*Source: Adapted from Cameroon Tribune (Wednesday 12<sup>th</sup> September, 1986:3)*

#### Local Relief Aid for Nyos Disaster

LOCAL COMPANIES AND ORGANISATIONS	FINANCIAL AID	MATERIAL AID
Milky Way Company		10 tonnes of milk
Camsuco		7 tonnes of sugar
Guinness Cameroon		Malta worth 1.2 million frs
Canon Yaounde	308850	
SNAC	5000000	
National Relief Commission in Menchum and Donga Mantung divisions		School equipments worth 17 million FCFA.
SCAC Transport International	1000000	
Fougereolle Company	1000000	
SNEA Reglement Secours	50000000	
Ebobo and C.I.E Company	1000000	
CIE Commercial Agricole	250000	
SOCACOP	250000	
Societe Anonyme E.K.	2000000	
Sangmalima Council	500000	
Bamenda Family Meeting	200000	
Mr. Olivier Cacoub	3000000	
Cameroon Brazillian Community	910000	
AMACAM	1000000	
Islamic Cultural Association	500.000	
Brasseries du Cameroun	15000000	
Rotary Club	2000000	
Dumez Cam Industrie	3000.000	
CIFOA S.A	1500000	

SOCUCAM	2000000
Commerce Service Transit	5000000
Thomson CSF DRT/RTC	250000
Ecam Placages	1091000
Lom Djerem CPDM Section	521000
UNALOR	30000000
Bank of Central African States	10000000
Razel Cameroon	3000000
Professional Womens Club	500000
Paribas Cameroon Bank	15000000
Aluminium Pehiney	5000000
Banque de Zaire	36396250
Fonds Specieux in Libreville	100000000
YCPDM Nkondongo IV	44500
Federation of Evangelical Churches	346500
Eglise Presbyterian Ndongolo Parish	116910
Niger community in Cameroon	200000
IBM France company	3000000
Rhode and Shwarz	3280000
Staff in Cameroon Embassy in Saudi Arabia	515850
Caprice et Forme Company	100000
National Order of Cameroon Pharmacists	10000000
Bouygues Boubert	100000
Scanwater Engineering	1000000
Syndicate of Producers and Exporters of Timber	250000
Banque Unie Credit	1000000
Mr Moulayesse B.	1000000

Source: Adapted from *Cameroon Tribune* (Wednesday 12<sup>th</sup> September, 1986: 3)

#### Material and Foodstuffs donated to Nyos Disaster Victims

<b>SELECTED SEMI-PROCESSED/IMPORTED FOODS</b>	
Milk	1.679 cartons
Palm Oil (drums)	43 cartons of 25 liters
Finoline vegetable Oil	171 drums of 25 liters
Finoline vegetable oil	125 cartons
Rice	7,343 bags of 220 tons
Salt	10 tons
Fish (dried imported)	10 tons
Biscuits	522 cartons
Flour	7 cartons + 200 bags
Sardines	2,583 cartons
Sugar	140 cartons + 123 bags
Semolina	500 sacks
Repas de flacon	16,809 pieces
Beans	50 bags
Diamao Oil (1 lit bottles)	1,588 cartons
Nido Milk	64 cartons
Corned beef	637 tins
Tin food (other types)	1,752 tins etc
<b>SELECTED LOCAL UNPROCESSED FOODSTUFFS</b>	
Plantain	
Bananas	
Corn	
Yams	
Tapioca	
Eggs	
Fresh vegetables	
Fruits	
Life animals etc	

## EQUIPMENTS

Tents  
Variety of households utensils  
Toilet materials  
Cloths  
Building Materials  
7 Vehicles

*Adapted from Ngwa (1992)*

## APPENDIX 14

### POLICY RECOMMENDATIONS

#### A. Government policy on integrating natural hazard/disaster risk reduction with development planning in the country

1. The Government's main approach to DM and DRR in the country should emphasise the need to incorporate natural hazard/disaster mitigation within the development planning process of the country.
2. How the government intends to integrate the different disaster mitigation instruments within the development process should be clearly spelled out in policy documents.
3. How the government's inter-sectoral and inter-agency cooperation for DRR and DM at the international, national and local levels will fit with the overall development planning process of the country should also be mentioned
4. Experiences and lessons learned in the management of the Lake Nyos and Monoum disasters should be used in the management or prevention of similar hazards/disasters in the country.
5. Priority in contemporary DM in Cameroon should be based on potential risk, frequency and intensity of hazards rather than the administrative area or geographical location in the country.
6. The government should mainstream DRR into the social and physical development process in Cameroon based on contemporary DRR challenges in the context of sustainable development.

