



Ministry of Health  
Department of Health Services  
Epidemiology & Disease Control Division

# HEALTH SECTOR EMERGENCY PREPAREDNESS & DISASTER RESPONSE PLAN NEPAL



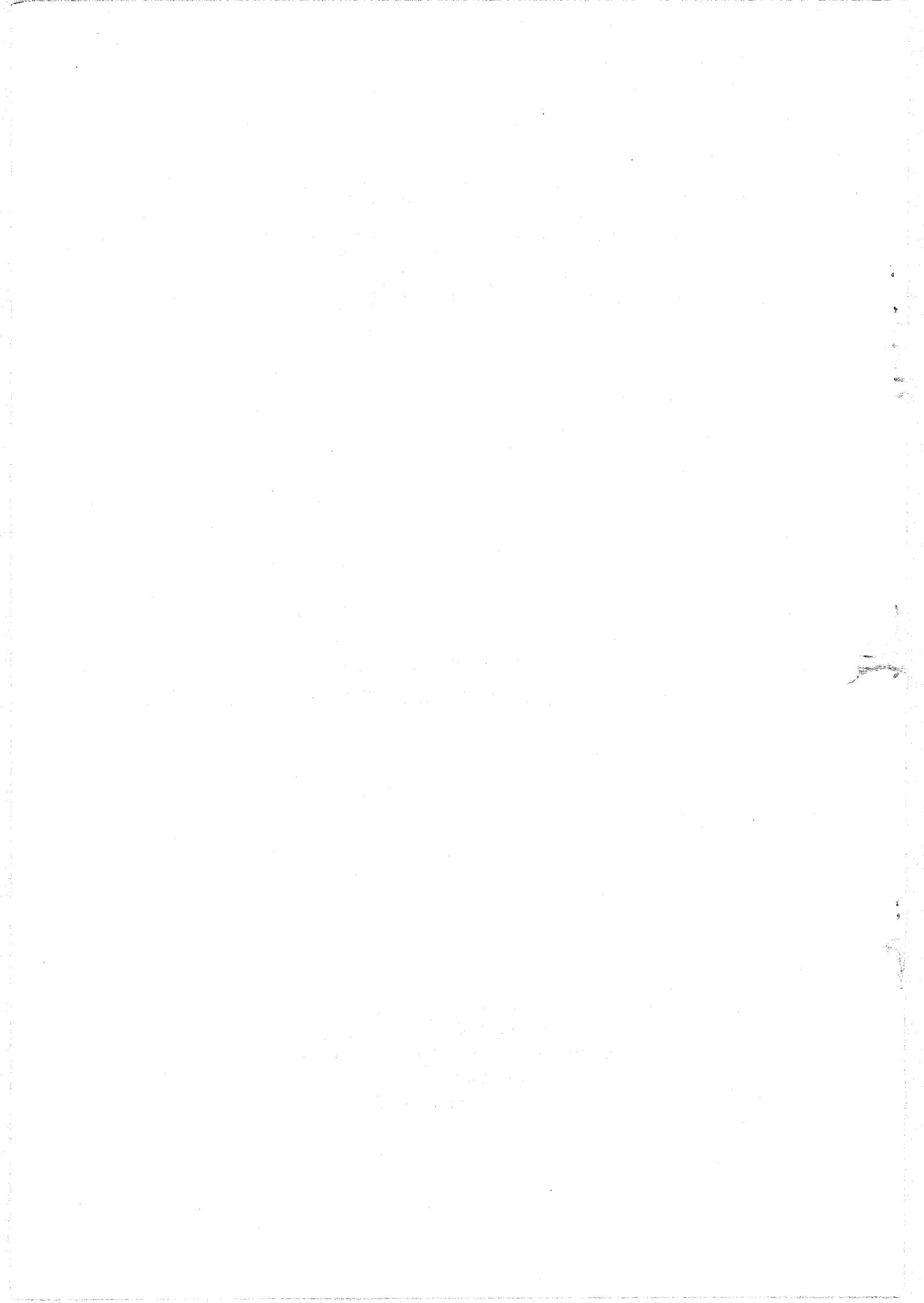
Disaster Analysis,  
Management Framework and Planning Guidelines

Kathmandu, Nepal  
September 2003

**HEALTH SECTOR  
EMERGENCY PREPAREDNESS  
& DISASTER RESPONSE PLAN NEPAL**

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## List of Abbreviations

CDRC	Central Disaster Relief Committee
DDRC	District Disaster Relief Committee
DHS	Department of Health Services
DHWG	Disaster Health Working Group
DP-Net	Disaster Preparedness Network
EDCD	Epidemiology & Disease Control Division
EHA	Emergency & Humanitarian Action Programme
FAWG	Food & Agriculture Working Group
GESI	Global Earthquake Safety Initiative
GTZ	German Technical Co-operation
ICRC	International Committee of the Red Cross
LWG	Logistics Working Group
MOH	Ministry of Health
MOHA	Ministry of Home Affairs
NGO	Non-government organisation
NSET	National Society for Earthquake Technology
NRCS	Nepal Red Cross Society
OFDA	Office of Foreign Disaster Assistance
PAHO	Pan American Health Organization
RADIUS	Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters
UN	United Nations
UNCHS	United Nations Centre for Human Settlements (Habitat)
UNCRD	United Nations Centre for Regional Development
UNDAC	United Nations Disaster Assessment and Co-ordination
UNDP	United Nations Development Programme
UNDMT	United Nations Disaster Management Team
UNSMT	United Nations Security Management Team
WFP	World Food Programme
WHO	World Health Organisation

The cover photo illustrates a mass casualty management mock drill in Bharatpur, June, 2003.



## Foreword

It is a pleasure for me to see the final version of the Health Sector Emergency Plan, which is a significant outcome of the collaborative and sustained efforts of the Ministry of Health, Department of Health Services, Epidemiology and Disease Control Division, the Disaster Health Working Group (DHWG) and WHO.


Since the DHWG was established at the end of year 2000, we have witnessed significant progress in the area of emergency preparedness and disaster management, particularly in the fields of emergency planning, mass casualty management, seismic assessments of hospitals and dissemination of best public health practices in emergencies.

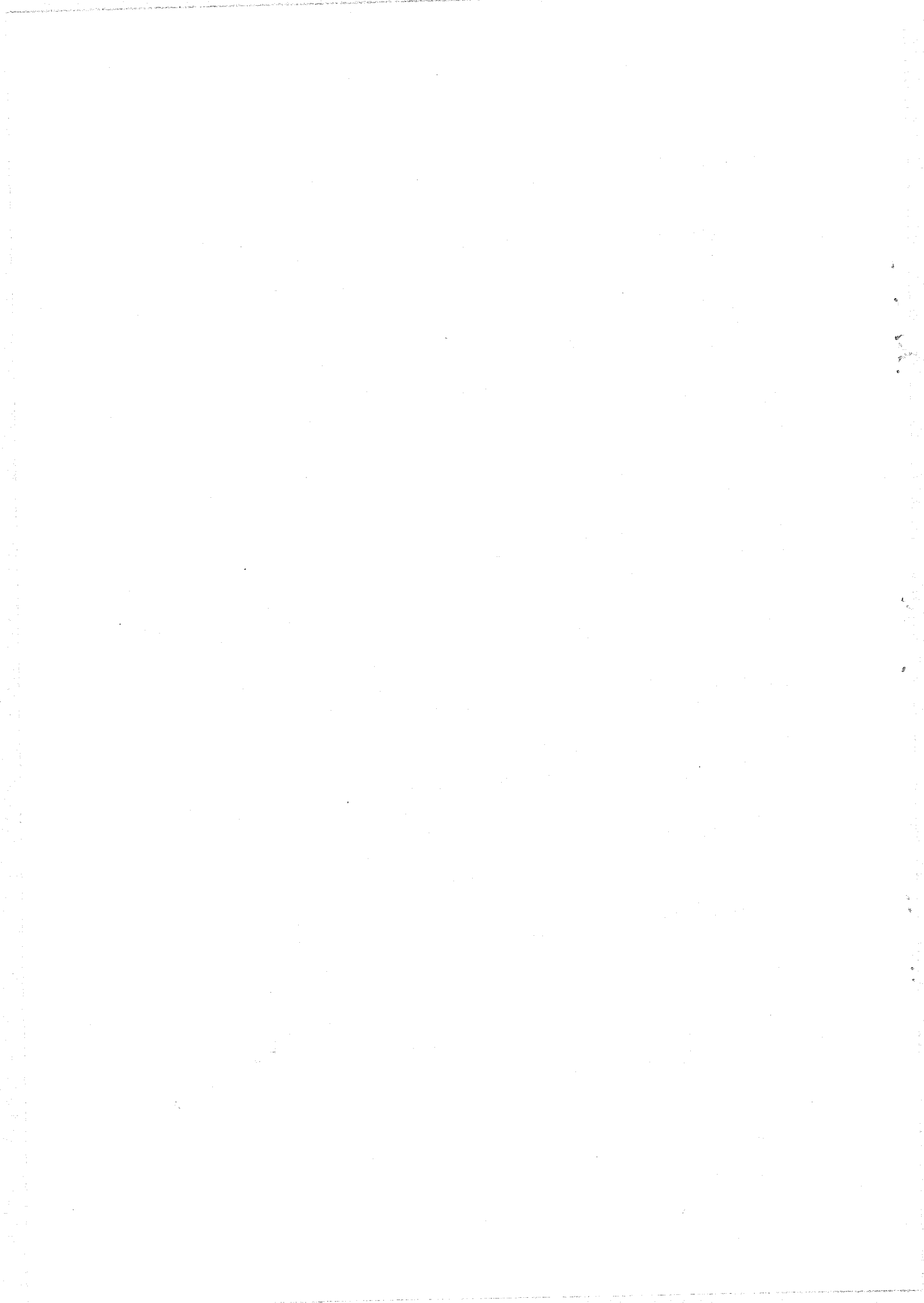
The inter-institutional collaboration of the seven key institutions in the DHWG Secretariat is especially commendable as a manifestation of joint Government, UN, NGO and donor commitment in the field of health sector emergency planning. Experiences from other countries indicate that such a collective approach is the only effective strategy to reduce the consequences of disasters and ensure response capacity.

