ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

ASSESSMENT Of HAZARDS, VULNERABILITY, AND CAPACITY FOR DISASTER PREVENTION AND EMERGENCY PREPAREDNESS IN ADDIS ABABA

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DECEMBER, 1997

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A THESIS SUBMITTED TO THE
SCHOOL OF GRADUATE STUDIES OF
ADDIS ABABA UNIVERSITY

IN PARTIAL FULFILMENT OF THE REQUIREMENT
FOR THE DEGREE OF MASTER OF PUBLIC HEALTH

BY

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DECEMBER, 1997

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Assessment of Hazards, vulnerability and capacity for disaster prevention and emergency preparedness in Addis Ababa

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ACKNOWLEDGEMENTS

This thesis was funded by WHO/PTC (World Health Organization/ Panafrican Emergency Training Center), Addis Ababa, Ethiopia, to which I express my thanks.

I am very grateful to Dr. Berhanu Demeke, my primary advisor from the Department of Community Health, for devoting his time, giving me advise, and supplying me with reference materials from the inception to the completion of this thesis work.

I would like to express my special thanks and appreciation to Dr. Alessandro Loretti, my advisor from WHO/PTC, for his unreserved advise and strong support with references and other necessary materials during my thesis work. Dr. Loretti's input in revising and shaping this thesis was very important.

My special thanks go to Dr. Fisseha Eshetu, Ato Fikre Enqueselassie, and Dr. Mesfin Kassaye, all from the Department of Community Health, for their advise and valuable comments.

I am grateful to Drs. Brigitte Toure and Yonas Tegegn, both from WHO/PTC, for their support, advise, supply with references and necessary

materials during my research work. My special thanks also go to Ato Mokonen T/Giorgis, W/O Elsa Tesfaye, W/O Mulie H/Selasie, and other staff of WHO/PTC for their kind assistance.

Special thanks and appreciation also go to all households and officials of the organizations who participated in the study without whom this thesis would not have been realized.

I am greatly indebted to all data collectors and supervisors for their hard work and carefulness in the data collection process, particularly to supervisor W/T Alemzewd Degefu for her valuable contribution in the tallying and coding of the results. Special thanks also go to Ato Wondwossen Bekele for his data entry and W/T Genet H/Mariam for her secretarial assistance.

I would like to express my special thanks to the Department of Community Health for the material assistance and making this thesis possible.

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LIST OF ABBREVIATIONS

A.A.	Addis Ababa
DMTP	Disaster Management Training Programme
DPP	Disaster Prevention and Preparedness
DPPC	Disaster Prevention and Preparedness Commission
EPR	Emergency Preparedness and Response
ETB	Ethiopian Birr
GNP	Gross National Product
H.H.	Households
n	Number of respondents
No.	Number
PTC	Panafrican Emergency Training Center
Qs.	Questionnaires
SRS	Simple Random Sampling
SS	Systematic Sampling
UNDRO	Office of the United Nations Disaster Relief coordinator.
UNDP	United Nations Development Programme
UNITAR	United Nations Institute for training and Research.
WHO	World Health Organization

ABSTRACT

This community based descriptive cross-sectional study was conducted in Addis Ababa to assess hazards, vulnerability, and capacities for disaster prevention and emergency preparedness. The study was conducted in 720 households selected by multiple stage sampling from 30 Kebeles of which 647(90%) responded, and in 66 institutions of which 55(83.3%) responded. The most frequent and most worrying hazards identified were flood, fire, outbreak of diseases and car accidents. These four hazards had caused significant number of injuries, deaths, and a large amount of property losses in the past five years. The main factors of vulnerability identified were: unemployment, monthly income below the minimum government wage salary, illiteracy, and housing crowdedness with difficult road access. The capacities for preparedness, as measured by awareness of causes and prevention methods, availability of resources, and presence of a preparedness plan were as follows: the majority of the respondents were aware of the causes and prevention methods for the identified hazards, but the prioritization of concerns did not correspond to the extent of damage that the different hazards had caused. The Majority of the organizations claimed having various shortages of resources for response. Although most of the organizations had no written preparedness plans, minority did have a written preparedness plan which can be a good example to the rest. Overall, much needs to be done on disaster prevention and emergency preparedness as most organizations lack the capacities for preparedness. A number of measures can contribute to disaster prevention and emergency preparedness. These measures include: Public education through mass media on prevention and preparedness; strict traffic regulations enforced by traffic police; strict licence issuance system; construction of flood protection walls; and strengthening the capacities of specific service organizations for response and encouraging them to have a written preparedness plan.

I. INTRODUCTION

Disasters can be major causes of premature death, impaired health status, and diminished quality of life. Indeed, the direct effects on humans, on the environment or on physical structures defines whether a phenomenon will be viewed as a "disaster" (1).

The importance of disasters was acknowledged by the United Nations which designated the 1990s as the International Decade for Natural Disaster Reduction (IDNDR). The aim of IDNDR is to achieve a significant reduction in the loss of life and material damage caused by disasters, by the end of the decade (1,2).

Definition of disaster:- Disaster is defined as "any occurrence that causes damage, ecological disruption, loss of human life, and deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community" (3,4,5).

Classification of disasters:- Disasters are usually divided into natural and human-made, although it is often possible to recognize human-made components in a so called "natural" disaster. Disasters may have a sudden onset, like floods or earthquakes, or a progressive onset, like droughts and famine. Disasters can also be mono-causal or multi-causal (3,4,5).

Disasters can be triggered by different events: meteorological like cyclones, floods and drought; topographical like landslides; tectonics and telluric like earthquakes and volcanic eruptions; technological and human-made like accidents, wars, civil strifes, structural failures, and environmental contamination; epidemics like meningitis, cholera, and measles; and infestations (5).

The phases of disaster:- The progression of events that lead to disasters can be viewed as a series of phases taking place in a time continuum. Identifying and understanding these phases helps to describe disaster-related needs and to conceptualize appropriate disaster management activities (3,5,6). The different phases are:-

1. The non-disaster phase: Long before the disaster strikes, this is the time for prevention and preparedness, training, and education of the community.
2. The pre-disaster phase: Just before the disaster strikes, this is the time for warning, protective action, and possible evacuation of the population.
3. The impact phase: When the disaster strikes, this is the time of destruction and death. It may last a few seconds as in the case of earthquakes, or months as in the case of droughts. The effects on health vary with the type of disaster.
4. The emergency phase includes: a) The isolation period, when the affected population is cut off from the outside world; the survivors themselves

organize rescue and assistance for the victims with locally available means; and b) the relief period when external assistance starts to reach the disaster area.

5. The reconstruction or rehabilitation phase: When the relief period ends, this phase should lead to the restoring of conditions of existence comparable, if not the same, with those prevailing before the disaster (3,5,6).

Causal factors of disaster:- Whatever the triggering event for a disaster to take place, a human community must be involved, and it must be vulnerable. That is, the community's capacities must be insufficient to respond to the new conditions of existence and level of suffering (4). Lack of capacities can be absolute or relative, and it can originate:-

a) from the fact that the hazard is new and the community is caught unaware and unprepared;

b) because in spite of the hazard being known, external and internal circumstances undermine the community's capacities e.g., through war or market pressure;

c) because the community's expectations grow and previously accepted levels of suffering become unacceptable (4).

Some of the factors influencing the occurrence of disasters are poverty, population growth, rapid urbanization, lack of awareness and information, environmental degradation, war and civil strife, or transitions in socio-economic structures and cultural practices. Virtually all disaster studies show that the wealthiest in the population either survive the disaster unaffected or are able to recover quickly. If there are more people and structures where a disaster strikes, then it is likely that there will be more of an impact (7). Thus, rapid population growth can contribute to vulnerability.

Rapid population growth and migration are related to the phenomenon of urbanization, a process which is accelerated in developing countries. Many landslides or flooding disasters are closely linked to rapid and unchecked urbanization which forces low-income families to settle on the slopes of steep hill-sides, or along the banks of flood-prone rivers (7).

Disasters can also happen because people simply do not know how to get out of harm's way or how to take protective measures. This may be due to lack of awareness of what measures can be taken to build a safe location or, more often, due to a lack of material means for appropriate action. Environmental degradation can cause or exacerbate deforestation which leads to flooding and drought. War and civil strife which are usually caused by competition for scarce resources, religious or ethnic intolerance, and ideologic differences, often result in displaced people (7).

Relation between disasters and development:- For a long time, the cause and effect relationship between disasters and socio-economic development was ignored. Disasters were seen in the context of emergency response, not as part of the development process(8). But, in fact:

1. Development can increase vulnerability to disasters through, for example, dense urban settlements, development of hazardous industries, environmental degradation, technological failures or imbalance of pre-existing natural or social systems.
2. Development programmes can reduce vulnerability to disasters by, for example, strengthening urban utility systems, use of hazard-resistant building techniques, institution building, and agricultural and forestry programs.
3. Disasters can hamper development by destroying development inputs and years of development initiatives. Disasters can delay future development, as they cause resources to shift to emergency response thereby under-cutting funds for development.
4. Disasters can provide development opportunities by:
   a. Creating a social and political atmosphere of acceptance to change.
   b. Uncovering the sources of underdevelopment that exacerbated the disaster.
   c. Focusing international attention and aid on the disaster area (8).

A number of reports from different countries indicate that the great damage due to disasters is due to a lack of or poor prevention and preparedness measures. The main reasons for this seem to be lack of adequate information and appropriate concern about disasters, their effects, and prevention or reduction measures; and lack of coordination and collaboration between responsible sectors (9).

The magnitude of the disaster problem:-

World situation: Large-scale epidemics of communicable diseases and natural disasters, such as earthquakes, volcanic eruptions, floods and cyclones as well as droughts with consequent famines, have occurred throughout history; they still pose serious and even increasing threat in many parts of the world, but predominantly in developing countries (10).

The death toll and the devastating effects on local and national economics are most severe in developing countries which can least afford them (10). Both developed and developing countries are facing the increasing threat of human-made or technological disasters, caused by traffic, fires, explosions, or accidental release of chemical substances into the environment. War and civil strife may also affect large populations (10).

African situation:- In Africa, sudden natural and technological disasters are relatively rare. The major killers seem to be epidemics, droughts, famines, wars, and destabilization. These disasters have strong man-made origins and are closely linked with socio-economic development (3,11). The different hazards interact with various factors of vulnerability which include poverty, food insecurity, lack of or poorly developed infrastructures and services, poor structures and capacities for emergency management, rapid population growth, and urbanization (12).

Through these complex causal chains, disasters affect Africans directly by killing and injuring them, and indirectly by precluding production, destroying assets and stocks, denying access to services, disrupting the environment and the social fabric and by wasting opportunities for development (12).

Drought has hit the Sahelian Zone several times in the past 20 years, and it is extending to Southern and Eastern Africa. Desertification is mostly caused by the alarming growth in human and live stock populations, overgrazing, expansion of agricultural land and increased demand for fuel-wood. Human population continues to increase at 3.3% annually, while food production has not gone beyond 2% per year (3).

Disasters like severe storms, heavy rains, and floods have affected different countries in the continent causing damage to people, crops, physical

infrastructures, and transport systems. Seasonal disasters like cyclones and hurricanes are confined to the Indian Ocean islands and coastal countries (3). Earthquakes are rare in most African countries, although the risk is high in certain areas. Numerous infections of bacterial, viral, and parasitic origins are known to cause large scale epidemics, including malaria, meningitis, yellow fever and cholera (3).

Most of the 53 countries of the continent, which in 1996 had a total population of 760 million people, are highly susceptible to disasters. Out of the 100 disasters reported worldwide in 1996, 20 occurred in Africa; yet Africa suffered 60% of all disaster-related deaths (12).

Ethiopian situation:- Disasters, both of natural and human-made causes, like droughts and famines, wars and civil strifes, floods, disease outbreaks and traffic incidents (car, train and plane crashes) have occurred in Ethiopia in the past. These disasters have caused many injuries, deaths and large property losses. Although records of the effects of these disasters could not be found, summary data on some of the disasters which occurred from 1981 to 1989 European calendar are shown in table 1 (13).

Table 1. **Record of disasters in Ethiopia from 1981-1989 European calendar.**

YEAR	Type of Disaster	killed	Number of people: affected	Homeless
81	Flood	...	20,000	...
83	Drought	300,000	7,750,000	...
83	Drought	...	5,000,000	...
85	Flood	9	...	8,000
87	Drought	...	7,000,000	...
87	Locust	...	...	...
87	Drought	...	1,000,000	...
88	Meningitis	15	165	...
88	Flood	...	45,000	...
88	Drought	...	5,200,000	...
88	Locust	...	...	...
88	Refugees	...	340,000	...
89	Meningitis	...	6,688	...

Source: Record of disasters in Africa, WHO/EPR, A.A., 1990.

In order to reduce the disasters from natural and human-made hazards to which Ethiopia is vulnerable, every effort must be made towards prevention and preparedness, both by the community and by the responsible organizations. Measures include public education and information dissemination about the potential hazards and their causes and effects, possible prevention and damage reduction methods, and multi-sectoral coordination. Although many disasters occur in Ethiopia, there seems to be few documented studies about pre-disaster hazard identification, assessment of vulnerability and preparedness status of communities and institutions.

Since no meaningful epidemiologic analyses or public health action can be undertaken without reliable data, this study aims at collecting and systematizing data on the levels of awareness of communities and institutions in Addis Ababa, their vulnerability to the most prevalent hazards, and their degree of preparedness in the face of emergencies.

The anticipated potential utility of this thesis research is to sensitize Ethiopian health researchers and the organizations of concern to disasters, their multi-faceted impact on the community, and the importance of disaster prevention and emergency preparedness.

II. LITERATURE REVIEW

Evidence shows that losses from natural and human-made disasters are increasing, causing death and injury to millions, leading to the destruction of property, and setting back the efforts of the poorest countries to develop their economies (14).