#### B. Legislative and institutional framework of disaster management in the country

1. Government policy on DM should focus more on proactive measures that should address all the phases in the DM cycle.
2. The role of NGOs and the private sector in DRR should be explicit in government DM policy.
3. Government legislation and policy on DM in the country should address natural hazards and disasters separately from technological and human induced hazards. This is because “natural” disasters occur on a different scale, frequency, geographical locations and often requires different contingency planning than the other disasters.
4. Government policy aimed for the protection of internally displaced people should be clearly spelled out as outlined in the guiding principles on internal displacement by the United Nations Office for the Co-ordination of Humanitarian affairs. Such policies need to safeguard the rights of the disaster affected community to basic social amenities and living conditions in a healthy environment.
5. Government policy on resettlement should spell out that relocated communities should be resettled in a manner that their cultural and religious assets, social networks and social ties will be preserved.

**C. Administrative process of disaster management**

1. The government should decentralize responsibilities and resources for DRR to relevant provincial/regional or local authorities to avoid administrative bottlenecks.
2. There should be a stronger horizontal collaboration between the DCP and the other bodies or agencies which facilitate DRR in the country. The DCP should also encourage and facilitate strong interagency collaboration.
3. The organizational structure under the MTAD should be revised to clarify the working relationships and operational procedures with the other ministries and agencies that provide supportive services to the DCP.
4. All information and academic materials on government policy or training on disasters in the country should be distributed to the relevant departments in the entire territory.
5. There should be a monitoring and evaluation process to track the progress of DM programs.
6. A robust contingency planning for natural hazards, which the country is prone to should be put in place.
7. A comprehensive risk, vulnerability and hazard assessment of the physical environment of the country should be done and a hazard risk map produced.
8. Disaster Management and Risk Reduction program should focus on the socio-economic as well as the technical aspects.
9. The responsibilities of disaster managers and DM committees at the national, provincial and local levels should be well defined to avoid duplication of functions.
10. Government pledges and promises to compensate disaster victims and survivors should be respected.
11. Government promises, plans and programs to implement infrastructural, social and economic development projects in disaster affected communities should be respected.
12. Partisan politics should be kept out of DM programs.
13. Good governance and the tackling of corruption and embezzlement of material and financial resources allocated for disaster survivors should be prevented.
14. Attention should be taken to ensure that disaster victims, disaster survivors, beneficiaries and vulnerable populations are incorporated into the DM planning and decision making.
15. Because poverty is intimately associated with vulnerability to disasters, the government should implement development programs that reduce poverty.
16. The government should enforce decisions taken to prevent people from settling in very dangerous and risk areas or from engaging in livelihood activities that are risky to their lives.
17. The government should create incentives that will make vulnerable populations to comply with decisions taken to mitigate risks to natural hazards.

**D. Knowledge, skills and expertise in the country's disaster management staff**

1. The Government should train or recruit staff knowledgeable in disaster management to work alongside the government administrators at the national, provincial/regional and local levels in the country.
2. Disaster Managers at the local and provincial levels should be sufficiently and frequently trained to establish and sustain institutional effectiveness like their colleagues at the national level.

**E. Information, Communication and Education**

1. A good communication process should be established between the various sectors involved in DM and the beneficiaries or populations at risk.
2. A good road network should link all areas identified as high risk zones.
3. People living in high risk zones should be well informed, educated and motivated towards a culture of disaster prevention and resilience in their environment. Every effort should be made to dispel societal beliefs that can give a wrong perception of risk, which can impact negatively on disaster preparedness and resilience.
4. A higher degree of interaction and integration of disaster affected communities with formal and informal institutions and organisations at the local, national and international levels should be encouraged.

**F. Natural disaster research and academic engagement with the international community**

1. The government should integrate social science disaster research into the government research agenda on natural disasters.
2. The government should create a research institute which focuses on the socio-economic and cultural aspects of “natural” disasters to complement the current one (Institute of Geological and Mining Research) that focuses on scientific and technical aspects of hazards/disasters.
3. Disaster studies should be incorporated into the educational curriculum from the primary to the University levels.

The government should encourage social disaster research in the Country’s Universities and enable academics as well as policy makers participate and share knowledge on disasters at international conferences.