The Health Sector Emergency Plan presents the various disaster scenarios that confront Nepal along with policy recommendations on how to respond to emergencies. However, it is worth remembering that analysing hazards, vulnerabilities and risks is only the first step in disaster management. In order to make the emergency plan operational, the national health authorities and supportive institutions must ensure follow-up activities that systematically enhance the operational capacity in the health sector.

I am confident that the Health Sector Emergency Plan will inspire other sectors and institutions / agencies to undertake similar exercises. Only a comprehensive and coherent system of emergency plans and procedures can provide guidance on how to use scarce resources in the optimal way and thereby ensure that human survival and well-being is assured in whatever emergencies develop.

I wish to assure our collaboration partners that WHO remains committed to coping with the immense challenge of disaster management in Nepal.

  
Dr Klaus Wagner  
WHO Representative to Nepal





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## Preface

In Nepal, recurring disasters such as epidemics, floods, landslides and earthquakes have claimed a substantial number of deaths, injuries and disability and caused a high level of physical destruction. This has always been a major concern of His Majesty's Government of Nepal - particularly the Ministry of Home Affairs and the Ministry of Health, which have acquired valuable knowledge on how to cope with emergencies through the years. This knowledge deserves to be recorded, analysed and utilised by emergency planners in- and outside the health sector, in order to strengthen our response capacity.

More than twenty years have passed since the national disaster management system was conceptualised in the Natural Calamity Act of 1982. Tragic disasters such as the stampede at the National Stadium in Kathmandu in 1988 and the severe floods in 1993 provided important stimulus to the health sector's emergency preparedness efforts. At the end of 2000, the Epidemiology & Disease Control Division of the Department of Health Services and the Emergency & Humanitarian Action Programme in the World Health Organisation decided to revitalise the Disaster Health Working Group. The objective was to strengthen the co-ordination within the health sector and to develop operational capacity to respond to disasters. This *Health Sector Emergency Preparedness and Disaster Response Plan Nepal*, prepared by committed emergency managers in the Disaster Health Working Group, is the most tangible result of the comprehensive planning process.

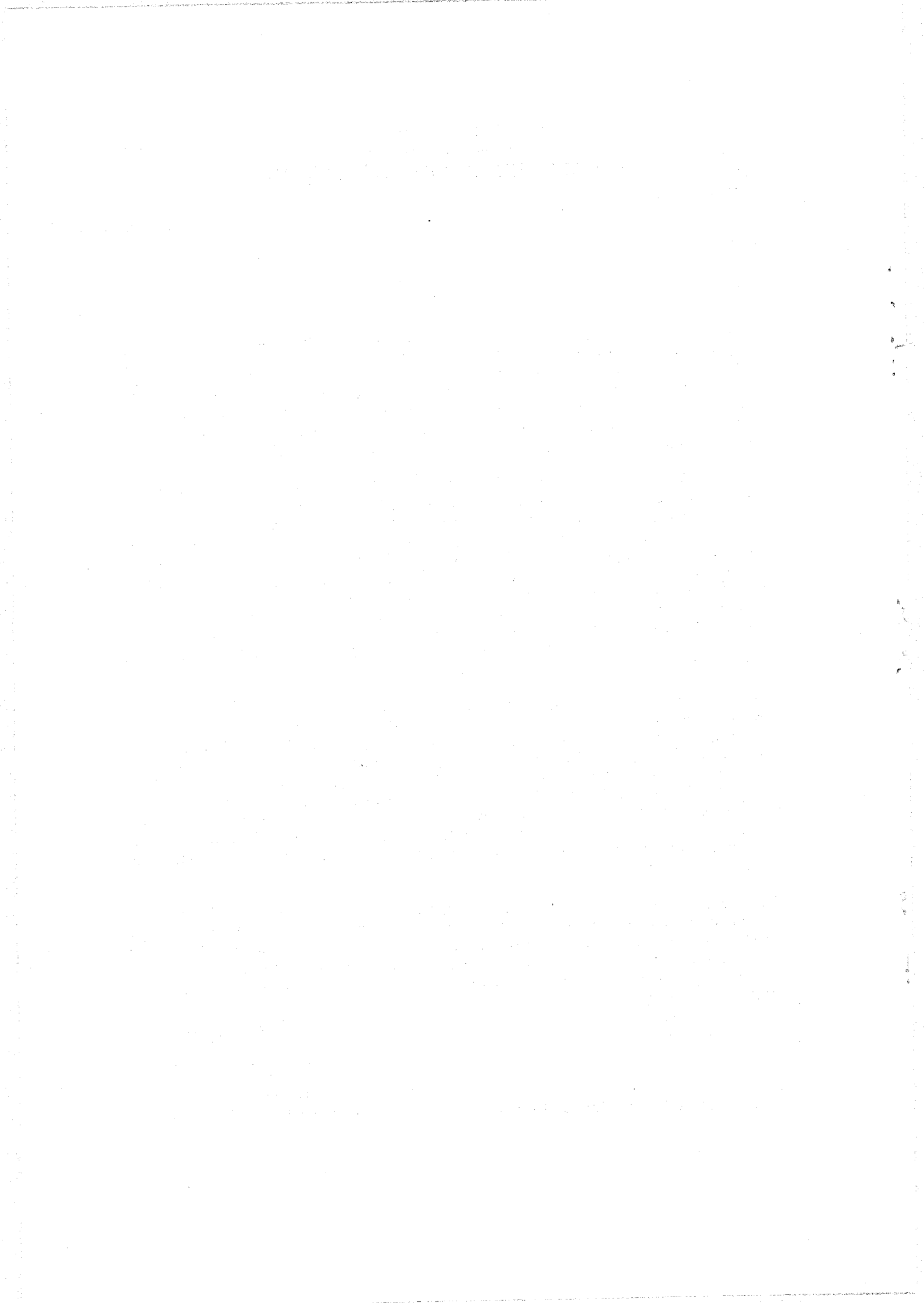
Since this plan is a pioneer undertaking in terms of the inter- and intra-sectoral collaboration and the ambitions of the whole exercise, it is bound to be a rolling document. It is our sincere hope that the *Health Sector Emergency Preparedness and Disaster Response Plan Nepal* will inspire others to develop their emergency preparedness and disaster response plans. This includes all the health centres and hospitals throughout the country, which are likely to be affected by disasters and expected to provide curative care. It also includes all Divisions of the Department of Health Services, which are likely to be involved in managing a public health response. Only a comprehensive and coherent system of emergency plans and procedures can ensure that Nepal develops standing readiness to confront major disasters.