The number of people affected by natural disasters amounts to several millions in each century. More than 26 natural disasters, each with 10,000 or more victims, have been registered in the Twentieth century. In the last 100 years alone, some 9 million people died due to floods, around one million due to earthquakes, and more than 600,000 due to hurricanes, typhoons, and cyclones. Losses in these disasters included not only human life but also extensive damage to property. The possible amount of damage from natural disasters in just one year was shown in 1966 when 58 disasters, predominantly in developing countries, cost about US $3.4 billion (15).

The effects of disaster:- Disasters have health, environmental, economic, social, and political effects. The worst effects are the deaths and injuries caused. It has long been recognized that all disasters, whether natural or human-made, have repercussions on the health of the affected populations. The consequences of disasters differ according to the type of disaster, the characteristics of the stricken area and the population, the pre-existing health conditions, the state of services,

the coping mechanisms, and the state and degree of preparedness of different organizations and of the population in general (16). The effects of a disaster depend on several factors:-

1. where it occurs, especially in relation to population;
2. when it occurs, e.g., during the day or night;
3. the preparedness of the community vis-a-vis the event;
4. the amount of advance warning that can be given;
5. the seriousness with which persons heed warnings and know what to do;
6. the extent to which relief personnel and structures are directly affected by the event (16).

Public health consequences of disasters:- The cumulative effects of disasters include: injuries, disabilities, death, risk of communicable diseases, spread of epidemics, deterioration of health conditions, malnutrition, famine, psychological problems, increased dependency on food aid, increased number of displaced people and refugees, and environmental deterioration (3). Disasters may be considered a public health problem for a number of reasons:-

1. Disasters may cause a high number of deaths, injuries, or illnesses in the affected community.
2. Disasters may destroy local health infrastructures and disrupt the provision of routine curative and preventive activities.
3. Disasters may have adverse effects on the environment and the population,

increasing the risk for communicable diseases and environmental hazards.

4. Disasters may affect the psychological and social behaviour of the stricken community. Anxiety, neuroses, and depression may follow both sudden and slow-onset disasters.
5. Some disasters may cause food shortages and consequent malnutrition.
6. Disasters can cause large population movements (5,16).

Influences of disasters on disease transmission:- Outbreaks of communicable disease can occur after disasters, though very few such outbreaks have been observed during the last 40 years. This may partially reflect poor ascertainment, and partially effective counter-measures. Disease outbreaks during disasters can occur from the pathogens in the affected area, the movement and density of the population, the environmental changes, the loss of utilities and routine public health services (17).

Importance of Hazard Identification:- A critical element of disaster prevention is the full understanding of the nature of the hazards. In each country and in each region, hazards differ. Some counties are prone to floods, others have histories of tropical storms, while others are known to be prone to earthquakes. Most countries are prone to some combination of the various hazards, and all face the possibility of technological disasters as industrial development progresses (18).

Understanding a hazard requires comprehension of its causes, its

geographical distribution, magnitude, severity, risk of occurrence, the physical mechanisms of destruction, the elements and activities most vulnerable to its effects, the consequences of damage, and its possible economic and social consequences (18).

The effects that hazards are likely to have depend on what is present in the region, i.e., the people, their houses, their sources of livelihood, and the infrastructures. The vulnerability of people, buildings, roads, bridges, pipelines, communication systems, and other elements is different for each hazard (18). Each country is different, thus for any particular location or country it is crucial to know the types of hazards likely to be encountered and to plan accordingly (18).

Significance of Vulnerability Assessment:- Vulnerability assessment is another crucial aspect of disaster prevention. Vulnerability implies susceptibility to physical and economic damage and lack of capacities for rapid recovery. Because hazards tend to be uncontrollable, much prevention work is centred on reducing vulnerability (19).

Specific population sub-groups differ in their vulnerability. When equated over countries, mortality and morbidity from disasters seem to be significantly higher for countries with a low GNP compared to more affluent countries, even when controlling for population density (20).

The vulnerability of an area is determined by the capacity of its social, physical, and economic structures to withstand and respond to hazards. Certain groups of people, as well as certain physical assets and economic activities can be particularly vulnerable to damage (21). Factors influencing vulnerability vary, but it is possible to identify common, fundamental forms of vulnerability:-

1. Material/economic vulnerability (lack of access to resources)
2. Ecological vulnerability (unprotected and degraded environment)
3. Organizational vulnerability (lack of strong organizational structures).
4. Educational vulnerability (lack of information and knowledge).
5. Attitudinal and motivational vulnerability (lack of awareness)
6. Political vulnerability (limited access to political power).
7. Cultural vulnerability (certain beliefs and customs).
8. Physical vulnerability (weak building or weak individual) (21).

Certain characteristics of cities exacerbate human vulnerability. The larger the city and the greater its rate of growth, the more intractable are the problems of managing and controlling development. Demand for land in and around the city results in geographical expansion. A large proportion of the city's population may live in unplanned settlements in marginal areas which are often particularly prone to natural hazards (21).

When a disaster strikes, the larger and the more unplanned the city, the

more difficult it will be to organize rescue efforts and respond to the disaster. The vulnerability of city dwellers to natural hazards is fundamentally dependent upon the nature of the buildings and infrastructures surrounding them. Different types of dwellings are vulnerable to different hazards (21).

Buildings and physical infrastructures which are vulnerable to natural hazards include:-

1. Old residential buildings in densely populated areas, with low standards, and which are poorly maintained and overcrowded.
2. Buildings like schools and other community buildings of low construction standards.
3. Unplanned settlements, in marginal and possibly hazardous areas (e.g., steep slopes and flood plains).
4. Communication and control centres, especially if concentrated in one area.
5. Hospital facilities which are not prepared for large numbers of casualties and which may also become inaccessible.
6. Bridges and embankments of poor design which are liable to collapse thereby preventing casualty evacuation and movement of emergency supplies; crowded traffic and narrow streets.
7. Potable water mains which are liable to rupture, resulting in pollution and diseases.
8. Sewerage systems which are liable to flood and spread disease.
9. Electrical supply lines and systems which are liable to failure.
10. Gas mains which are liable to rupture thereby fuelling fires (21).

Risk assessment:- Understanding the risk is important in dealing with disasters. Risk may be estimated in terms of human lives, buildings destroyed or financial losses incurred. Knowledge of what makes a person or a community more vulnerable than another determines the steps which can be taken to reduce the risk. Awareness of the risk by the public at large, and the perception of how the risk compares to other risks will determine society's attitudes about reducing it (22). For most risks, prevention can only be handled at the level of the community because protection requires collective, sometimes large-scale action (22).

The risk of mortality and morbidity in disasters is not only a function of the physical characteristics of the event, but it is also determined by the prevailing socio-economic and health conditions of the affected community (4), as well as by random factors, such as the time (day or night) and day of week when the event occurs. Individual households may not take preventive measures due to lack of resources or lack of awareness and the ability of a community to protect itself may be weakened by a lack of social cohesion or inadequate institutional structures (21).

The risk of disaster-related mortality and morbidity is also determined by demographic characteristics. Studies on risk factors for disaster-related mortality and morbidity have identified a number of factors linked to population density. Data from selected disasters show that the vulnerability of older children to

mortality is substantially higher than other age groups. De Bruycker et al. in their study of the earthquake in Campania (Italy) observed that children between 5 and 9 years of age were at higher risk of injury and death than smaller children; this may be explained by the fact that parents take care of small children in crisis conditions while they expect older children to take care of themselves (20).

Guha-Sapir et al. noted similar vulnerability patterns in a survey of affected communities in China during the 1985 famine: mortality was higher among children above two-years-of age. They concluded that infants were protected against the decrease in food intake by being breast-fed while older children were mistakenly expected to be able to secure their own food (20).

Disaster and Emergency Management:- Disaster and emergency management is a cycle of interlinked activities encompassing prevention, preparedness, response, recovery and reconstruction. Activities within each phase are necessary for effective disaster management. Disaster response alone is not sufficient, as it yields only temporary results at very high cost. Disaster prevention and preparedness are better approaches than response in order to achieve the aim of IDNDR: a significant reduction in loss of life and material damage caused by disasters (23).

Expenditures on international emergency relief are absorbing significant

proportions of development aid. Although accurate records on emergency relief are difficult to maintain and assess, incomplete reports from national and international agencies indicate that relief disbursements are over US $1 billion each year (20).

As a result of current inefficiencies in the management of disasters, the ever-increasing expenditures have not had any visible results in attenuating or preventing the ravages of disasters in the developing countries. Health response during emergencies, for instance, has been typically an ad hoc action that is often inappropriate and usually late. Today, it is recognized that there is a need of rationalizing the response to emergencies so that vital needs are assessed correctly and on time. Preparedness, with special emphasis on planning and early warning, has been identified as a key element in the management of disasters (20).

The rationale for disaster prevention:- Prevention means taking actions to reduce the effects of a hazard before it occurs. The scale of disasters, the increasing loss of economic assets and the number of people affected are its primary justifications (14). Disasters can be either prevented by reducing vulnerability, or their impact reduced by preparedness and appropriate response (24).

A useful analogy with the recently developing science of disaster

prevention are the public health measures that began in the mid 19th century. Before that time, the high risk of disease was generally accepted because there was little alternative. As the understanding of what caused diseases increased, it became evident that disease was preventable and the concept of public protection against disease became accepted (18). Disasters today are seen in much the same way as disease was in the early 19th century: unpredictable, unlucky, and part of the every day risk of living. However, the epidemiology of disasters shows that disasters are largely preventable. There are many ways to reduce the impact of a disaster and to prevent its effects (18).

It is far more cost-effective to prevent disasters than to recover from them afterwards. A common ingredient of disaster prevention programs is public education, to increase awareness and to educate the public that disasters are preventable and to encourage them to participate in protecting themselves (23).

Where resources for prevention are limited, they should be targeted where they will be most effective for the most vulnerable elements, and where they will support existing community activities against the most prevalent hazard. Natural hazards offer little or no opportunity for reduction. In these cases, the focus must be on reducing the vulnerability of the elements and activities at risk. On the contrary, for technological and human-made hazards, reducing the hazards is the most effective prevention strategy (25).

The importance of preparedness and assessment:- Plans and strategies must be frequently reviewed, modified, updated and tested, in order to ensure timely, appropriate, and efficient organization and delivery of emergency response before or following the impact of a hazard. The efficiency of those plans is measured in terms of their capacity to deliver assistance to the most vulnerable. Because of the increasing threat of natural, human-made or technological disasters, the national and international communities are increasingly aware of the necessity for preparedness for disasters to reduce their effects (25).

Assessment is a critical activity all along the disaster preparedness and management continuum. Assessment of needs and resources is required for the prevention of all types of disasters, whatever the cause and speed of onset (26). It is through a formal assessment process that information is gathered and provided to the responsible decision-makers. Assessment is most effective when it is pre-designed as part of a preparedness plan which is regularly tested and refined. Because assessment differs for different types of hazards, the preparedness plan must take into account the range of possible situations that the country might encounter (26).

A comparison of two recent earthquakes illustrates the advantages of preparedness: Armenia in 1988 and San Francisco in 1989. Populations of roughly equivalent size were subjected to tremors of equivalent magnitude. In

Armenia, the death toll exceeded 15,000. By contrast, in San Francisco, where four months earlier the US Government had spent US$ 500,000 dollars on testing its preparedness plan, the result was less than 100 deaths (11).

Disaster response:- Disaster response is the sum total of actions taken by people and institutions in the face of disaster. It starts with implementation of contingency plans and procedures, and ends with completion of rehabilitation programmes. The main activities are warning, evacuation, search and rescue, post-disaster assessment, emergency relief, rehabilitation, and reconstruction. This, in turn, calls for organized systems including survivor response logistics and supply, communication and information management, and coping, security, and emergency operations management (27).

Role of the health sector in disaster preparedness:- Disaster preparedness and response require multi-sectoral cooperation in which, occasionally, the health sector may play the leading role. The response guidelines must be integrated into the regular health programmes and infrastructures (28).

Hospitals:- In areas prone to disasters, each hospital should have a preparedness plan designed to cope with a sudden influx of casualties. A hospital plan should also take into account the possibility of severe damage to its structure and service utilities (29).

The importance of information availability for preparedness:- Information must be maintained on the organizational structure and contact points of all key services in the health and related sectors. It is essential to keep information updated constantly on the locations, names, telephone numbers, addresses, and duties of all key officials on the disaster prevention and preparedness and the health relief committees (28,29).

III. OBJECTIVES OF THE STUDY

1. General Objective:-

To assess the hazards, vulnerability, and capacities for disaster prevention and emergency preparedness in Region 14 Administration (Addis Ababa).

2. Specific objectives:-

2.1. To identify hazards in Region 14 Administration (Addis Ababa).

2.2. To describe the perceived effects and recorded damages from the hazards in the past five years in the Region.

2.3. To assess the main factors of vulnerability in the Region.

2.4. To assess the capacities of the community and organizations in the Region for disaster prevention and emergency preparedness.

IV. SUBJECTS AND METHODS

1. **Study design**: A community and institution based descriptive cross-sectional study.

2. **Study area**: The study was conducted in Addis Ababa, known as the Region 14 Administration, from June 1 - July 30, 1997. The city is geographically and administratively divided into 6 Zones, 28 Weredas and 305 Kebeles (the lowest administrative unit). According to the Population and Housing Census of Addis Ababa, 1994, the city has a population of 2,112,737 with 48.4% males and 51.6% females (30). The health coverage by physical accessibility to health institutions is estimated at 98% (31).

3. **Source Population**: The source population for the community based survey was all households in Addis Ababa.

4. **Study Population**: The study population was:

a) households from the selected study Kebeles; and

b) all administrative and specific service organizations which have direct linkage with the control of disaster.