The earthquake in Gujarat in India on 26 January 2001 was a tragic reminder of what could happen at any moment in Nepal. If anything positive can be said about such a major disaster, it would be that the catastrophic earthquake was a drastic wake-up call encouraging all of us to pay serious attention to emergency preparedness. It is our responsibility to ensure that this wake-up call will lead to tangible results in terms of emergency planning.

Dr. M. B. Bista  
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# Acknowledgements

In the process of formulating the *Health Sector Emergency Preparedness and Disaster Response Plan Nepal*, we received invaluable guidance and suggestions from several organisations and individuals. Without their comments, it would not have been possible to reach this far. We would particularly like to thank the United Nations Disaster Management Team in Nepal for providing the overall format and many of the key statements of this plan. Based on extensive field experiences, Dr. Luis Jorge Perez from the Pan American Health Organisation's Headquarters / World Health Organisation's Regional Office for the Americas in Washington D.C. has given us valuable input regarding the health aspects of disaster management. Several others were consulted during the process of finalising this document. We remain grateful for their suggestions. It should also be acknowledged that Ms. Helen Shipley and Mr. Erik Kjaergaard from the EHA programme in WHO Nepal edited the final manuscript based on previous drafts.

We would be failing our duty if we did not recognise the importance of certain publications, which provided us with significant inputs while drafting this emergency preparedness and disaster response plan. Particularly *UN Nepal's Disaster Response Preparedness Plan* (UN, Kathmandu, 2001) from which we adapted the text format, hazard analysis and response guideline to the requirements of the health sector. **We believe it is a significant achievement that more or less the same format, analysis and guideline are utilised within the UN system and within the health sector.** It facilitates the process of reaching a mutual understanding among the key players in disaster management and helps to identify gaps in the overall disaster management system. As for the health aspects of disaster management, *Humanitarian Assistance in Disaster Situations – A Guide for Effective Aid* (PAHO, Washington D.C. 1999) and *Natural Disasters – Protecting the Public's Health* (PAHO, Washington D.C. 2000) - as well as other PAHO-documents - have been an invaluable source of inspiration.

Comments and suggestions on how to improve this rolling document are highly appreciated by the following eight members of the Disaster Health Working Group Secretariat:



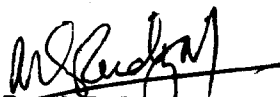
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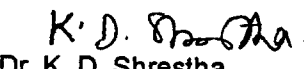
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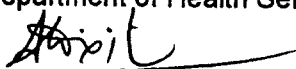
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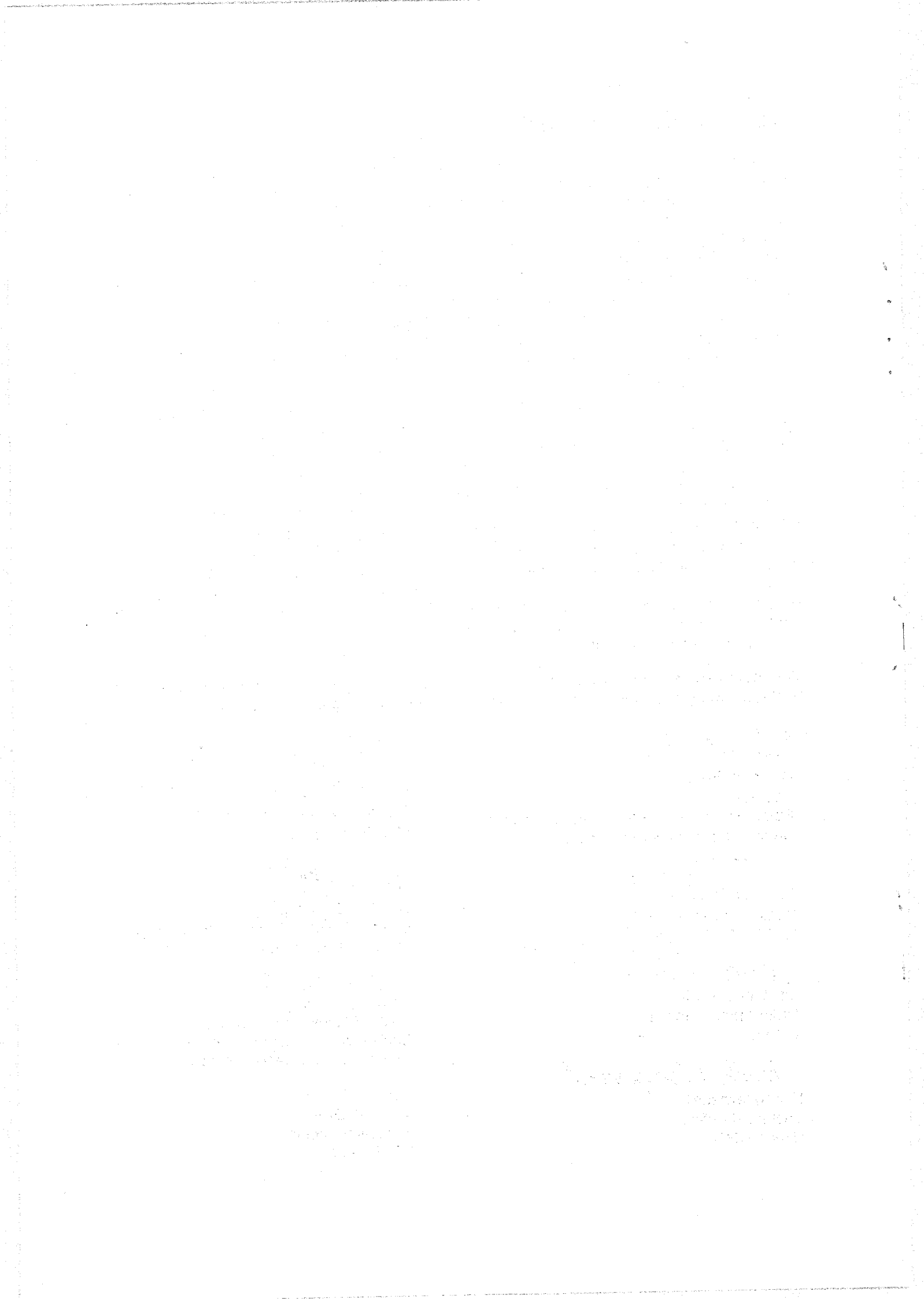
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# 1. Introduction

At the end of the year 2000, the Ministry of Health (MOH), Department of Health Services (DHS), Epidemiology & Disease Control Division (EDCD) and the Emergency & Humanitarian Action Programme (EHA) of the World Health Organization (WHO) in Nepal initiated a collaborative preparedness planning process to ensure that in the event of a major disaster - particularly a severe earthquake affecting the Kathmandu Valley – the health sector and its partners will be able to provide effective and timely assistance to the people in need. This initiative proves that His Majesty's Government of Nepal is committed to establishing and maintaining a level of readiness to respond to emergency situations.

The health sector's response to emergencies is not only expected to be effective and timely, but also coherent and co-ordinated. To this end, the drafting of contingency plans is a necessary prerequisite<sup>1</sup>. Recorded plans establish a disaster response starting point, which can seem elusive in times of crisis. Emergency preparedness requires: Defining anticipated hazards and elements at risk (which will need periodic update), agreeing on required actions (likewise needing update) and setting an action plan that incorporates collective and separate organisational efforts (which can change as institutions change and new institutions are formed). It is important to emphasise that **effective planning implies commitment, responsibility and accountability**.

“Effective planning implies commitment, responsibility and accountability”.

However, **preparedness also requires a commitment to an ongoing collaborative planning relationship, not just writing a plan**. It is thus not only the contents themselves that are important, but also the process represented. Recording plans helps to preserve decision making over time and over staff changes. They also help other agencies understand how the health sector will work together during emergencies. In addition, plans that may with good fortune not be required will provide invaluable guidelines for future preparedness efforts.