5. **Sample size**: The sample size of households was calculated using the formula for cross sectional survey: $n = \left(\frac{Z_{\alpha/2}}{d}\right)^2 * P(1-P)$ (32).

n : sample size — $Z_{\alpha/2}$: level of confidence, 1.96

d : sampling error, 4% — P : prevalence of hazards, 50%

Assuming 50% prevalence of hazards (to get maximum sample size), 95% level of confidence (corresponding to $Z_{\alpha/2} = 1.96$) and 4% sampling error, the minimum sample size was 600.

Additional 20%(120 households) were included for non-responses, for a total sample size of 720 households. In addition, 66 administrative and specific service organizations were included in the study. A description of these organizations, and their selection process, is given in the next section.

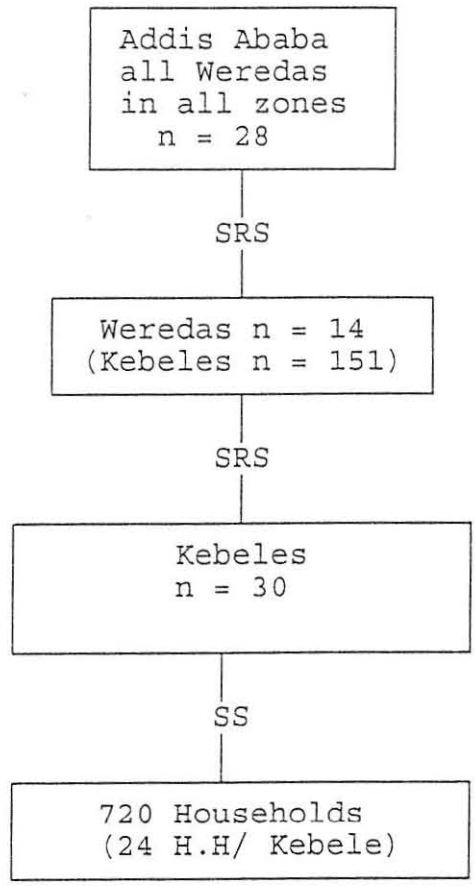
6. Sampling technique:- (see Figure 1):

6.1. A multi-stage sampling method was used to select the study units (households). First, 14 Weredas from the 28 Weredas in the Region were randomly selected by lottery method. Then, from the 151 Kebeles in the 14 Weredas, 30 Kebeles were randomly selected by lottery method. Twenty four households were selected by systematic sampling method from each of the selected 30 Kebeles to get the determined sample size of 720 households. The reasons for taking half of the Weredas, 10% of the Kebeles in the Region, and 24 households per Kebele were based on the available time, human resource, and logistics.

Additionally, 51 administrative and 15 specific service organizations whose activities are related to disasters were included in the study to get data regarding the frequency and recorded damage from hazards. These organizations are the administration offices of the 30 Kebeles from which the households were sampled, the 14 Weredas, and the 6 Zones; Region 14 Administration office; Region 14 Foreign Relations and Development Cooperation Bureau (same as DPP

Bureau); Region 14 Fire Brigade Office; Region 14 Health Bureau; six conveniently selected government hospitals in Addis Ababa (Tikur Anbessa, St. Paulos, Zewditu, Yekatit 12, Ras Desta, and Minilik II hospitals); Region 14 Red Cross Office; Ethiopian Civil Aviation Authority; Region 14 Traffic Police Office, Meteorology Service Organization Office, and Addis Ababa Flood Prevention Project Office.

Fig. 1. Schematic presentation of the sampling procedure used to select house holds for the study.



SRS = Simple Random Sampling

SS = Systematic Sampling

H.H = Households

7. For the purpose of this study, the following standard and operational definitions were used (33).

1. Disaster:- an occurrence disrupting the normal conditions of existence and causing a level of suffering that exceeds the capacity of adjustment of the affected community.

2. Hazard:- a natural or human-made event that threatens to adversely affect human life, property, or activity to the extent of causing a disaster.

3. Vulnerability:- the condition of individuals or communities which allows them to be harmed by the impact of a hazard.

4. Susceptibility:- exposure to danger.

5. Capacity:- quantitative assessment of human and material resources. According to WHO, capacity for emergency management implies: information, authority, institutional arrangements, skills and know-how, plans, resources, and procedures for their activation or mobilization.

6. Risk:- a statistical concept expressing the probability that a negative event or condition has to affect an individual in a given time and space. Alternatively, it is the level of damage that can be predicted from a particular hazard affecting a particular place at a particular time.

7. Emergency: a state in which normal operating procedures are suspended and immediate extraordinary measures are taken in order to avert a disaster or to limit its consequences.

8. Response:- the set of activities implemented after the impact of a disaster to assess needs, reduce suffering, limit the spread and consequences of disaster, and open the way to rehabilitation.

9. Disaster prevention:- a collective term encompassing all activities undertaken in anticipation of the occurrence of a potentially disastrous event, including preparedness and long-term risk reduction measures.

10. Preparedness:- the set of activities implemented before the impact of a disaster in order to ensure the organized mobilization of resources within a safe environment for an effective response.

11. Disaster Management:- a term encompassing all aspects of planning for and responding to disasters, including both pre- and post-disaster activities. It refers to the management of the causal factors, the risks, and the consequences of disasters.

12. Relief:- the provision on a humanitarian basis of material aid and emergency medical care necessary to save lives.

13. Rehabilitation:- the set of activities implemented after the impact of a disaster in order to restore the basic social services and functions.

14. Emergency Management: the system(s) set in place, and/or the measures taken before, during, or in the aftermath of disaster in order to prevent it or limit its impact and consequences.

15. Specific service organizations:- these are non-administrative organizations which give specific services.

8. Data collection and management:-

8.1. Data were collected by questionnaires and by direct observation. The questionnaires were developed after reviewing written documents related to the study topic. Brief discussions on disasters and emergencies in the Region with authorities from two Kebeles, one Wereda and one Zone helped in the design of the questionnaires. The questionnaires which were developed in English, were translated to Amharic by the principal investigator and commented on by a colleague. To ensure correct meaning, back translation to English was done by a translator. Comparisons were made between the original and back-translated versions, and there were no major differences.

8.2. Structured and open-ended questionnaires for the households, and for observational data collection were prepared as described above (Appendix 1). A separate Questionnaire was prepared for the administrative organizations (Appendix 2), and specific questionnaires were prepared for each specific service organization under study (Appendix 3).

8.3. Three supervisors and 12 data collectors, of both sexes from different parts of the city were recruited. The data collectors were high-school graduates while the supervisors were diploma holders.

8.4. The supervisors and data collectors were trained for five days by the Principal investigator and the advisor. The first three days were spent on discussing the purpose of the study, the contents of the questionnaires and how to complete them, ethical issues, procedures of interview, methods of supervision, and problem solving approaches. A mock interview was conducted among the trainees in the class and every trainee practiced filling-in the household questionnaires. On the fourth day, field practice of the questionnaires in one Kebele not included in the study was done for pretesting of the training. On the fifth day, the problems encountered during the field practice were identified, discussed and solved.

8.5. The household questionnaires were pretested in one Kebele which was not

included in the study and the problems encountered such as the difference in the number of households between the 1994 census and the Kebele's record, the difficulty in tracing the households, etc., were discussed and solved; certain questions which were difficult for the households to understand were corrected or modified.

8.6. The households were interviewed using the pretested questionnaires. Respondents were household heads or any family member who is 18-years-old or above.

8.7. Observational data collection was done using the pretested questionnaires, and check-lists filled in by consensus by the interviewers and supervisors at the end of each day.

8.8. Regular supervision of the data collectors was done by the three supervisors and the principal investigator.

8.9. Self-administered questionnaires prepared for the organizations were distributed to each organization under study. They were completed by the respective responsible officer after a brief explanation was given on the purpose of the study and on how to fill the questionnaires. The Questionnaires were later collected.

9. **Data entry and analysis**:- As most of the questionnaires were open-ended, the data collected from the households were first tallied and categorized. Then, the questionnaires were coded according to the results of the tally and category. Data entry, cleaning, and analysis were performed using EPI-INFO Version 6 statistical package. Data were presented using frequencies and percentages.

10. **Ethical considerations**:- After getting the approval of the ethical committee of the Faculty of Medicine, AAU to perform the study, all necessary arrangements were made with the Kebele, Wereda, Zonal and Regional administrative officials after explaining to them the purpose of the study. Respondents were interviewed after they were given a brief explanation on the purpose of the study; informed consent was obtained. Anonymity was used to increase their confidence.

V. RESULTS

The presentation of the results of this study is organized in four major parts, according to the four specific objectives.

Characteristics of the Respondents:-

Of the 720 households selected for the study, 647(90%) responded. Out of these, in 300(46.4%) households, it was possible to question the household heads; for the rest, other family members 18-years-old or above were questioned. The non-response rate was 10%. The socio-demographic characteristics of the household respondents is displayed in Table 2.

Of the 51 administrative organizations identified for participation in the study, 41(80.4%) responded to the questionnaires. Of the 15 specific service organizations included in the study, 14 (93.3%) responded. The number and percentage of respondents is given in figure 2 below.

Fig. 2. The number and percentage of respondents.

A/ Households

B/ Administrative Organizations

C/ Specific Service Organizations

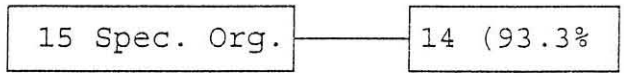


Table 2. Socio-demographic characteristics of the household respondents, Addis Ababa, Ethiopia, 1997. (N=647)

Characteristics		Number	Percent
Relation to household head:	Head	300	46.4
	Others▲	347	53.6
Age (years):	18-30	264	40.8
	31-60	311	48.1
	> 60	72	11.1
Sex:	Male	215	33.2
	Female	432	66.8
Occupation:	With job	341	52.7
	Without job	306	47.3
Educational Status:	Illiterate	137	21.2
	Read and write	74	11.4
	Formal education	436	67.4
Marital Status:	Currently Married	315	48.7
	Currently not Married	332	51.3

▲ Others include: Any family member who is 18-years-old or above.

Part 1. Identification of hazards:-

1.1. Hazards reported by households: Of the 647 respondents, 373(57.7%) said that at least one hazard had struck in the their area in the past five years. The most frequent hazards reported were flood (186;49.9%), fire (107;28.7%), outbreak of diseases (38;10.2%), and car incidents (36;9.7%). These four hazards accounted for 98.4% of the total responses. The remaining six (1.6%) respondents identified building collapse, electric incidents, explosions, and strong winds as the most frequent hazards in the past five years.

When all household respondents were asked about hazards that may occur in the future in their area, 490(75.7%) said that at least one hazard would strike; most concerns concentrated on fire (205;41.8%), flood (157;32.0%), outbreak of diseases (85;17.3%), and car incidents (36;7.3%). These four hazards accounted for 98.6% of the total responses; the rest (7;1.4%) mentioned building collapse, electric incidents, explosions, and strong winds.

1.2. Hazards reported by administrative organizations:- Forty-one administrative organizations out of 51 contacted (80.4%) responded to the questionnaires. The most frequent hazard reported for the past five years was flood (33;80.5%), fire (6;14.6%), outbreak of diseases (1;2.4%), and car accident (1;2.4%).

The hazards perceived as most severe were flood (25;61.0%), fire (10;24.4%), outbreak of diseases (4;9.8%), and car accidents (2;4.9%).

A summary of the results from the households and administrative organizations about the most frequent hazards in the past five years and the most worrying hazards in the future in their area is given in Table 3.

Table 3. **Identified hazards by the households versus the administrative organizations, Addis Ababa, Ethiopia, 1997.**

Type of hazards	Household	Administrative Organizations
Most frequent past hazards	(n=373)	(n=41)
1. Flood	49.9%	80.5%
2. Fire	28.7%	14.6%
3. Disease outbreak	10.2%	2.4%
4. Car incident	9.7%	2.4%
5. Others▲	1.6%	-
Most probable future hazards	(n=490)	(n=41)
1. Fire	41.8%	24.4%
2. Flood	32.0%	61.0%
3. Disease outbreak	17.3%	9.8%
4. Car incident	7.3%	4.9%
5. Others▲	1.4%	-

▲ Others include: building collapse, electric incidents, explosions, and strong winds.

1.3. Hazards reported by specific service organizations:

a) **Fire**:- The Region 14 fire brigade office reported that fire remains one of the most frequent and severe hazards in Addis Ababa. The Foreign Relations and Development Cooperation Bureau of Region 14 (the same as Disaster Prevention and Preparedness Bureau) shared this view.

b) **Flood**:- The Flood Prevention Project of Addis Ababa said that Addis Ababa is prone to flood, and that floods occurred frequently. The Foreign Relations and Development Cooperation Bureau of Region 14 also confirmed this view.

c) **Car accidents**:- The Region 14 Traffic Police Office reported that traffic incidents were frequent in the past five years and remain one of the most frequent and serious hazards in the city.

d) **Outbreak of Diseases**:- The Region 14 Health Bureau reported that different epidemics of diseases are known to occur in the Region, of which Meningococcal Meningitis is the most serious.

e) **Earthquake**:- The Geophysics Department, Addis Ababa University, reported that although there has been no earthquake in Addis Ababa recently, there is a degree of risk because the city is situated in the Rift Valley.

f) **Plane crash accident**:- The Ethiopian Civil Aviation Authority reported that there had been plane crashes around Addis Ababa in the past years and, although rare, plane crash is a possible event.

Part 2. Reported damage caused by hazards in the past five years.

2.1. Damage reported by households:- Of the 186 households who said flood was the most frequent hazard in their area, 62(33.3%) reported that flood had damaged the family itself and its property; 160(86.0%) reported damages to people and property in near-by areas. Of the 107 households who mentioned fire as the most frequent hazard, 8(7.5%) said fire damaged their family and property, while 82(76.6%) said it had damaged people and property in the area.

Of the 38 households who mentioned outbreak of disease, 19(50%) claimed that this had affected family members, and 35(92.1%) said that it had affected people in their area. Of the 36 households who mentioned car accident, 8(22.2%) said this had affected their family and property, and 30(83.3%) said it had affected people and property in their area. The results for the households are given in Figure 3.