The present *Health Sector Emergency Preparedness and Disaster Response Plan Nepal* should be considered as a preliminary outcome of an on-going planning process among health agencies in Nepal. It reflects the initial efforts to ensure preparedness by attempting to establish a collaborative basis for standing readiness. Readiness includes at least **five basic elements: Staff safety, programme readiness, operations readiness, collaborative arrangements and capacity building**. These five elements are central features of this emergency preparedness and disaster response plan.

## 1.1 Objectives

The overall objective of the health sector's emergency preparedness and disaster response plan is to ensure that human survival and well-being – particularly the health needs of the most vulnerable groups - is assured in whatever emergencies develop.

**The most vulnerable groups are defined as children, pregnant and lactating mothers, the elderly, and poor people, who are threatened most.** In addition, sick, injured and

<sup>1</sup> Contingency planning is a forward planning process in which management systems are put in place in order to mitigate the impacts of disasters by better responding to emergencies.

disabled citizens deserve special attention. However, it is worth noting that emphasising the needs of the most vulnerable groups does not imply a neglect of other social strata of society, who have legitimate expectations to receive support from the health sector.

“The overall objective is to ensure that human survival and well-being – particularly the health needs of the most vulnerable groups - is assured in whatever emergencies develop”.

The specific objective of this emergency preparedness and disaster response plan is to enhance the capacity of the health sector in Nepal to provide humanitarian relief to the people in need in an effective and timely manner.

The proper planning and implementation of relief should consider and incorporate the concerns of related disaster mitigation programmes, as well as rehabilitation, reconstruction and development activities. **Disasters should not only be evaluated in terms of their immediate destructive effects but also in terms of their potential as windows of opportunity for future development.**

In line with the objectives of this plan, the focus is on health in emergencies. The Disaster Health Working Group (DHWG) is dependent on the overall co-ordination of the Ministry of Home Affairs (MOHA) and other line ministries as well as the support from the Logistics Working Group and the Food & Agriculture Working Group. Only a co-ordinated emergency preparedness and disaster management process that takes place between the health sector and other sectors can create an appropriate response capability.

## 1.2 Strategies

Since 2000, DHWG has been providing complementary support to disaster management activities in the health sector. Through the activities of the DHWG Secretariat, preparedness and mitigation of disasters have been emphasised. One of the main results is the development of this plan.

The planning strategy adopted by the DHWG Secretariat involves the development of an overview of disaster management needs, activities, and key players as well as the formulation and / or collation of inter-agency and agency-specific plans.

## 1.3 Focus

Many situations may be considered a disaster, from a plane crash involving a few casualties to a major flood involving multiple victims. Although the health sector strives to ensure the survival and well-being of people in all types of emergencies, **the primary focus of this document is on natural hazards in general and on earthquakes in particular.** This is mainly due to the anticipated high degree of hazards and their extensive human effects (as described in chapter 3). However, this focus does not imply a neglect of various types of man-made disasters.

Regarding scale, the emergency guidelines described in this plan will only come into action if the disaster is of such a magnitude that the usual programmes cannot deal with the affected population. This is typically the case if casualties are counted in three to five digit numbers.

## 1.4 Definitions

There is no unambiguous way to define key concepts in the field of emergency preparedness and disaster management. The health sector may therefore categorise situations as disasters which others would not and visa versa.

A disaster can be understood through the following formula:

$$\text{Disaster} = \frac{\text{Hazard} \times \text{Vulnerability}}{\text{Capacity}}$$

In which:

**Disaster** is a serious disruption of the functioning of a society, causing widespread human, material, or environmental losses, including loss of lives and deterioration of health and health services. This disruption is "on a scale sufficient to warrant an extraordinary response from outside the affected community or area" (WHO, 1995, 6).

**Hazard** is a trigger event. It is a rare or extreme natural or human event that threatens to adversely affect human life, property or activity to the extent of causing disaster.

**Vulnerability** reflects the level of disruption and loss a hazard can potentially cause in society.

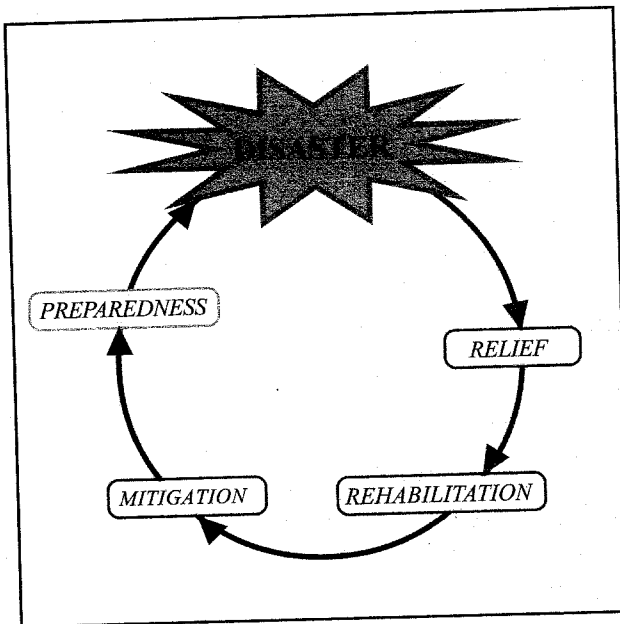
**Capacity** is the ability of humans to mitigate or cope with the combined effect of hazard and vulnerability.

The destructive potential of a disaster is aggravated when human and societal vulnerability is high and it is diminished when humans improve their capacity to mitigate or cope with disasters. **Natural disaster is a somewhat misleading concept, as nature usually adapts without great trauma to its own changes. It is the human interaction with natural hazards that creates or prevents disaster.** The inclusion of vulnerability and capacity in the above formula indicates that human factors are to a large extent responsible for the severity of a disaster.

In our interpretation, **emergency** is a closely related term with a stronger focus on human beings. It is an extraordinary situation where there are serious and immediate threats to human life as a result of disasters, imminent threats of disasters or cumulative processes of neglect, civil conflict, environmental degradation and extremely negative socio-economic conditions. **Declaring a situation or problem an emergency is a call to extraordinary action.**



Figure 1: Disaster Management Cycle



The health sector has found it useful to distinguish between **emergency preparedness** and **disaster response**. Whereas emergency preparedness focuses on various measures that must be taken or readied before a disaster happens, disaster response focuses on the response operation itself during and immediately after the occurrence of a disaster. The linkage between emergency preparedness and disaster response (relief) is illustrated by the Disaster Management Cycle in Figure 1.

Another helpful distinction is between **top-down** and **bottom-up planning approaches**. Our planning process has taken into account our vision of what the health sector ought to do (as defined by

policy-makers and disaster managers) and what the implementers (individual institutions and agencies) seem to assess themselves as capable of doing.

## 1.5 Two Disaster Response Approaches

The health sector plans its disaster response in two distinct ways according to the frequency and magnitude of the anticipated disasters:

1) **For frequent and somewhat manageable size emergencies** – of a scale that the agencies can respond to without international support – the health sector aims at responding through contingency plans and programmes regularly updated by the agencies themselves under supervision of DHWG. **It is thus necessary to incorporate emergency preparedness and disaster management as an integral part of the health sector's usual activities through a strategy of integration.** The health sector may also choose to reorient its programmes to incorporate mitigation and rehabilitation for this predictable scale of disaster.

2) **For infrequent and catastrophic size emergencies** – of a scale that is likely to greatly exceed the health agencies' usual disaster response mechanisms and necessitate international support – DHWG has developed this disaster response plan in collaboration with the health sector, His Majesty's Government of Nepal, UN, donors and NGOs. DHWG is committed to updating this document regularly. **Special contingency plans that incorporate the collaborative actions required with UN and neighbouring countries are needed as a supplement to this plan.**

## 1.6 Publications Supporting Planning

In addition to this emergency preparedness and disaster response plan, other publications have been developed or are currently under preparation by the health authorities and WHO. These publications include operational guidelines, response procedures and action plans for emergency planners in hospitals / health facilities and public health departments / offices.

Whereas this plan provides the overall disaster analysis, management framework and planning guidelines, the supporting publications focus on field level and institutional planning and preparedness. The entire health sector emergency planning exercise can draw on the following publications (including this plan):

<b>TITEL</b>	<b>SUMMARY</b>	<b>PRINTED</b>	<b>REVISION</b>
<b>Health Sector Emergency Preparedness &amp; Disaster Response Plan Nepal</b>	This plan presents analysis of major disasters and the response framework and guidelines for anticipated hazards, notably a great earthquake.	Draft printed in May 2001. First version printed in Aug. 2003.	Second version expected in 2004.
<b>Tools &amp; References - for Health Sector Emergency Planners and Disaster Responders in Nepal</b>	This compilation of tools and references presents best practises in curative care and public health related to disaster response.	Forthcoming.	First version expected in Dec. 2003.
<b>Guidelines on Emergency Preparedness &amp; Disaster Management for Hospitals</b>	These hospital guidelines provide simple recommendations on earthquake preparedness and response, emergency planning and mass casualty management.	First version printed in Feb. 2002.	Second version expected in 2004.
<b>Public Health Guidelines on Emergency Preparedness &amp; Disaster Management</b>	These public health guidelines provide operational guidance on how to prepare for and respond to disasters in accordance with international Sphere standards.	Forthcoming.	First version expected in Nov. 2003.
<b>Guidelines on Earthquake Safety for Health Facilities</b>	These guidelines provide technical guidance on how health facilities should prepare for earthquakes to ensure they remain functional.	Forthcoming.	First version expected in Dec. 2003.

DHWG recognises that a coherent and co-ordinated disaster response is obtained by initially giving priority to developing national and inter-agency emergency preparedness and disaster response plans. At a later point of time, separate agencies / institutions can draw on the resources and efforts from the national and inter-agency plans when designing or improving their own emergency preparedness and disaster response plans.

## 1.7 Future Needs

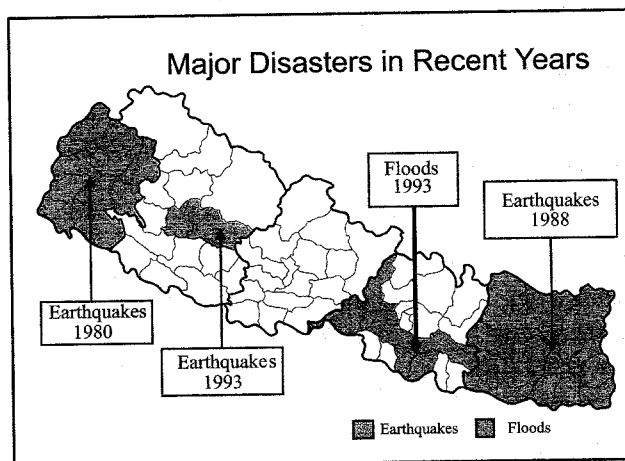
Co-ordinated and realistic planning is a prerequisite to a timely and effective response to a disaster. This plan alone does not guarantee such a response. It is vital that detailed plans are developed by all the major health institutions and agencies that are expected to participate in the health sector response operation. These plans must be tailored to the individual institution or agency but must also be integrated in a co-ordinated system.

## 2. Experienced Hazards and Human Effects

In order to be able to realistically assess anticipated hazards and their health effects, it is necessary to analyse the consequences of previous disasters during recent years.

### 2.1 Location of Recent Disasters

Figure 2: Location of Recent Disasters

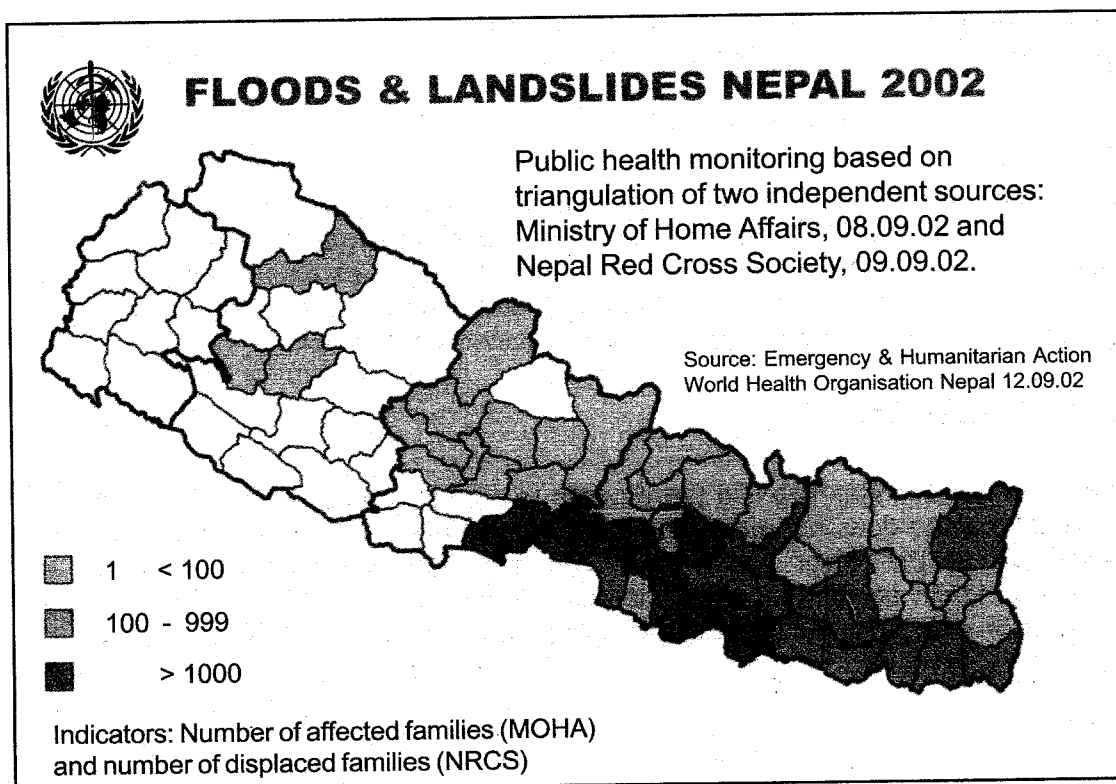


In the year 2000, WHO and EDCD prepared a sketch of the location of recent disasters. Figure 2 suggests that all parts of Nepal are prone to natural hazards and that they occur frequently.

The severe flood and landslides during the monsoon season of 2002 affected almost all districts of Nepal. To monitor public health priority districts, WHO developed monitoring maps based on triangulation of two independent sources: MOHA's number of affected families and Nepal Red Cross Society's (NRCS) number of displaced

families. Figure 3 shows that the Eastern parts and Terai area of the country were most severely affected by this particular disaster.

Figure 3: Flood and Landslides in 2002



## 2.2 Loss of Life in Recent Years

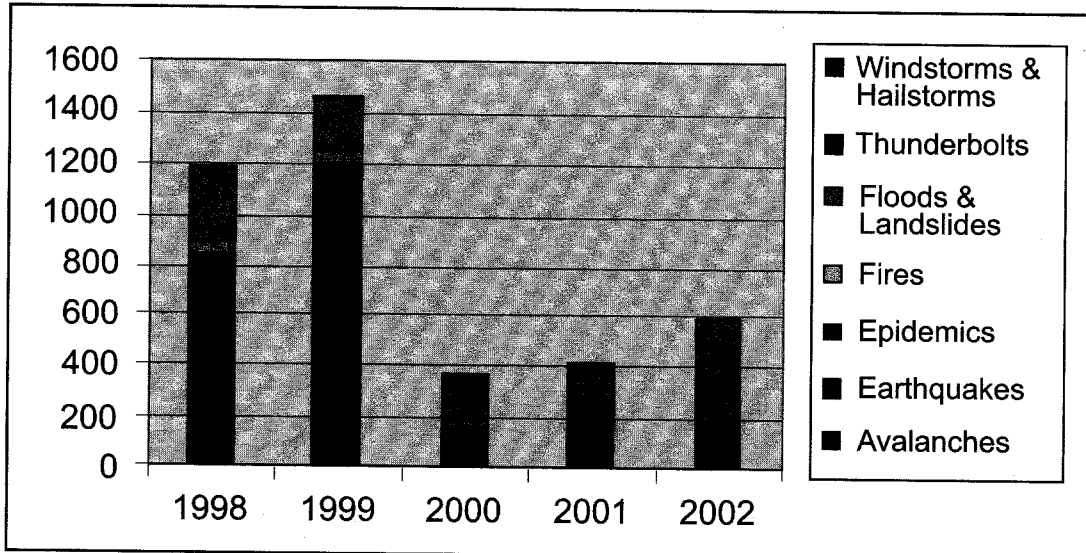
Figure 4 gives an overview of the loss of life in Nepal due to various natural hazards during the last five years. The categorisation and data originate from MOHA (epidemics statistics 2002 from EDCC) and represent the official disaster statistics. It is worth noticing that the mortality rates are the most reliable disaster statistics in Nepal as they originate from police reports.