2.2. Damage reported by administrative organizations:- Thirty two (97.0%) of 33 administrative organizations which said flood was the most frequent hazard in their area, confirmed that flood had caused damage to people and property in their area.

2.3. Damage reported by specific service organizations:- In the past five years, the recorded number of deaths caused by fire, traffic incidents, and flood in Addis Ababa was 207, 1,268, and 3 respectively. Additionally, car accidents and fire caused 6,017 and 206 injuries to people, respectively, while flood rendered 2,880 people homeless.

Although outbreaks of diseases were reported to have occurred and affected people, no record could be found at the Health Bureau. The extent of damage caused to people and property from the hazards which occurred in the past five years, as reported from the specific service organizations, is displayed in Tables 4, 5 and 6.

Table 4. The recorded hazards and the damage they caused in Addis Ababa in the past five years. ▲

Type of Hazard	No. of events	Property lost (estimated in millions ETB)	No. of people: injured	killed	homeless
1. Floods	37	17	...	3	2,880
2. Fires	1,085	85	206	207	...
3. Disease* Outbreaks	...	-	...	...	-
4. Car incidents	19,965	36	6,017	1,268	-
Total		138	6,223	1,478	2,880

▲ Source: From the records of the different specific service organizations in Addis Ababa, A.A., 1997.

* No records found from the Region 14 Health Bureau.

Table 5. **Recorded fire incidents and the damage they had caused in Addis Ababa in the past five years.** ▲

YEAR	Number of Incidents	Number of people: injured	killed	Property lost (estimated in millions ETB)
1984(1992)*	135	20	50	20
1985(1993)*	198	20	26	11
1986(1994)*	245	38	50	11
1987(1995)*	246	54	30	21
1988(1996)*	261	74	51	22
TOTAL	1,085	206	207	85

* Note: the years in bracket are in European years
▲ Source: Addis Ababa Fire Brigade Office.

Table 6. **Recorded car incidents and the damage they had caused in Addis Ababa in the past five years.▲**

YEAR	Number of Incidents	Number of people: injured	killed	Property loss estimated ETB
1984(1992)*	3,617	1208	228	6
1985(1993)*	3,564	1230	228	6
1986(1994)*	3,137	941	271	6
1987(1995)*	3,445	957	255	7
1988(1996)*	6,202	1682	286	11
TOTAL	19,965	6,017	1,268	36

* Note: the years in bracket are in European years

▲ Source: Addis Ababa Traffic Police Office, A.A., 1997

Part 3. Assessment of the vulnerability of the study population:

Data collected from the households:-

3.1. Human vulnerability:

a) **Household heads**: 44% of the households were female-headed, and 32% of the household heads were without job. Among the 542 respondents, the average monthly family income was less than 105 ETB in 30.6% of the households. Of the 640 household heads who gave this information, 24.5% were illiterate. The vulnerability factors from the socio-demographic characteristics of household heads is shown in Table 7.

b) **Household vulnerability**: Of 647 households, 189(29.2%) have at least one under-five child, and 54(8.3%) have more than one under-five child. In 58(9.0%) of households there was at least one chronically bed-ridden or physically disabled family member.

3.2. Human and structural vulnerability: Of 647 households, 65.5% live in rented houses; 6.5% of all houses were used for both residential and business purposes. Sixty two percent of the houses have one or two rooms, while the average family size of the households is 6. The walls of 86.4% houses are made of wood and mud, and 43.9% of the houses were perceived by the household respondents as needing major repair. The characteristics of the houses surveyed are displayed in Table 8.

From the observational data in the 30 Kebeles under study, the following results were obtained. 48.6% of the houses were judged to require major repair. The majority of the Kebeles' roads are of dry weather type, narrow, and damaged. The majority of the houses in the Kebeles were found to have either no or difficult road access. In nearly 75% of the Kebeles, the houses are crowded together and the traffic was perceived to be heavy in 50% of the Kebeles. Reportedly, nearly half of the Weredas in the city are prone to flood and fire hazards, according to the Flood Prevention Project and the Fire Brigade Office of the Region.

Three of the five hospitals which responded were perceived, by their respective administrations, as being very old buildings which are in need of major repair, and as hosting too many patients and staff. One was reportedly affected by flood. Another has a very old electrical system and equipments which were reported to have resulted in repeated fire incidents. None of the hospitals has functional emergency exits.

The vulnerability of the hospitals was assessed because of their importance as places where many sick and disabled people are found. The vulnerability of the other organizations participating in the study was not assessed because it was not the objective of the study.

Table 7. Main factors of vulnerability from the socio-demographic characteristics of the household heads, as responded by the households, Addis Ababa, Ethiopia, July, 1997. (N=647)

Characteristics		Number	Percent
Age (years):	18-30	63	9.7
	31-60	487	75.3
	> 60	97	15.0
Sex:	Male	362	56.0
	Female	285	44.0
Occupation:	With job	440	68.0
	Without job	207	32.0
Educational Status:	Illiterate	157	24.5
(n=640)	Read and write	130	20.3
	Formal education	353	55.2
Marital Status:	Currently Married	428	66.2
	Currently not Married	219	33.8
Monthly Income	< 100	166	30.6
(ETB)(n=542)	100-300	225	41.5
	301-500	73	13.5
	> 500	78	14.4

Table 8. Factors of vulnerability given the characteristics of the houses surveyed, as reported by the households, Addis Ababa, Ethiopia, July, 1997. (n=647)

Characteristics		Number	Percent
House ownership:	privately owned	223	34.5
	rented	424	65.5
House used for:	residential	584	90.3
	business	21	3.2
	both	42	6.5
Number of rooms:	one	176	27.2
	two	226	34.9
	more than two	245	37.9
Type of walls	mainly wood and mud	559	86.4
	mainly stone and cement	88	13.6
Condition of house:	needs minor repair	285	44.0
	needs major repair	284	43.9
	needs no repair	78	12.1
Lighting:	Electricity	635	98.1
	Kerosene lamp	12	1.9
Cooking fuel:	Kerosene	354	54.7
	Fire wood & charcoal	192	29.7
	Buta gas	77	11.9
	Electricity	24	3.7
Water supply:	with tap water	644	99.5
	Without tap water	3	0.5
sanitation*:	With facility	573	88.4
	Without facility	74	11.6
Garbage disposal**:	with	444	68.6
	without	203	31.4
Telephone:	With	172	26.6
	Without	475	73.4
Radio or T.V.:	With	497	76.8
	Without	150	23.2

* Facility: either flush-water toilet or pit latrine

** Garbage disposal: Regular garbage disposal facility (pit or tanker)

Part 4. Assessment of the capacity for disaster prevention and emergency preparedness.

4.1. Awareness of the causes and prevention methods:-

a) **Flood**: The methods to prevent and/or reduce damage from flood mentioned by households were: construction of new and cleaning of the blocked drainage systems, construction of flood protection walls, and evacuation of people and property.

The ways to prevent and/or reduce damage from floods mentioned by administrative organizations were similar to those mentioned by households. Those who said it was not possible to prevent flood gave as reasons that it is difficult to control river over flooding, and that the capacity for flood prevention is scarce.

b) **Fire**: The methods to prevent and/or reduce damage from fire mentioned by households were: not to add kerosene while a fire is burning, to extinguish the fire after use, early control of fire unplanned, and evacuation of people and property. Those who said it is not possible to prevent and/or reduce damage from fire gave the following reasons: fire occurs suddenly, there is no road access for fire brigade trucks, and the fire brigade is late in responding to emergency calls.

The measures mentioned by the administrative organizations were: to avoid causes of fire, early control of fire, and evacuating people and property.

The methods of fire prevention mentioned by the Fire Brigade are: appropriate and careful use of fuels, and safety measures and fire extinguishers, especially in factories and
hospitals.

The main reasons for delay in fire control, as reported by the fire brigade, were: lack of road access to majority of the houses, crowded traffic, late emergency calls, houses being crowded and made of easily combustible materials, late response of other responsible organizations, shortage of fire brigade sub-stations, and inadequate fire trucks and equipment in relation to the size and development of the city.

c) **Disease outbreak**: The prevention measures mentioned by household respondents were: environmental sanitation and construction of latrines.

d) **Car accidents**: It was reported by the Traffic Police of the Region that drivers account for 45% of traffic accidents in Addis Ababa. The main reasons for this are lack of knowledge of driving rules, lack of driving experience, negligence, and altered consciousness due to alcohol, chat, etc.

Knowledge of the main causes of the most worrying hazards, the perception of households and administrative organizations, and the main methods mentioned by all respondents on prevention and/or reduction of damage from hazards, are displayed in Tables 9, 10 and 11, respectively.

Table 9. **The reported causes of the most worrying hazards: responses by the households versus the specific service organizations concerned with the hazard. Addis Ababa, Ethiopia, 1997.**

Type of hazard	The perception of households	The perception of specific service organizations
1. Flood[a]	1. Lack of drainage system 2. Blocked drainage system 3. Heavy rain 4. Presence of rivers	1. Heavy rain 2. Presence of rivers without protective wall 3. Settlement of houses near rivers without protective wall
2. Fire[b]	1. Lack of proper knowledge of kerosene usage 2. Negligence of people 3. Lack of awareness of the	1. Inappropriate use of fire sources 2. Deliberately set fires 3. Lightning 4. Strong winds damaging electric wires
3. Disease[c] outbreak	1. Lack of environmental sanitation 2. Lack of latrines	1. No information
4. Traffic[d] accidents	1. Narrow and damaged roads 2. Traffic crowdedness 3. Carelessness of people	1. Driving while drunk or chewing 2. Driving in high speed 3. Bad condition of vehicles and roads 4. Lack of knowledge of driving rules and negligence 5. Lack of driving experience

a/ Meteorology Service Organization & Flood Prevention Project of Addis Ababa
b/ Region 14 Fire Brigade Head Office
c/ Region 14 Health Bureau
d/ Region 14 Traffic Police Head Office

Table 10. The perception of households versus administrative organizations on ways to prevent and/or reduce damage from the hazards of concern, Addis Ababa, Ethiopia, 1997.

Type of hazard	It is Possible to prevent occurrence		It is Possible to reduce damage	
	Household n(%)	Admin. org. n(%)	Household n(%)	Admin. Org. n(%)
1. Flood	154(83) (N=186)	29(88) (N=33)	123(66) (N=186)	28(85) (N=33)
2. Fire	71(66) (N=107)	3(50) (N=6)	83(78) (N=107)	5(83) (N=6)
3. Disease outbreak	31(82) (N=38)	1(100) (N=1)	32(84) (N=38)	1(100) (N=1)
4. Car incident	30(83) (N=36)	1(100) (N=1)	22(61) (N=36)	1(100) (N=1)

Table 11. Main methods mentioned by households and organizations on ways to prevent and/or reduce damage from the most probable and worrying hazards, Addis Ababa, Ethiopia, 1997.

Hazard	The main methods mentioned
1. Floods	1. Construction of new and cleaning of blocked drainage systems
	2. Construct flood protection walls
	3. Prompt evacuation of people and property
2. Fires	1. Careful and appropriate use of fuel sources especially kerosene
	2. Early control of fire and evacuation of people
	3. Inform the responsible body as early as possible
	4*. Safety measures and fire extinguishers especially factories and Hospitals
3. Car incidents	1. Not to drive while drunk or chewing Khat
	2. Not to drive in high speed
	3▲. Strict licence issuance
	4▲. Improve road condition and placement of road traffic signs in needed areas

* Region 14 Fire Brigade Office ▲ Region 14 Traffic Police Office

4.2. **Availability of resources for disaster prevention and emergency preparedness.**

Of the 647 households, only 17(2.6%) have a fire extinguisher at home. The fire brigade has nine fire fighting trucks, 341 workers and other fire extinguishing equipment and chemicals. The workers are trained for three months on how to deal with fires and other hazards, followed by yearly refreshment courses of two weeks.

The Traffic Police have 564 police men, 19 radios for communication, and seven vehicles for daily traffic activities.

The Geophysics Department, AAU has two stations for earthquake recording, stationed at AAU and at Fure (near A.A.)

The Red Cross Office has 18 functional ambulances stationed at different places, and 29,000 first aid trained volunteers on call.

4.3. **Presence of preparedness plans:** No administrative organization, from Kebele to Zone level, has a written preparedness plan against any hazard that can occur in its area.

The Region 14 administration office and the Foreign Relations and Development Cooperation Bureau (same as Disaster Prevention and Preparedness Bureau) have a general written preparedness plan for response. There is a Disaster Prevention and Preparedness Committee in the Region which includes all responsible organizations.

The Red Cross of Addis Ababa reported to have a general written plan for response. The Flood Prevention Project Region 14 has no written preparedness plan against flood response. The Meteorology Service Organization broadcasts forecasts through mass media. The Fire Brigade and the Ethiopian Civil Aviation Authority have written preparedness plans which are tested (on simulation or actual), updated and distributed to all concerned parts.

The written preparedness plan of the fire brigade for response includes:-

1. Raising alarm by siren
2. Telephone call to all fire brigade stations and responsible organizations to be ready and on stand-by

3. Interrupt electric power

4. Evacuation of people and property

5. Appropriate fire extinguishing activities

6. Help for Fire Brigade workers injured during fire extinguishing.

To reduce occurrence of fires, the Fire Brigade runs the following activities:-

1) Public education

2) Supervision and advice

3) Collaboration with responsible organizations.

To reduce damage from fires, the Fire Brigade does the following activities:-

1) Urgent response to emergency fire calls

2) Control the expansion of the fire hazard to other areas

3) Evacuate people and property.

The Region 14 Health Bureau has a written preparedness plan for control of disease epidemics like meningitis and malaria; it also has an early warning system for disease epidemics for 17 selected diseases. There is no written preparedness plan for mass casualty management; nonetheless, the Bureau claimed that there is a communication network among the hospitals that allows them to handle mass casualty together, and that there are contingency stocks of drugs and equipment for emergency use only.