Figure 4: Deaths due to Natural Hazards 1998 – 2002

HAZARD	1998	1999	2000	2001	2002
Avalanches	0	5	0	0	0
Fires	54	39	38	26	11
Floods and Landslides	273	193	173	196	441
Earthquakes	0	0	0	1	0
Thunderbolts	17	16	23	36	3
Windstorms and Hailstorms	6	6	3	2	3
Epidemics <sup>2</sup>	840	1,207	141	154	151
<b>TOTAL</b>	<b>1,190</b>	<b>1,466</b>	<b>378</b>	<b>415</b>	<b>609</b>

(Source: MOHA and EDCC)

Figure 5: Deaths due to Natural Hazards 1998 – 2002



(Source: WHO based on data from MOHA and EDCC)

Figure 5 shows that epidemics by far have claimed most lives followed by floods & landslides. Fires, thunderbolts and windstorms & hailstorms have also caused significant numbers of deaths, whereas the effects of avalanches and earthquakes have been negligible in recent statistics. Earthquakes, in particular, are characterized by a long return pattern, which diminishes the collective memory and, often, the imperativeness of preparedness.

<sup>2</sup> The current statistics on epidemics are field and not hospital based. It is unknown whether the drastic decline in number of deaths during 2000 and 2001 is caused by difficulties in collecting data or improved health status.

## 2.3 Affected Families in Recent Years

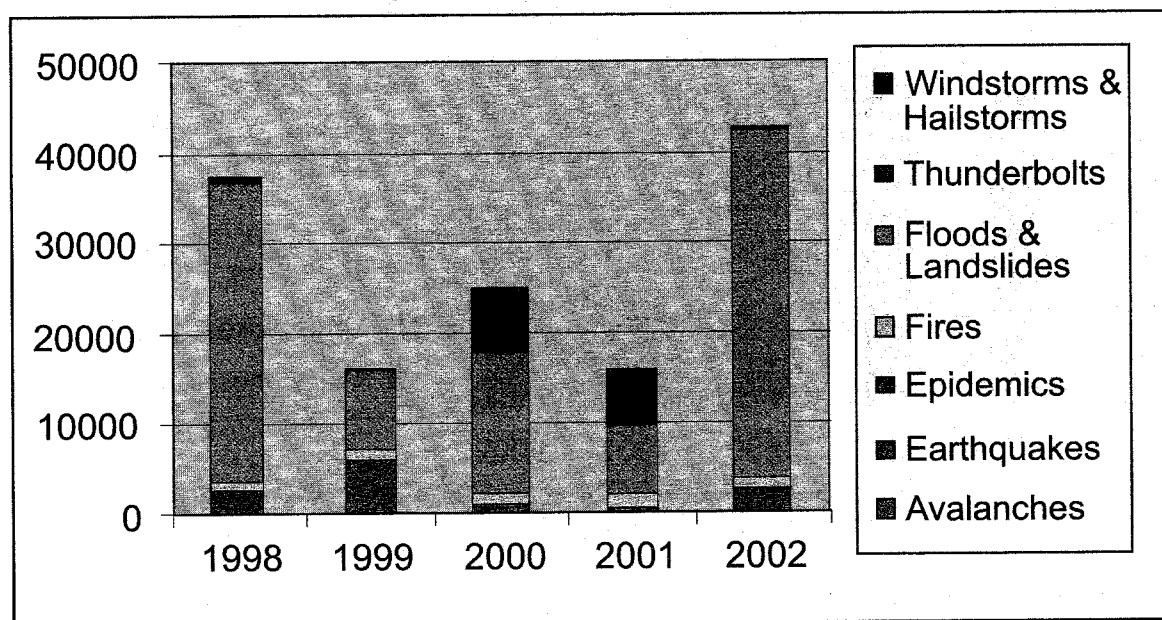
Figure 6 gives an overview of the number of affected families in Nepal due to various natural hazards in the period 1998-2002. The categorisation and data originate again from MOHA (epidemics statistics 2002 from EDCD). Although it remains unclear what the exact definition of an affected family is, the statistics indicate that innumerable families are suffering from disasters every year.

Figure 6: Affected Families due to Natural Hazards 1998-2002

HAZARD	1998	1999	2000	2001	2002
Avalanches	0	1	0	0	0
Fires	876	1,065	1,254	1,347	1,387
Floods and Landslides	33,541	8,925	15,617	7,901	38,859
Earthquakes	3	90	0	136	0
Thunderbolts	87	55	70	40	12
Windstorms and Hailstorms	172	293	7,224	6162	227
Epidemics	2,300	6,119	735	468	2645
<b>TOTAL</b>	<b>36,987</b>	<b>16,548</b>	<b>24,900</b>	<b>16,054</b>	<b>43,130</b>

(Source: MOHA and EDCD)

Figure 7: Affected Families due to Natural Hazards 1998-2002



(Source: WHO based on data from MOHA and EDCD)

Figure 7 shows that floods & landslides and windstorms & hailstorms have affected most families followed by epidemics and fires. Thunderbolts and avalanches have only affected a small number of families during recent years. The same is true for earthquakes with the exception of 2001, where quakes of moderate magnitude caused considerable damage.

## 2.4 Past Earthquakes

Regarding infrequent disasters such as earthquakes, recent disaster statistics are insufficient. Nepal has a long record of destructive earthquakes, which extends back to 1255 AD. According to historical evidence, Nepal has experienced nine major earthquakes during the last 700 years. Earthquakes during the 20<sup>th</sup> century claimed more than 11,000 lives. Most prominent among them was The Great Bihar Earthquake - which could equally well have been named The Great Kathmandu Earthquake - in 1934, measuring 8.3 or 8.4 on the Richter scale<sup>3</sup>. About 8,500 people lost their lives, thousands were wounded, 20% of the Valley's buildings were destroyed and 40% damaged, including a large number of temples and monuments. In 1988, an earthquake of magnitude 6.6 on the Richter scale hit Eastern Nepal with the epicentre in Udayapur. More than 700 people were killed, about 6,500 were injured, 22,000 houses collapsed and approximately 56,000 houses were damaged.

### Box 1: The Earthquake in Gujarat, India on 26 January 2001

The earthquake that struck Gujarat on 26 January 2001 may help us to get an overview of the anticipated consequences of a major earthquake in Nepal and the importance of increasing our preparedness.

The Gujarat earthquake was assessed at a magnitude of 7.7 on the Richter scale, with the epicentre located in a sparsely populated district. The magnitude of the disaster was so great that it will take time to develop a complete and comprehensive picture of the damage done. The official death toll by 1 June 2001 was 17,110 but up to 25,000 deaths may have occurred. More than 166,812 people were reported injured and more than one million houses were either destroyed or damaged. Approximately 16 million people were affected and there was an estimated loss of property equivalent to nearly 5 billion US dollars.

The effects of the earthquake were reduced by the excellent infrastructure (roads and airport) of Gujarat and the impressive first response to the emergency by the Indian Defence Services. The military hospital in Bhuj notably performed approximately 1,500 major surgeries and 7,000 minor surgeries in the first 48 hours post-disaster. The capacity to respond shown following this disaster must be replicated and built upon in Nepal.

<sup>3</sup> The strength of an earthquake can be measured by magnitude and intensity. Magnitude is a measure of the physical energy released by the earthquake epicentre and it is commonly measured on the open-ended logarithmic Richter scale. Intensity is the effect of an earthquake at a particular place on the earth's surface and it is commonly measured in the Modified Mercalli Intensity (MMI) Scale. MMI is assigned to particular places in the earthquake-affected area based on a field survey of the earthquake effects on the structure and contents of buildings, surrounding physical environment and human response.