None of the five hospitals which responded to the questionnaire reported having a written preparedness plan for mass casualty management, or for hazards that can occur inside the hospitals. In apparent contradiction with the statements of the Health Bureau, they reported that they do not keep contingency stock of drugs and equipment for use during mass casualty situation only, and also that they have no communication network among them to handle mass casualty together. The reason given for this was that they had not thought of it. The remaining organizations have no written preparedness plan.

VI. DISCUSSION

The hazards identified in this study were quite similar for all types of respondents, be they households, or administrative and specific service organizations. The main hazards identified by most of the respondents were: flood, fire, car accidents and disease outbreaks. These hazards are similar to those reported from most developing countries. Hazards like fire and traffic incidents can occur in cities like Addis Ababa since the causes are human- made and technological.

According to the respondents, the causes of the hazards are many but the main ones are related to poor infrastructures, e.g., lack of drainage system, absence of flood protection walls, crowded housing, poor sanitary facilities, and narrow and damaged roads. Moreover, lack of knowledge and negligence by the population were reported by the respondents as the major contributors to the occurrence of disasters.

Though flooding was the most frequent hazard reported by both the community and administrative organizations, fire was the most worrying hazard mentioned by the community, while flooding was the most worrying hazard mentioned by the administrative organizations. The communities' concern with fire could be due to the extent of damage that past fires have caused to people and property. Road inaccessibility and crowdedness of the houses were observed during the data collection time; these factors contribute to making it more difficult to control fire.

The fact that flooding is mentioned as the most worrying hazard by the administrative organizations as opposed to fire could be due to the difference in the perceived effects of the two hazards, and to the fact that flooding is more of a responsibility of the administrative organizations than fire, which is viewed as the exclusive responsibility of the fire brigade.

Though traffic incidents are comparatively less reported hazards, their effect on the population appears, in fact, to be much higher than floods and fires. The human losses from

traffic incidents were reported in the New Scientist of Sept. 14, 1996, where Ethiopia stood first in the world in number of deaths per 10,000 vehicles per year. This may reflect the bad road conditions, as well as all the other reasons mentioned by the study respondents.

Traffic incidents were a major concern only for a small percentage of the community and administrative organizations, though according to the traffic police authority it caused many injuries, deaths, and loss of property. This could be due to lack of information as one fourth of the respondents do not have radio or Television. Besides, community exposure to the event seems to be rare as only 22% of those who said that car incidents are the most frequent hazard in their area reported that car incidents had affected their family members or property. This difference in perceptions between the community and the different organizations deserves to be looked into for possible action in the areas of public education and information.

Epidemics are one of the hazards mentioned both by the households and administrative organizations, but no record could be obtained from the Health Bureau. This may reflect poor health information system, lack of surveillance, and poor or unclear codes of recording and documentation in the health sector. Good health information systems or surveillance can help in the early detection of epidemics, and in the preparation for response by health institutions.

Although there are slight differences between the households and administrative organizations in the prioritization of the hazards, the knowledge on causes and prevention methods was similar. This can facilitate preparedness measures through dialogue and coordination between the community and the various organizations.

The average family size found in this study, six persons per household, is higher than the results of the 1994 census report which was five. The crowding index in the homes, the fact that one third of households have at least one under-five child, and that most houses require major repair are factors which increase the vulnerability to hazards such as building collapse and fire as these small children would not be able to help themselves.

The households with low average monthly family income i.e., less than 105 Birr, was about 25%, while 32% of the household heads were without jobs. This increases the vulnerability to all hazards since low income families are likely to live in poor housing with poor sanitary conditions. The absence of sanitary facilities and crowded houses increase greatly the risk of transmission for different diseases. Moreover, the households are more likely to be malnourished and with poor general health status.

Hospitals were found to be old, and needing major repairs of their walls, electrical system, and drainage systems. These institutions host many sick and disabled people, and staff, and these factors make them more vulnerable to all hazards. In addition, the absence of functional emergency exits makes evacuation and rescue more difficult.

Hazard prevention and preparedness at the community level appear to be at a rudimentary stage, though there is knowledge on the causes of the hazards that can occur. Although it is difficult to measure preparedness, some proxy measures like the absence of fire extinguishers and telephones, and poor road accessibility in most of the households indicate a lack of capacities for prevention and response. These factors are obviously related to the low socio-economic status and poor living standards.

At an organizational level, only the Region 14 Administration Office, the Foreign Relations and Development Bureau, and the Red Cross Society have a general preparedness plan. More efforts in this direction are needed at the Kebele and Zone levels.

The Fire Brigade and the Ethiopian Civil Aviation Authority have written preparedness plans which are tested, updated, and distributed to all responsible bodies. The hospitals have none. Respondents at all levels, claimed that they did not have sufficient capacity for appropriate response. For instance, the Fire Brigade reported shortage of trained man power, branch stations, modern trucks, and other logistics for fire fighting, in relation to the size and development of the City and surrounding areas.

The absence of preparedness plans for hazard prevention and for minimizing the extent of damage, at all levels, indicates that the attention given to disaster prevention and preparedness is minimal and that, in addition, inter-sectoral communication and dialogue are scarce.

Organizations, like hospitals, which are expected to serve victims in the event that a hazard strikes have neither a preparedness plan nor the capacity to handle mass casualties. They reported shortages of health professionals, drugs, and equipment. They also do not appear to keep contingency stocks for emergency use.

Strengths and weaknesses of the study

Strengths:

- First study of its kind.
- Studied both communities and institutions.
- Used fairly large sample size.
- Minimized selection bias by using probability sampling technique.
- Minimized observation bias through training and close supervision of the data collectors and use of multiple data collection tools.

Weaknesses:

- The use of a large number of questionnaires.
- Potential difficulties with recall.
- Lack of comparable studies.

Generalizability: The absence of similar studies for comparison, and the scarcity of relevant references may make generalizability difficult.

VII. CONCLUSIONS AND RECOMMENDATIONS

Conclusions:-

1. The hazards identified in this study were flood, fire, disease outbreaks, and traffic incidents. Earthquakes were also identified as a possibility in Addis Ababa.

2. The recorded effects of the identified hazards (flood, fire and traffic incidents) in the past five years (1992-1996) were 6,223 people injured, 1,478 deaths, 2,880 made homeless, and an estimated property loss of 138 million Birr. There appears to be a growing trend, over the past five years, in damage to property, as well as in injuries and deaths.

3. The main factors of human and structural vulnerability identified were: unemployment, Average monthly family income below the minimum government wage salary (105 Birr/month), illiteracy, crowding of houses, and difficult road access to most houses.

4. The capacity for preparedness:-

4.1. Awareness of causes and prevention methods:- The majority of the respondents were aware of the causes and prevention methods for the identified hazards; however, the prioritization of concerns did not correspond to the extent of damage that the different hazards caused to people and property.

4.2. Resource availability:- The majority of the organizations reported experiencing various shortages in the resources required for adequate response to emergencies.

4.3. Preparedness plans: Kebele, Wereda and Zone administrations, hospitals, the Flood Prevention Project of Addis Ababa, and a number of other agencies were found to have no written preparedness plans. The Region 14 Administration Office, the Foreign Relations Development and Cooperation Bureau, the Red Cross Society, the Ethiopian Civil Aviation Authority, and the Fire Brigade of Region 14 did have written preparedness plans; these plans may serve as examples to others who do not have written plans.

5. Overall, extensive efforts are needed on disaster prevention and emergency preparedness in the Region as the majority of the organizations interviewed did not appear to be aware of the importance of the issue.

Based on the above findings, the following recommendations are made:-

Recommendations:-

1. The responsible bodies, in collaboration with the community, government organizations, NGOs, and UN agencies need to design intervention programs to prevent the occurrence and/or minimize the extent of damage resulting from the identified hazards, particularly fires, traffic incidents and floods. Such programs may include: strong and regular traffic control; placement of road traffic signs in needed areas; strong reinforcement of laws; construction of flood protection walls along the rivers; etc.

2. The responsible authorities should assist all the organizations that do not have written preparedness plans to prepare such plans. In addition, assistance can be given to build the capacities of specific service organizations particularly the Fire Brigade, the Red Cross Society, the Flood Protection Project, and the Traffic Police in terms of human and material resources needed for response.

3. Extensive public education should be given, through mass media and other means, regarding the extent of damages caused by the hazards, the precautions to be taken to prevent such disasters, and the steps to be taken should these hazards occur.

4. The Region 14 Health Bureau should prepare and distribute a written preparedness plan to coordinate mass casualty management in all the hospitals in the Region. In addition, all hospitals in the Region should be required to prepare a written preparedness plan for handling mass casualties, and a plan for rescue and evacuation of patients and staff should hazards such as fires or building collapse occur.

5. The Region 14 Foreign Relations Development and Cooperation Bureau should take the full authority and responsibility as a centralized coordinating body of all disaster-related organizations and should cover all hazards that can occur in the Region.

6. Further study should be conducted on the relationship between the main factors of vulnerability and the identified hazards. In addition, a community-based study in rural areas should be carried out to identify hazards, vulnerability factors, and capacities for response; the results of such a study could be compared with the findings of this urban-based study.

7. The World Health Organization Representative in Ethiopia, in collaboration with the World Health Organization Panafrican Training Centre Addis Ababa (WHO/PTC), the Department of Community Health, AAU and the various responsible authorities in the Region, should organize workshops to sensitize and increase the awareness of disaster-related organizations on the issues of disaster prevention and emergency preparedness.

8. Training should be given and guidelines provided to the hospital authorities and the health professionals working in the Region regarding mass casualty management and how to prepare written preparedness plans for emergency response.

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IX. Appendices:- Questionnaires for the survey on the assessment of hazard, vulnerability and capacity for preparedness in Addis Ababa.

I. English version questionnaires

Appendix 1. Questionnaires For Households

GREETINGS:

Hello!

This study is being conducted to assess hazards, vulnerabilities and capacities for disaster prevention and preparedness of the community and organizations in Addis Ababa. The information you give us will be used only for the purpose of the study and confidentiality will be maintained. We kindly request you to participate in our study. Thank you.

Agreed _____

Not Agreed _____

1. Address: Zone ____ Wereda_____ Kebele_____ H.No._____

Name of interviewer_____ Sig._____

Date of interview _____

I.A. Socio-economic and demographic characteristics

1. Information about the respondent

1.1. Interviewee's relation to the head house hold:

1. head 2. husband 3. wife 4. son/daughter

5. other/specify/_____

1.2. Age: _____

1.3. Sex: 1. Male 2. Female

1.4. Occupation:

1. Government employee 2. Non government employee

3. Business (Private) 4. student 5. Retired

6. Unemployed 7. Other/specify/ _____

1.5. Educational status:

1. illiterate 2. able to read and write

3. 1-6 4. 7-8 5. 9-12 6. 12 +

1.6. Marital status: 1. Never married 2. Currently Married

3. Divorced/Separated 4. Widowed

2. Information about the family:

2.1. Number of family members by age and sex

	AGE	<5	5-14	15-64	>64	Total
SEX	MALE					
	FEMALE					
	TOTAL					

2.2. Average Monthly family income in Birr? _____

2.3. Is there a chronically bed ridden or physically disabled member in the family?

1. Yes, how many? _____ 2. No

Note: Question 3 will be filled only if the respondent is not the head of house hold.

3. Information about the Head of house hold.

3.1. Age: _____

3.2. Sex: 1. Male 2. Female

3.3. Occupation:

1. Government employee 2. Non government employee

3. Business (Private) 4. student 5. Retired

6. Unemployed 7. Other/specify/ _____

3.4. Educational status:

1. illiterate 2. able to read and write 3. 1-6 4. 7-8

5. 9-12 6. 12 +

3.5. Marital status 1. Never married 2. Currently Married

3. Divorced/separated 4. widowed

Part I.B. Information about the housing and living area.

4. What is the type of tenure of the house (ownership) 1. Owner occupied
   2. Rented from Kebele/public housing agency
   3. Rented from other organization 4. Rented from private owner
   5. Other/specify/ _____
5. How many rooms are there in the house? _____
6. What is the material used for construction of the roof?
   1. Corrugated iron sheet 2. concrete or cement with iron bars 3. Thatch
   4. wood and mud 5. other/specify/_____
7. What is the material used for construction of the wall
   1. wood and mud 2. bricks/stone and mud
   3. stone/brick and cement 4. bricks/stone, cement & Iron bars
   5. other/specify/ _____
8. What is the height of the building?
   1. Ground only 2. Ground + 1 3. Ground + 2
   4. Ground + 3 5. Ground+4 & above 6. other_____
9. How is the condition of the house
   1. recently built & needs no repair 2. needs minor repair
   3. heavily damaged & needs major repair
10. For what purpose is the house used? 1. Residence only
    2. Business only 3. Residence & Business 4. others/specify/ _____
11. What type of fuel is mostly used for cooking? 1. Electricity 2. Kerosene
12. What type of illumination do you have? 1. electricity 2. lantern lamp
    3. kerosene lamp 4. other/specify/_____
13. What is the Water supply
    i. Source? a. Tap private b. Tap common c. River or lake
    d. protected well/spring e. unprotected well/ spring
    ii. Distance? 1. < 5 min. walk 2. 5-10 min. walk
    3. 11-15 min. walk 4. >15 min. walk
    iii. Availability? 1. <1 bucket/day 2. 1-3 buckets/day
    3. 4-5 buckets/day 4. >5 buckets/day
14. What type of toilet facility do you have?
    1. flush toilet 2. pit private 3. pit communal 4. Non
15. What type of garbage disposal system do you use?
    1. Municipality truck 2. Pit 3. Non
16. Is there a radio or T.V. in your house? 1. Yes 2. No
17. Is there a telephone in the house? 1. Yes 2. No
18. If no to Q.17, is there a telephone accessible to you in the near-by area for use during emergency? 1. Yes 2. No

I.C. **Questionnaires on the most frequent and most worrying hazards their perceived causes and effects, prevention methods and precautions taken.**

19. What kind of hazards Have occurred in your area in the last five years?

1/ _____ 2/ _____ 3/ _____ 4/ _____

5/ _____ 6/ _____ 7/ _____ 8/ _____

20. Of these hazards which one occurred most frequent?_____

21. What were the main causes for the most frequent hazard to occur?

1._____ 2._____ 3. _____ 4. _____

22. Did this most frequent hazard cause any damage to you, your family or your property?

1. yes 2. No

23. Did this most frequent hazard caused any damage to people and property in your area?

1. yes 2. No

24. Could it have been possible to prevent the occurrence of this frequent hazard?

1. Yes 2. No

25. If yes to Q.24, how? 1. _____ 2. _____ 3. _____

26. If No to Q.24, why not? 1. _____ 2. _____ 3. _____

27. Could it have been possible to reduce the damage from this hazard?

1. Yes 2. No

28. If yes to Q.27, how? 1. _____ 2. _____ 3. _____

29. If No to Q.27, why not? 1. ____ 2. _____ 3. _____

30. What precautions did you take in your part to prevent the occurrence of this hazard?

1. _____ 2. _____ 3. _____

31. What precautions & preparedness did you make in your part to minimize the damage from this hazard?

1. _____ 2. _____ 3. _____

32. Did the community participate to minimize the damage from this frequent hazard?

1. Yes 2. No

33. If yes to Q.32, in what way did the community participate?

1. _____ 2. _____ 3. _____ 4. _____

34. If No to Q.32, why not? 1. _____ 2. _____ 3. _____

35. Did the responsible organizations participate to minimize the damage from this frequent hazard? 1. yes 2. No

36. If yes to Q.35, in what way was the participation? 1. _____

2. _____ 3. _____

37. If No to Q.35, why not? 1. _____ 2. _____ 3. _____

38. Which hazards do you think can occur any time in the future in your area? (If possible list in order of their likelihood)

1/ _____ 2/ _____ 3/ _____

4/ _____ 5/ _____ 6/ _____

39. What do you think the effects of these hazards could be?

1. kill people 2. injure people 3. destroy property

4. destroy infrastructures 5. Other _____

40. Which of the hazards that can occur in the future worries you most? _____

41. Why does it worry you most? 1. _____ 2. _____ 3. ____

42. What preparedness measures have you taken to in your part to prevent the occurrence of this worrying hazard? 1. _____ 2. _____ 3. _____

43. What preparedness measures have you taken to in your part to minimize the damage from this worrying hazard? 1. _____ 2. _____ 3. _____

44. What would you do if an emergency occur in your area?

1. _____ 2. _____ 3. _____ 4. _____

45. Do you have the telephone number of the following organizations to call during an emergency?

45.1/ Any Fire brigade station? a. Yes,_____ b. No

45.2/ Near-by Police station a. Yes,_____ b. No

45.3/ Ambulance service a. Yes,_____ b. No

45.4/ Your Kebele a. Yes,_____ b. No

46. What do you think will hinder any relief service to be efficient?

1. _____ 2. _____ 3. _____

4. _____ 5. _____

47. Do you have life or property insurance? 1. Yes 2. No

48. If no to Q.47, why not? 1. _____ 2. _____ 3. ____

I.D. General awareness questions on the common hazards seen in Addis Ababa.

49. What do you think the damage from a fire incident could be?

1. kill people 2. injure people 3. destroy property

4. destroy infrastructures 5. I don't know 6. Others _____

50. What do you think are the main causes of fire incident?

1. _____ 2. _____ 3. _____ 4. _____

51. Do you think the occurrence of fire incident can be minimized? 1. Yes 2. No

52. If yes to Q.51, how? 1. _____ 2. _____ 3. ____

53. If No to Q.51, why not? 1. _____ 2. _____ 3. ____

54. Do you think the damage from a fire incident can be minimized?

1. Yes 2. No

55. If yes to Q.54, how? 1. _____ 2. _____ 3. ____

56. If No to Q.54, why not? 1. _____ 2. _____ 3. _____

57. What precautions do you take to prevent the occurrence of fire incident at your home?

1. _____ 2. _____ 3. _____

58. What would you do if fire incident occur at your home?

1. _____ 2. _____ 3. _____ 4. _____

59. What would you do if fire incident occur in your near by area?

1. _____ 2. _____ 3. _____ 4. _____

60. Do you have a fire extinguisher at your home? 1. Yes 2. No

61. Do you think the fire brigade will respond quickly if you call them in case fire incident occur in your area? 1. yes 2.No

62. If yes to Q.61, why? 1. _____ 2. _____ 3. _____

63. If no to Q.61. why not? 1. _____ 2. _____ 3. _____

64. Is there a road for a fire extinguishing truck to reach your home and near-by areas?

1. yes 2. No

65. What do you think will hinder the fire brigade to control a fire incident before it causes large damage?

1. Late to be informed
2. Far distance
3. Lack of enough fire extinguishing trucks
4. lack of enough chemicals
5. Presence of crowded houses & lack of accessible road
6. Lack of enough water in the near-by area
7. Lack of enough trained man-power
8. Presence of flammable materials in the area
9. Others/specify/ _____

66. What do you think the damage from a flood incident can be?

1. injure people 2. kill people 3. destroy property 4. Other/specify/ ___

67. What do you think are the main causes of flood incident?

1. _____ 2. _____ 3. _____ 4. _____

68. Do you think the damage from a flood incident can be minimized? 1. Yes 2. No

69. If yes to Q. 68, how? 1. _____ 2. _____ 3. _____

70. If no to Q.68, why not?. 1. _____ 2. _____ 3. _____

71. I your area prone to flood hazard? 1. yes 2. No

72. If yes to Q.71, what do you think should be done to minimize the damage from flood hazard? 1. _____ 2. _____ 3. _____

73. Are there rivers which can cause flood hazard in your area? 1. yes 2. No

74. If yes to Q.73, what do you think should be done on the rivers to prevent flood hazard?

1. _____ 2. _____ 3. _____

I.E. **The following are observational questionnaires to be filled by the interviewer during the visit to the house holds.**

75. What is the material used for construction of the roof?

1. Corrugated iron sheet 2. concrete or cement with iron bars 3. Thatch

4. wood and mud 5. other/specify/_____

76. What is the material used for construction of the wall? 1. wood and mud

2. brick/stone and mud 3. stone/brick and cement

4. bricks/cement and Iron bars 5. other/specify/ _____

77. What is the height of the building?

1. Ground only 2. Ground + 1 3. Ground + 2

4. Ground + 3 5. Ground+4 & above 6. Other _____

78. How is the condition of the house

1. Recently built & need no repair 2. Needs minor repair

3. Heavily damaged & needs major repair

I.F. <u>Observational Questionnaires on the general view of the Kebele under survey</u>

(to be filled by the data collectors and supervisors together in consensus.)

1. The general topography of the Kebele: 1. Predominantly hilly

2. Predominantly plane 3. Partly hilly and Partly plane

2. The majority of the roads in the Kebele:

1. Type - 1. All weather road 2. Dry weather road

2. Wideness - 1. Wide 2. Narrow 3. Moderate

3. Status - 1. Good 2. Fair 3. Bad

4. Accessibility to majority of houses in the Kebele

1. Accessible to majority of the houses in the Kebele

2. Not accessible to majority of the houses in the Kebele

3. General traffic conditions of the area Kebele?

1. Very crowded 2. Moderately crowded 3. No traffic crowdedness

4. The houses of the Kebele in general:

4.1. Crowdedness of the majority of houses in the Kebele:

a. Very crowded b. Moderately crowded c. Not crowded

4.2. The type of the majority of houses in the Kebele

1. separately built villas 2. Apartment buildings

3. small houses in one compound 4. small houses in line

4.3. The majority of the houses are built from 1. wood & mad

2. stone & mad 3. stone/bricks & cement

4. others/specify/ _____

4.4. The general condition of the majority of houses

1. Recently built & need no repair
2. Need minor repair
3. Heavily damaged & need major repair

5. The majority of the houses in the Kebele are used for

1. Predominantly Commercial 2. Predominantly Residential
3. Partly Commercial & Partly Residential

6. Are there rivers in the Kebele:

1. Yes, how many?_____ 2. No

7. List the factories or small scale industries in the Kebele:

1. _____ 2. _____ 3. _____
4. _____ 5. _____ 6. _____

8. Are there regular garbage disposal areas or containers?

1. Yes, how many? _____ 2. No

9. Are there out of control open field defecation and garbage disposal areas:

1. Yes, how many?_____ 2. No

10. Are there major drainage systems in the area?

1. Yes, how many?_____ 2. No

Appendix 2. Questionnaires For Administrative Offices at different levels.

(Kebeles, Weredas, Zones and Region 14 Administration office)

II.A. Questionnaires common to all administrative organizations

1. What kind of hazards have occurred in your area in the last five years? (If possible list in their order of frequency)

   1/ _____ 2/ _____ 3/ _____

   4/ _____ 5/ _____ 6/ _____

2. Of these hazards which one occurred most frequent?_____

3. What were the main causes for this most frequent hazard to occur?

   1. _____ 2. _____ 3. _____ 4. _____

4. Did this most frequent hazard cause any damage to people and property in the area?

   1. yes 2. No

5. Could it have been possible to prevent the occurrence of this frequent hazard?

   1. Yes 2. No

6. If yes to Q.5, how? 1. _____ 2. _____ 3. _____

7. If No to Q.5, why not? 1. _____ 2. _____ 3. _____

8. Could it have been possible to prevent the occurrence of this hazard?

   1. Yes 2. No

9. If yes to Q.8, how? 1. _____ 2. _____ 3. _____

10. If No to Q.8, why not? 1. _____ 2. _____ 3. _____

21. What precautions & preparedness did you make in your part to prevent the occurrence of this hazard?

    1._____ 2. _____ 3. _____

11. What precautions & preparedness did you make in your part to minimize the extent of damage from this hazard? 1._____ 2. _____ 3._____

12. Which of the hazards which have occurred in your area in the past five years caused the highest damage? _____

13. Did the community participate to minimize the extent of damage from the hazards?1. Yes 2. No

14. If yes to Q.13, in what way did the community participate?

    1. _____ 2. _____

15. If No to Q.13, why not? 1. _____ 2. _____ 3. _____

16. Did the responsible organizations participate to minimize the extent of damage from the hazards? 1. yes 2. No

17. If yes to Q.16, in what way was the participation?

    1. _____ 2. _____ 3. _____ 4. _____

18. If No to Q.16, why not? 1. _____ 2. _____ 3. _____

19. Which hazards do you think can occur any time in the future in your area? (If possible list in order of their likelihood)

1/ _____ 2/ _____ 3/ _____

4/ _____ 5/ _____ 6/ _____

20. What do you think the effects of these hazards could be?

1. kill people 2. injure people 3. destroy property

4. destroy infrastructures 5. Other _____

21. Which of the hazards that can occur in the future worries you most? _____

22. Why does it worry you most? 1. _____ 2. _____ 3. _____

23. What preparedness measures have you taken in your part to prevent the occurrence of this worrying hazard? 1. _____ 2. _____ 3. _____

24. What preparedness measures have you taken in your part to minimize the extent of damage from this worrying hazard? 1. _____ 2. _____ 3. _____

25. What would you do if an emergency occur in your area?

1. _____ 2. _____ 3. _____ 4. _____

_____

26. Do you have the telephone number of the following organizations to call during an emergency?

26.1/ Any Fire brigade station? 1. Yes,_____ 2. No

26.2/ Near-by Police station 1. Yes,_____ 2. No

26.3/ Ambulance service 1. Yes,_____ 2. No

26.4/ others if any_____ 1. Yes,_____ 2. No

27. What do you think will hinder any relief service to be efficient during an emergency?

1. _____ 2 _____ 3. _____ 4. _____

28. Do you have a written preparedness plan for emergency response?

1. yes 2. No

29. If No to Q.28, why not? 1. _____ 2. _____ 3. _____

30. If yes to Q.28,

30.1. What does it include? _____

30.2. How many copies are there? _____

30.3. Who has the copies? _____

31. Do you know whom to communicate with for response if an emergency occur in your area? 1. yes 2. No

32. Do you have the means to collect and disseminate information regarding emergencies?

1. yes 2. No

33. If yes to Q.32, how? 1. _____ 2. _____ 3. _____

34. If No to Q.32, why not? 1. _____ 2. _____ 3. _____

35. Which areas are more prone to fire? _____

36. Which areas are more prone to flood? _____

37. Do you have the name and address of Red Cross volunteers in your area?

1. Yes 2. No

II.B. Specific questionnaires to each administrative organization.

II.B.1. Questionnaires for Kebele administrative offices.

1. The general topography of the Kebele: 1. Predominantly hilly
   2. Predominantly plane 3. Partly hilly and Partly plane
2. The majority of the roads in the Kebele:
   1. Type - a. All weather road b. Dry weather road
   2. Wideness - a. Wide b. Narrow c. Moderate
   3. Status - a. Good b. Fair c. Bad
   4. Accessibility to majority of houses in the Kebele
      1. Accessible to majority of the houses in the Kebele
      2. Not accessible to majority of the houses in the Kebele
3. General traffic conditions of the area Kebele?
   1. Very crowded 2. Moderately crowded 3. No traffic crowdedness
4. The houses of the Kebele in general:
   4.1. Crowdedness of the majority of houses in the Kebele:
      a. Very crowded b. Moderately crowded c. Not crowded
   4.2. The type of the majority of houses in the Kebele
      1. separately built villas 2. Apartment buildings
      3. small houses in one compound 4. small houses in line
   4.3. The majority of the houses are built from
      1. wood & mad 2. stone & mad 3. stone/bricks & cement
      4. others/specify/ _____
   4.4. The general condition of the majority of houses
      1. Recently built & need no repair 2. Need minor repair
      3. Heavily damaged & need major repair
5. The majority of the houses in the Kebele are used for
   1. Predominantly Commercial 2. Predominantly Residential
   3. Partly Commercial & Partly Residential
6. Are there rivers in the Kebele: 1. Yes, how many?_____ 2. No
7. List the factories or small scale industries in the Kebele:
   1. _____ 2. _____ 3. _____
   4. _____ 5. _____ 6. _____
8. Are there regular garbage disposal areas or containers?
   1. Yes, how many? _____ 2. No
9. Are there out of control open field defecation and garbage disposal areas:
   1. Yes, how many?_____ 2. No
10. Are there major drainage systems in the area?
    1. Yes, how many?_____ 2. No

II.B.2. Questionnaires for Region 14 Administration.