### 3. Anticipated Hazards and Human Effects

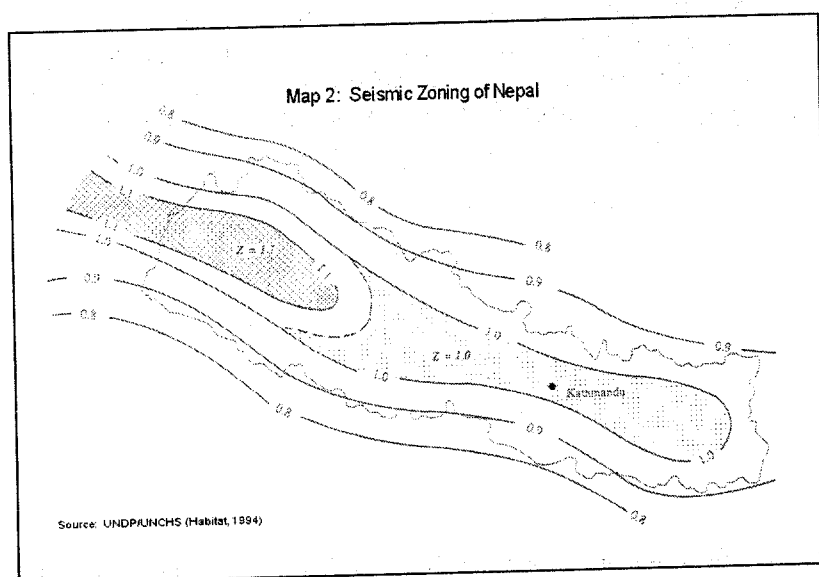
The previous chapter on regional disasters and hazard history shows that Nepal is a disaster prone country that is exposed to most types of natural hazards such as avalanches, earthquakes, epidemics, fires, floods, hailstorms, thunderbolts and windstorms. The data on Nepal and India reveals that **earthquakes and floods & landslides can produce severely negative effects**. Other types of disasters also deserve serious attention, not least epidemics and complex emergencies. This chapter discusses anticipated future hazards and their related human effects, which DHWG foresees as potential scenarios in the near future. Both chapters serve as a foundation for planning an appropriate disaster response.

#### 3.1 Earthquakes

Nepal is situated in the seismically active Himalayan mountain belt dominated by the northward movement of the Indian tectonic plate towards and below the Eurasian tectonic plate. Earthquakes are the process by which the earth responds to pent-up force from this subduction. Every year, more than a thousand earthquakes of various sizes ranging from 2 to 5 on the Richter scale occur in Nepal. Even this high number of earthquakes cannot, however, release the energy accumulated underground. According to many geologists only major earthquakes can compensate for the movements of the plates.

UNDP and UNCHS have produced a seismic risk map of Nepal based on geological data. The seismic zoning of the country is shown in Figure 8 where  $z = 1.1$  and  $1.0$  represent the highest earthquake risks. The map indicates that the middle part of the country is more exposed to earthquakes than the northern and southern parts. Likewise, the western and central parts of Nepal are more exposed than the far-eastern parts. Unfortunately, the middle and central part of the country consist of valleys where a large percentage of the population and vulnerable infrastructure is concentrated.

Figure 8: Seismic Risk in Nepal



(Source: UNDP & UNCHS).



The amount of damage is strongly influenced by the composition of the Earth's subsurface. The Kathmandu Valley is located in an old lake basin consisting of soft sediments such as clayey silt and sand. A larger part of the valley is said to be susceptible to liquefaction<sup>4</sup> because of the presence of fine sand and a high water table. Due to the basin geomorphological form, seismic waves are amplified and the level of earthquake destruction is likely to be increased.

As previously pointed out, the magnitude of disasters does not only relate to hazards but also to society's vulnerability and capacity to respond appropriately. The vulnerability in urban and rural areas differs because of variations in concentration of population, quantity and quality of constructions and availability of response options. The Kathmandu Valley and other city centres are particularly vulnerable to earthquakes due to population growth and density and prevailing poverty, which expose a high number of people to low quality and dangerous construction. Lack of proper urban planning, insufficient enforcement of building codes and poorly constructed and maintained structures further increase the destructive potential of hazards. **It is worth remembering that it is not earthquakes themselves that injure people but collapsing structures.** Insufficient emergency response capability and lack of emergency medical care facilities further aggravate the consequences of earthquakes.

### Box 2: The Global Earthquake Safety Initiative and Kathmandu's Relative Earthquake Vulnerability

The Global Earthquake Safety Initiative (GESI) organised by GeoHazards International and UNCRD focuses on helping cities around the world recognise and reduce their risk of life-loss in earthquakes. This initiative builds on the work of the RADIUS initiative, and is targeted to decision-makers and disaster managers in earthquake threatened cities world-wide.

The study undertaken demonstrates that **urban earthquake risk is greatest and most rapidly growing in developing countries** and that the portion of the world's expenditure on earthquake research aimed at the needs of developing countries remains small. While the mortality rate from earthquakes in developed countries has significantly decreased over the last century, the mortality rate in developing countries has remained high.

Data has been collected for 21 vulnerable cities around the world - including Kathmandu - on a wide range of topics affecting life-loss in earthquakes. The results suggest that **Kathmandu has the lowest performance among all 21 major cities.** It does not only possess the highest risk of casualties in absolute terms but also the highest per capita risk.

The risk of mortality from damaged or collapsed buildings in Kathmandu is extremely high. The evaluation of fire fighting preparedness, medical care preparedness and general preparedness reveals a very low disaster response capability. The study suggests that **the best mitigation options in Kathmandu are to increase the quality of buildings, improve medical preparedness and strengthen the level of emergency preparedness.**

(Source: GESI, 2001)

<sup>4</sup> Liquefaction is a process in which water-saturated soil changes from a firm substance to a semi-liquid material when shaken and thereby loses its ability to support structures.



### 3.1.1 The Earthquake Scenario

The seismic record of the country seems to suggest that earthquakes of the 1934-magnitude occur approximately every 75 years. Even though this is only a statistical estimate, no one questions that major earthquakes are an unavoidable part of Nepal's future. Many experts believe a major earthquake is bound to happen in the near future, especially in consideration of the recent seismic activity in the region.

Among all disaster scenarios in Nepal, none is as frightening as the prospect of a major earthquake affecting the Kathmandu Valley. Due to the collaborative efforts of the National Society for Earthquake Technology (NSET) and GeoHazards International, a thorough description of this scenario has been publicly available during the last few years. As it remains the best description of the anticipated consequences, DHWG has adopted it in its contingency planning process. It is nevertheless appropriate to offer a word of warning: No scenario can exactly predict the nature and level of devastation caused by an earthquake.

#### Box 3: The Kathmandu Valley Earthquake Scenario

The Kathmandu Valley Earthquake Risk Management Project has estimated what would happen if the shaking of The Great Bihar Earthquake was repeated in the Kathmandu Valley at this point in time. Even though the next great earthquake is unlikely to have the same magnitude and location as the 1934-event, it is reasonable to assume that the shaking pattern will not differ radically due to the soft subsurface of the valley.

A frightening estimate indicates approximately 40,000 deaths and 95,000 injured. At the same time, more than 60% of the existing buildings would be destroyed, many beyond repair, leaving 600,000 to 900,000 residents homeless. In Bhaktapur alone, more than 75% of the housing stock would be heavily damaged. Moreover, 95% of the water pipes and 50% of the pumping stations, treatment plants etc. could be seriously affected, hampering water supplies for several months. Furthermore, almost all telephone exchange buildings and 60% of the telephone lines are likely to remain defunct for at least one month, as well as approximately 40% of the electric lines and all electricity substations. In addition, it is estimated that almost half of the bridges and many narrow roads in the valley could be impassable due to damage or debris. Although liquefaction susceptibility is very low around Tribhuvan International Airport, it is likely to be isolated due to destroyed bridges and roads in the proximity. One serious consequence may be that the arrival of international relief teams and assistance by air will be delayed and complicated due to collapsed structures.