1. Is there an organized communication net-work among the responsible organizations in the region for emergency management? 1. Yes 2. No
2. If yes to Q.1, What does it look like? 1._____ 2. _____
3. If yes to Q.1, who has the mandated authority to coordinate emergency condition? ___
4. If No to Q.1, how will they organize their response to any emergency condition? ____
5. Are the following organizations evenly distributed in the town?
   - 5.1. Fire brigade 1. Yes 2. No
   - 5.1. Police stations 1. Yes 2. No
   - 5.3. Ambulance stations 1. Yes 2. No
6. If No to Q.5, does this have an influence on their efficiency? 1. yes 2. No
7. If yes to Q.6, 7.1. How does this affect? _____
   7.2. How do you think this can be improved? _____
8. Is there a written disaster prevention and preparedness policy at regional level?
   1. Yes 2. No
9. If No to Q.8, why not? _____
10. If yes to Q.8, which hazards are included? 1. _____ 2. _____ 3. _____
11. Is there a written disaster prevention directives at regional level? 1. Yes 2. No
12. Which hazards does the national disaster prevention and preparedness policy include?
    1. _____ 2._____ 3._____ 4._____
13. What measures did you take for disaster prevention regarding engineering and construction? 1. _____ 2._____ 3. _____
14. Do you have a checking and penalizing rules to make engineering and construction to comply with the standards? 1. Yes 2. No
15. If yes to Q.14, How? 1. _____ 2. _____ 3. _____
16. If No to Q.14, why not? 1. _____ 2. _____ 3. _____
17. Do you give education to the public to increase awareness about the importance of preparedness? 1. Yes 2. No
18. If yes to Q.17, how? 1. _____ 2. _____ 3. _____
19. If No to Q.17, why not? 1. _____ 2. _____ 3. _____
20. Do you have an early warning system for emergencies? 1. Yes 2. No
21. If yes to Q.20, to which hazards? 1. _____ 2. _____ 3. _____
22. If No to Q.20, why not? 1. _____ 2. _____ 3. _____
23. Did you integrate the plan of disaster prevention and emergency preparedness in the region's long-term development plan? 1. Yes 2. No
24. If No to Q.23, why not? 1. _____ 2. _____ 3. _____
25. How is the human and material resource capacity of the region for emergency response?
    1. _____ 2. _____
26. What are the main constraints of your office for emergency response? _____

Appendix 3. Questionnaires for specific service organizations

III/1. Questionnaires for the Foreign Relations and Development Cooperation Bureau (Same as Disaster Prevention and Preparedness Bureau)

A/ General Questions.

1. What kind of hazards have occurred in your area in the last five years? (If possible list in their order of frequency)

   1/ _____ 2/ _____ 3/ _____

   4/ _____ 5/ _____ 6/ _____

2. Of these hazards which one occurred most frequent? _____

3. What were the main causes for this most frequent hazard to occur?

   1._____ 2. _____ 3. _____ 4. _____

4. Did this most frequent hazard cause any damage to people and property in the area?1. yes 2. No

5. Could it have been possible to prevent the occurrence of this frequent hazard?

   1. Yes 2. No

6. If yes to Q.5, how? 1. _____ 2. _____ 3. _____

7. If No to Q.5, why not? 1. _____ 2. _____ 3. _____

8. Could it have been possible to prevent the occurrence of this hazard?

   1. yes 2. No

9. If yes to Q.8, how? 1. _____ 2. _____ 3. _____

10. If No to Q.8, why not? 1. ____ 2. _____ 3. _____

11. What precautions & preparedness did you make in your part to prevent the occurrence of this hazard? 1._____ 2. _____ 3. _____

12. What precautions & preparedness did you make in your part to minimize the extent of damage from this hazard? 1. _____ 2. _____ 3._____

13. Which of the hazards which have occurred in your area in the past five years caused the highest damage? _____

14. Did the community participate to minimize the extent of damage from the hazards?

   1. Yes 2. No

15. If yes to Q.13, in what way did the community participate?

   1. _____ 2. _____ 3. _____

16. If No to Q.13, why not? 1. _____ 2. _____ 3. _____

17. Did the responsible organizations participate to minimize the extent of damage from the hazards? 1. yes 2. No

18. If yes to Q.16, in what way was the participation?

   1. _____ 2. _____ 3. _____ 4. _____

19. If No to Q.16, why not? 1. _____ 2. _____ 3. _____

20. Which hazards do you think can occur any time in the future in your area? (If possible list in order of their likelihood)

1/ _____ 2/ _____ 3/ _____

4/ _____ 5/ _____ 6/ _____

21. What do you think the effects of these hazards could be?

1. kill people 2. injure people 3. destroy property

4. destroy infrastructures 5. Other _____

22. Which of the hazards that can occur in the future worries you most? _____

23. Why does it worry you most? 1. _____ 2. _____ 3. _____

23. What preparedness measures have you taken in your part to prevent the occurrence of this worrying hazard? 1. _____ 2. _____ 3. _____

24. What preparedness measures have you taken in your part to minimize the extent of damage from this worrying hazard? 1. _____ 2. _____ 3. _____

25. What would you do if an emergency occur in your area?

1. _____2. _____ 3. _____ 4. _____

26. Do you have the telephone number of the following organizations to call during an emergency?

26.1/ Any Fire brigade station? 1. Yes,_____ 2. No

26.2/ Near-by Police station 1. Yes,_____ 2. No

26.3/ Ambulance service 1. Yes,_____ 2. No

26.4/ others if any_____ 1. Yes,_____ 2. No

27. What do you think will hinder any relief service to be efficient during an emergency?

1. _____ 2. _____ 3. _____ 4. _____

28. Do you have a written preparedness plan for emergency response?

1. yes 2. No

29. If No to Q.28, why not? 1. _____ 2. _____ 3. _____

30. If yes to Q.28,

30.1. What does it include? _____

30.2. How many copies are there? _____

30.3. Who has the copies? _____

31. Do you know whom to communicate with for response if an emergency occur in your area? 1. yes 2. No

32. Do you have the means to collect and disseminate information regarding emergencies?

1. yes 2. no

33. If yes to Q.32, how? 1. _____ 2. _____ 3. _____

34. If No to Q.32, why not? 1. _____ 2. _____ 3. _____

35. Which areas are more prone to fire? _____

36. Which areas are more prone to flood? _____

37. Do you have the name and address of Red Cross volunteers in your area?

1. Yes 2. No

b) Specific Qs.

1. What is the role of your organization in disaster prevention and emergency preparedness?

   1. _____ 2. _____ 3. _____

2. For which hazards is your organization responsible?

   1._____ 2. _____ 3. _____

3. Do you have a written disaster prevention and emergency preparedness policy?

   1. Yes 2. No

4. If No to Q.3, why not? 1. _____ 2. _____ 3. _____

5. If yes to Q.3,

   5.1. Which hazards are included? 1. _____ 2. _____ 3. _____

   5.2. How many copies are there? _____

   5.3. Who has the copies? _____

6. Do you have a written disaster prevention and preparedness directives?

   1. Yes 2. No

7. Do you have a written preparedness plan for emergency management?

   1. Yes 2. No

8. If No to Q.7, why not? 1. _____ 2. _____ 3. _____

9. If yes to Q.7,

   9.1. Which hazards are included? 1. _____ 2. _____ 3. _____

   9.2. How many copies are there? _____

   9.3. Who has the copies? _____

10. Who has the mandated authority to coordinate an emergency situation? _____

11. Is there a responsible department/ section for each hazard? 1. Yes 2. No

12. Do you have an early warning for disaster prevention? 1. Yes 2. No

13. If yes to Q.12, to which hazards? 1. _____ 2. _____ 3. _____

14. If No to Q.13, why not? 1. _____ 2. _____ 3. _____

15. Do you give education to the public to increase awareness about the importance of preparedness? 1. Yes 2. No

16. If yes to Q.54, how? 1. _____ 2. _____ 3. _____

17. If No to Q.53, why not? 1. _____ 2. _____ 3. _____

18. What do you think should be the role of the health sector in emergency preparedness?

   1. _____ 2. _____ 3. _____

19. How is the human & material resource capacity of your office for emergency response?

   1._____ 2. _____ 3. _____

20. What are the main constraints of your office for emergency response?

   1. _____ 2. _____ 3. _____ 4. _____

21. Whom do you communicate within Region 14 Administration?

   1. _____ 2. _____ 3. _____

22. Do you have a communication net-work with the following organizations during an

emergency?

i. Fire brigade 1. Yes 2. No

ii. Police force 1. Yes 2. No

iii. Red Cross 1. Yes 2. No

iv. Traffic police 1. Yes 2. No

v. Others/specify/ _____

23. Do you have a communication net-work with NGOs & UN-Agencies for cooperation during emergency management? 1. Yes 2. No

24. If yes to Q.23, How? 1. _____ 2. _____ 3. _____

25. If No to Q.23, why not? 1. _____ 2. _____ 3. _____

26. Do you think the disaster prevention & emergency preparedness plan be integrated into the region's long-term development plan? 1. Yes 2. No

27. If yes to Q.26, how? 1. _____ 2. _____ 3. _____

28. If No to Q.26, why not? 1. _____ 2. _____ 3. _____

29. Have you decentralized authority and power to Zonal & Wereda offices?
1. Yes 2. No

30. If No to Q.68, why not? 1. _____ 2. _____ 3. _____

III/2. Questionnaires for Fire Brigade Station

1. Fill the following table with the records on fire incidents which have occurred in the past five years in Addis Ababa.

YEAR	Number of incidents	Number of people injured	Number of people died	Property lost in ETB
1984				
1985				
1986				
1987				
1988				
TOTAL				

2. Which areas /Kebele or Wereda/ were more frequently affected by fire incident?

_____

3. What are the main causes of fire incidents in A.A.?

1. _____ 2. _____ 3. _____ 4. _____

5. _____ 6. _____

4. What are the reasons which delay the efficient control of fire in A.A.?

1. _____ 2. _____ 3. _____ 4. _____

5. _____

5. Do you give information to the public on fire prevention? 1. Yes 2. No

6. If yes to Q.5, how? 1. _____ 2. _____ 3. _____

7. If no to Q.6, why not? 1. _____ 2. _____ 3. _____

8. Is it possible to prevent the occurrence of fire incidence?

1. Yes 2. No

9. If yes to Q.8, how? 1. _____ 2. _____ 3. _____

10. If no to Q.8, why not? 1. _____ 2. _____ 3. _____

11. What activities do you do to prevent fire incident in A.A.?

1. _____ 2. _____ 3. _____ 4. _____

12. Is it possible to prevent the extent of damage from fire incident?

1. Yes 2. No

13. If yes to Q.12, how? 1. _____ 2. _____ 3. _____

14. If no to Q.12, why not? 1. _____ 2. _____ 3. _____

15. Have you ever made an assessment of the areas to identify those which are more susceptible to fire?

1. Yes 2. No

16. If yes to Q.15, which Kebeles or Weredas are affected? _____

17. How many fire brigade stations are there in A.A.? _____

18. Are they evenly distributed in the town? 1. Yes 2.No

19. If no to Q.18, does this have any effect on the efficiency of the fire brigades?

1. Yes 2. No

20. If yes to Q.19, how can this be improved? 1. _____ 2. _____ 3. ____

21. Do you have a written preparedness plan for response to fire incident?

1. Yes 2. No

22. If yes to Q.21, what does it include? 1. _____ 2. _____

23. If No to Q.21, why not? 1. _____ 2. _____

24. List the methods you use for fire extinguishing purpose?

1. _____ 2. _____ 3. _____ 4. _____

5. _____ 6. _____

25. For which hazards is your organization responsible other than fire?

1. _____ 2. _____ 3. _____

4. _____ 5. _____

26. With which organizations does your organization have a net-working to control fire hazard?

1. Police force 1. Yes 2. No

2. Red Cross 1. Yes 2. No

3. Traffic police 1. Yes 2. No

4. others/specify/ _____

27. Do the different fire brigade stations in A.A. make communication for fire extinguishing activities? 1. Yes 2. No

28. How is the human and material capacity of your organization to control fire hazards?

1. How many fire extinguisher tucks?_____

2. How many fire extinguisher workers? _____

3. Other facilities _____

29. Are the fire extinguishing workers trained? 1. Yes 2. No

30. If yes to Q.29,

30.1. For how long? _____

30.2. For which hazards? 1._____ 2._____ 3. _____

31. If No to Q.29, why not? 1. _____ 2. _____ 3. _____

32. What are the major constraints of your organization to perform your duties?

1. _____ 2. _____ 3. _____

33. When does fire incident more frequently occur?

1. Day time 2. Night time 3. No difference

34. Does the time of occurrence of fire incident have an influence its control?

1. Yes 2. No

35. If yes to Q.34, how? 1. _____ 2. _____ 3. _____

III/3. Questionnaires for Traffic Police

1. What type of traffic incidents occurred frequently in the past five years in A.A.?

   1. _____ 2. _____ 3. _____

2. In which areas of A.A. did major traffic incidents occur in the last years?

   1. _____ 2. _____ 3. _____

   4. _____ 5. _____

3. Which of the traffic incidents which occurred in the last five years caused the highest damage? _____

   3.1. Property lost estimated in Birr: _____

   3.2. People died: _____

   3.3. People injured: _____

4. Fill in the following table which shows the traffic incidents which have occurred in the last five years and their effect on human & property?

YEAR	NUMBER OF INCIDENTS	PEOPLE INJURED	PEOPLE KILLED	PROPERTY LOST IN BIRR
1984				
1985				
1986				
1987				
1988				
TOTAL				

5. What are the main causes for major traffic incidents in A.A.?

   1. _____ 2. _____ 3. _____ 4. _____

6. What is organizations resource capacity?

   1. How many traffic police men do you have? _____

   2. How many radios for communication do you have? _____

   3. How many vehicles do you have? _____

   4. Other facility to prevent traffic accidents? _____

7. Do you have a net-working with other organizations like

1. Fire brigade	1. Yes	2. No
2. Red Cross	1. Yes	2. No
3. Hospitals	1. Yes	2. No
4. Civil Aviation	1. Yes	2. No

8. Does your office make data analyses on traffic incidents? 1. Yes 2. No

9. What have you done so far to reduce traffic incidents?

   1. _____ 2. _____ 3. _____ 4. _____

10. Do you have the means to call the ambulance service during mass casualty situation?

    1. Yes 2. No

11. If yes to Q.10, how? 1. _____ 2. _____ 3. _____

12. If No to Q.10, why not? 1. _____ 2. _____ 3. _____

13. Do you have the means to inform the hospitals to be ready should mass casualty occur? 1. Yes 2. No

14. If yes to Q.13, how? 1. _____ 2. _____ 3. _____

15. If No to Q.13, why not? 1. _____ 2. _____ 3. _____

16. Do you give education to the public on causes and ways to minimize traffic incidents? 1. Yes 2. No

17. If yes to Q.16, how? 1. _____ 2. _____ 3. _____

18. What is, in your view, the worst traffic incident which could happen in A.A.?

    _____

19. Should this happen what would you do? 1. _____ 2. _____

    3. _____

20. What can you do to prevent this hazard? 1. _____ 2. _____

    3. _____

21. What percentage of the traffic incidents which occurred in the past five years is due to drivers fault? _____

22. What are the main reason for the drivers fault?_____

III/4. Questionnaires for Meteorology Service Organization and Flood Prevention Project of Addis Ababa

1. Were there any flood occurrences in the past five years in A.A.?

   1. Yes 2. No

2. If yes to Q.1, fill in the following table with number of flood incidents & their effect on people & property?

YEAR	NUMBER OF INCIDENTS	NUMBER OF PEOPLE: INJURED	DIED	PROPERTY LOST IN ETB
1984				
1985				
1986				
1987				
1988				
TOTAL				

3. How many rivers are there in Addis Ababa? _____

4. Can this rivers cause flood hazard in Addis Ababa? 1. Yes 2 No

5. If yes to Q.4, what have you done to prevent flood hazard and its damage to people?

   1. _____ 2. _____ 3. _____

6. Which areas/Kebeles/Wereda/ do you think are more likely to be affected by flood incident in the future? _____

7. Can you predict or forecast flood hazard and give early warning system?

   1. Yes 2. No

8. If yes to Q.7, how do you transmit your early warning to the community and other responsible bodies to take precautionary measures?

   1. _____ 2. _____ 3. _____

9. How do you think the damage from flood hazard be minimized?

   1. _____ 2. _____ 3. _____

   4. _____

10. What measures have you taken so far to minimize the impact of flood hazard in A.A.?

    1. _____ 2. _____ 3. _____

11. Does the organization have a net-working with sectors like?

    1. Fire brigade 1. Yes 2. No

    2. Red Cross 1. Yes 2. No

    3. Police 1. Yes 2. No

III/5. Questionnaires for Red Cross Society of Addis Ababa

1. How many functional ambulances does the organization have? _____
2. How many trained first aid volunteers do you have? _____
3. Do you have a written preparedness plan to mobilize your ambulances at any time?

   1. Yes 2. No
4. Do you have a written preparedness to call the volunteers from their home for mass casualty response at any time? 1. Yes 2. No
5. If yes to Q.4, how? 1. _____ 2. _____

   3. _____
6. If No to Q.4, why not? 1. _____ 2. _____ 3. _____
7. For which hazards do you have a written preparedness plan?

   1. _____ 2. _____

   3. _____ 4. _____
8. How is your ambulance service stationed?

   1. stationed at one place 2. stationed in different places
9. If your answer to Q.8 is 1, does this have an effect on the efficiency to reach an emergency call? 1. Yes 2. No
10. If yes to Q.9, how can this be improved? 1. _____ 2. _____

    3. _____
11. How many Red Cross volunteers are there in A.A.? _____
12. How many ambulances can you mobilize for response to mass casualty which may occur at any time? _____
13. Does your organization have a communication network with other organizations like?

    1. Fire brigade: 1. Yes 2.No

    2. Police force: 1. Yes 2. No

    3. DPP bureau 1. Yes 2. No

    4. Kebeles or Weredas 1. Yes 2. No

    5. Hospitals 1.Yes 2. No
14. Do you have the name & address of your volunteers?

    1. Yes 2. No
15. Do you inform the name & address of the Red Cross volunteers to the following organizations?

    1. Fire brigade 1. Yes 2. No

    2. police 1. Yes 2. No

    3. Kebeles 1. Yes 2. No

    4. Hospitals 1. Yes 2. No

III/6. Questionnaires for Civil Aviation Authority Organization

1. Was there any plane crash incident in the past five years around A.A.?

   1. Yes 2. No

2. If yes to Q. 1,

   2.1. How many are they? _____

   2.2. What were the main causes of the incident?

   1. _____ 2. _____ 3. _____ 4. _____

   2.3. What was the property lost estimated in Birr _____

   2.4. People injured _____, People died _____

3. Do you have a written preparedness plan for emergency response to plane crash?

   1. Yes 2. No

4. IF No to Q.3, why not? 1. _____ 2. _____

5. If yes to Q.3, 1. how many copies are there?_____

   2. who has the copies?_____

6. If yes to Q.3, do you make a simulation test? 1. Yes 2 No

7. If yes to Q.6, how often do you make a simulation test? _____

8. If No to Q.6, why not? 1. _____ 2. _____ 3. _____

9. How many ambulances do you have? _____

10. How many fire extinguishing trucks do you have? _____

11. How many fire extinguishing workers do you have? _____

12. What precautions do you take to prevent plane crash hazards?

    1. _____ 2. _____ 3. _____ 4. _____

13. How will you respond should a plane crash incident occur in Addis Ababa?

    1. _____ 2. _____ 3. _____ 4. _____

    5. _____

14. Do have a communication net-work with the following organizations?

1. Hospitals	a. Yes	b. No
2. Fire brigade	a. Yes	b. No
3. Police force	a. Yes	b. No
4. Red cross	a. Yes	b. No
5. Ambulance	a. Yes	b. No

15. If yes to Q.14, how? 1. _____ 2. _____

    3. _____

16. If No to Q.14, why not? 1. _____ 2. _____ 3. _____

17. At which part of the flight time does plane crash incident more frequently occur?

    1. Take-off time 2. Landing time 3. Others /specify/ _____

18. Does this have an effect on the extent of damage & response

    to the incident? 1. Yes 2. No

19. If yes to Q.18, how? 1. _____ 2. _____ 3._____

20. How many flights do you serve on average per day? _____

III/7. Questionnaires for the Government Hospitals in A.A.

1. Have your hospital ever been affected by any hazard? 1. Yes 2. No

2. If yes to Q.1 :

   1. What kind of hazard? 1. fire 2. building collapse
   3. earthquake 4. other/specify/_____

   2. Property lost estimated in Birr? _____

   3. Number of people injured? _____

3. What kind of hazards do you think can occur in the hospital any time in the future?

   1. _____ 2. _____ 3. _____ 4. _____

4. Which one of these worries you most? _____

5. Why? _____

6. What do you think are the main causes of this hazard?

   1. _____ 2. _____ 3. _____ 4. _____

7. Does the hospital have a written preparedness plan for evacuation should these hazards occur in the hospital? 1. Yes 2. No

8. If yes to Q.7:

   8.1. How many copies are there? _____

   8.2. Who has them? _____

   8.3. Was simulation test done with the plan? 1. Yes 2. No

   8.4. Are there functional emergency exits in the hospital? 1. Yes 2 No

9. If No to Q.7,

   9.1. Why not? _____

   9.2. How will you respond should a hazard occur in the hospital? _____

10. Have the hospital ever faced an influx of mass casualty in the last five years?

    1. Yes 2. No

11. If yes to Q.10, what were the major problems encountered in the management of the mass casualties? 1._____ 2. _____ 3._____

12. Does the hospital have a written preparedness plan for mass casualty management? 1. Yes 2. No

13. If yes to Q.12:

    1. How many copies are there? _____

    2. Who has them? _____

    3. Have you made a simulation test? 1. Yes 2. No

14. If No to Q.12, how would you respond to mass casualty?

    1. _____ 2. _____ 3. _____ 4. _____

15. How many health workers can you mobilized when mass casualty occur?

    1. during day time _____ 2. night time _____

16. Do you think they are enough? 1. Yes 2. No

17. What will you do if they are not enough? 1. _____ 2. _____ 3. _

18. Do you have a system to call the staff from their home during non working hours when mass casualty situation? 1. Yes 2. No

19. If yes to Q.18, How? 1. _____ 2. _____ 3. _____

20. If No to Q.18, how will you manage a mass casualty situation?

1. _____ 2. _____ 3. _____

21. What is the role of your hospital in emergency situation?

1. _____ 2. _____ 3. _____ 4.

22. Who is the mandated authority to coordinate mass emergency?

1. During working hours: _____ 2. During non working hours: _____

23. Do you keep a contingency stock of drugs & materials to be used only for mass emergency? 1. Yes 2. No

24. If No to Q.23, what will you do when shortage occurs during mass emergency?

1. _____ 2. _____ 3. _____

25. Do you have a communication net-work with other hospitals in Addis Ababa for management of mass casualty together? 1. Yes 2. No

26. If yes to Q.25, how? _____

27. if No to Q.25, why not? _____

III/8. Questionnaires for Region 14 Health Bureau

1. What is the health coverage of Region 14? _____

2. What are the top ten causes of hospital morbidity of the past five years in region 14?

   1._____ 2. _____ 3._____ 4._____ 5._____ 6.___

   7._____ 8. _____ 9._____ 10._____

3. What are the top ten causes of hospital mortality of the Region in the past five years?

   1._____ 2. _____ 3._____ 4._____ 5._____

   6. _____ 7. _____ 8. _____ 9._____ 10. _____

4. What is the sanitation coverage of the Region? _____

5. What is the vaccination coverage of under 2's in A.A.?

   1. Of DPT? _____ 2. Of Measles _____

6. What epidemics have occurred in the past five years in A.A.?

   1. _____ 2. _____ 3. _____ 4. _____

7. Of these epidemics which one caused the highest:

   7.1. Morbidity? _____

   7.2. Mortality? _____

8. Which of the epidemics which can occur in the region any time in the future worries you most? _____

9. Why? 1. _____ 2. _____ 3._____

10. Do you have a written preparedness plan for epidemic management?

    1. Yes 2. No

11. If yes to Q.10:

    11.1. Which epidemics are included? 1. _____ 2._____

    3._____ 4._____

    11.2. How many copies are there? _____

    11.3. Who has them? _____

12. If No to Q.11,

    12.1. Why not? _____

    12.2. How would you manage if epidemics occur in A.A.? _____

13. Do you have an early warning system for disease epidemics?

    1. Yes 2. No

14. If yes to Q.13, to which disease epidemics do you have his?

    1. _____ 2._____ 3._____ 4. _____

    5._____ 6._____

15. If No to Q.13, why not? 1. _____ 2. _____ 3. _____

16. What health problems are commonly seen following a disaster in Region 14?

    1._____ 2._____ 3. _____ 4. _____

17. Did any hazard occur in any of the hospitals in the region in the past five years?

    1. Yes 2. No

18. If yes to Q.17, what kind of hazards?

    1. fire 2. building collapse 3. other _____

19. If No to Q.17, can this happen any time in the future? 1. Yes 2 No

20. If yes to Q.19, do you have a written preparedness plan for evacuation of patients and staff? 1. Yes 2. No

21. If No to Q.20, how will you manage if any hazard occur? _____

22. If yes to Q. 21,

    1. How many copies are there:_____

    2. Who has them: _____

    3. Have you made simulation test? 1. Yes 2. No

23. Do you have a written preparedness plan for mass casualty management in the hospitals?

    1. Yes 2. No

24. If yes to Q.23, 1. How many copies:_____

    2. Who has them? _____

    3. Have you made simulation test? 1. Yes 2. No

25. Do the hospitals in the Region have a communication net-work to handle mass casualties together? 1. Yes 2. No

26. Is there a referral system among the hospitals in the Region? 1. Yes 2 No

27. Do you keep a contingency stock of drugs and materials to support hospitals in A.A. during mass emergency situation? 1. Yes 2. No

28. Do you have a communication net-work with the following organizations?

    1. Fire brigade 1. Yes 2. No

    2. Red cross 1. Yes 2. No

    3. DPP bureau 1. Yes 2. No

    4. Police force 1. Yes 2. No

    5. Ambulance service 1. Yes 2. No

31. What is the role of the health sector on emergency preparedness?

    1. _____ 2. _____ 3. _____

DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in this or any other university and that all sources of materials used for this thesis have been duly acknowledged.

Name MULUGETA ABREHA

Signature  25/03/98

Place Addis Ababa

Date of submission _____

This thesis has been submitted for examination with our approval as University Advisors.

Berhanu Demeke, MD. _____