(Source: NSET, 1999)

The earthquake that struck Gujarat, India on 26 January 2001 confirms that the above estimates are not frivolous. **Rather than sensationalism, the predicted disaster statistics could be on the conservative side.** Furthermore, the above scenario does not address the likely long-term consequences of a great earthquake, which are likely to hamper the development of the country.

### 3.2 Floods and Landslides

The topographical setting of Nepal contributes substantially to the risk of disasters. Most of the country is covered by steep and fragile mountainous terrain that provokes or amplifies specific hazards. Prominent among them are high altitude hazards like glacial lake outburst

floods, avalanches and hailstorms and mid- and low altitude hazards like landslides and floods. The excessive accumulation or flow of water is often the result of monsoon clouds that bring torrential rainfall to the southern slopes of the Himalayas. The combination of the topography and weather conditions makes many parts of the country inaccessible during winter and the rainy season. **This situation easily creates logistical problems in terms of accessing potential disaster sites in marginal areas.**

**Floods and landslides are the most regularly occurring and most threatening water-induced hazards in Nepal.** Light floods and local landslides occur annually and are part of life in the Terai and the Mid Hills. Landslides frequently dam rivers the breaching of which creates massive surges downstream. During the last decade, severe floods affected the country in 1993 and 2002. The cumulative effect of floods and landslides is higher than from any other disaster as it directly affects the majority of the population and agricultural production in the so-called grain basket of the country.

### 3.3 Epidemics

Epidemics are issues of major public health concern in Nepal<sup>5</sup>. The transmission routes relate to contaminated water and food, person-to-person contact and various types of vectors. Commonly seen epidemics are diarrhoeal diseases such as cholera, dysentery, salmonellosis<sup>6</sup>. Acute respiratory infections and vector-borne diseases like Japanese encephalitis and malaria (mainly the fatal plasmodium falciparum) also claim many lives every year. Expanded programmes of immunisation could limit epidemics of vaccine preventable diseases and it is already in place in the health system. Chronic diseases like Kala-azar (visceral leishmaniasis) and tuberculosis do need attention. Emergency preparedness and a stronger epidemiological surveillance and rapid response system would further help to confine the outbreaks. **Until concerted efforts for controlling epidemics are properly institutionalised and fully implemented, emergency preparedness must be maintained.**

During the last 14 years (1988 - 2001), official statistics revealed that at least 9,000 people lost their lives due to various types of epidemics. The seasonal trend is that most outbreaks occur from March to October and peak in the rainy season from June to September. The number of casualties has shown a tendency to increase during this period. Mortality and morbidity from diseases with epidemic potential are likely to continue to rise in the near future due to increasing population density combined with lack of safe drinking water, sanitation facilities and basic health education.

### 3.4 Fires

Fire poses a serious threat to many areas of Nepal, especially the Terai. In areas of high population density what starts as a small kitchen fire can quickly spread and become a major disaster for the local area. The immediate human effects include deaths and injuries, especially burns, damage to property and possessions, disruption of lifeline systems and loss of valuable documents. In the longer term shortage of supplies and lack of adequate shelter can pose severe problems.

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<sup>5</sup> An epidemic means the occurrence of more cases of a particular disease than expected in a given area among a specific group of people over a particular period of time.

<sup>6</sup> Simple acute diarrhoeal diseases and poverty can be defined as so-called *silent* disasters that claim a high number of deaths annually. However, *silent* disasters should not be considered as emergencies but rather as basic development challenges.

### 3.5 Conflict Situations

Mass casualty influx by conflict situations of both intentional and non-intentional nature are increasing due to rapid changes in political, social and economic scenarios in the country and region. Time and again, conflict situations have become a regular phenomenon. War or war-like situations are the worst-case scenario in this category. Other complex mass casualty incidences can be caused by mob dispersal methods like lathi charge, tear gas, rubber bullets and water jet used during riots.

### 3.6 Prioritisation of Anticipated Hazards

Even though floods & landslides and epidemics are the most regularly occurring disasters in Nepal, they do usually not require special contingency plans from DHWG. Light floods and local landslides have only limited humanitarian implications that usually are met by local or national authorities. However, a catastrophic flood similar to the one in 1993 can cause massive displacement of people and pose severe health threats due to the disruption of water supplies and lack of sanitation facilities. Even though epidemics have substantial humanitarian implications, EDCD has - as part of their public health programmes - developed ad-hoc procedures for tackling various outbreaks. The situation is more critical regarding complex emergencies and, especially, earthquakes.

Figure 9 summarises how DHWG evaluates the anticipated disasters in the near future. For each hazard, it analyses the potential scale, the likelihood of occurrence, the possibilities of early warning and the human effects of a related disaster. The likelihood of occurrence in the near future is rated by the following criteria: 5 suggests that the disaster is very likely to happen, 4 suggests that it is likely to happen, 3 suggests that it may happen, 2 suggest that it can happen, and 1 suggests that it is unlikely to occur.

Figure 9: Anticipated Disasters in the Near Future

HAZARD	POTENTIAL SCALE	LIKELIHOOD	EARLY WARNING?	POTENTIAL HUMAN EFFECTS
Earthquakes	Small to large	4-5	No	Up to 40,000 deaths, 95,000 injured and 600,000-900,000 homeless.
Conflict Situations	Small to large	4-5	Yes	Up to 10,000 deaths and 100,000 homeless.
Major Epidemics	Small to medium	3	Yes	Up to 5,000 deaths.
Floods and Landslides	Small to medium	4-5	Yes	Up to 1,000 deaths a and 10,000-20,000 homeless.
Fires	Small to medium	4-5	No	Up to 500 deaths and 5,000 homeless.

## 4. Health Effects of Hazards

Every disaster has serious implications for health. Apart from social reactions and population displacement, the most common health problems experienced in disasters are disruption or loss of water supply and sanitation, food and nutrition, climate exposure, risk of epidemics, mental ill-health and damage to health infrastructure. The analysis of previous and anticipated hazards indicates that it is particularly **important for the health sector to be prepared to cope with the health-related consequences of earthquakes, floods & landslides, epidemics, conflict situations and fires**. Since DHWG foresees that these hazards could develop into disasters in the near future, the following chapter describes their likely health implications.

### 4.1 Health Effects of Earthquakes

#### 4.1.1 Death, Injury and Disability

Resulting from crush, suffocation, trauma, dust inhalation or exposure to hazardous materials or to the environment, the most immediate and serious health effects of earthquakes are high mortality and injury rates. **The toll depends mostly on the population density of the area, occupancy rate of the buildings, type of housing, time of occurrence and mitigation measures**. The ratio of dead to injured has been found to be approximately 1 to 3 when casualties result from the primary shaking of the ground. Even though there are large variations within disaster-affected areas, the ratio of dead to injured decreases as the distance from the epicentre increases.

The most demanding immediate health effect of earthquakes is a large number of injured people. The broad pattern of injury is likely to be a mass of injured with minor cuts and bruises, a smaller group suffering from simple fractures, and a minority with serious multiple fractures or internal injuries and crush syndrome, requiring surgery and other intensive treatment. Experiences from Russia indicate that the types and distribution of traumatic injuries to different parts of the body out of the percentage of the total casualties are as follows: head 18-19%, thorax 8-9%, abdomen 1%, pelvis 4-6%, spine 3-5%, extremities 48-55% and multiple 9-14% (WHO & Centre for Health Development, 1997, 44). Burns and electric shocks are also commonly observed.

The most urgent indirect health problems after an earthquake include increasing eye and respiratory tract irritations, myocardial infarctions, bronchial asthma, premature births and miscarriages. The most critical indirect health effects are interruption in basic health care due to massive damage to and / or destruction of health facilities and lifelines such as water and sewer systems, energy lines, roads, telecom and airports.

#### 4.1.2 Post-Earthquake Epidemics

In terms of the indirect health effects of earthquakes, epidemics are a concern. However, **disasters do not import diseases that are not already present in the affected area. Furthermore, epidemics do not usually occur after earthquakes** although the risk of the occurrence of sporadic cases does exist. Factors responsible for the occurrence of epidemics in the aftermath of an earthquake are the rupture of water & sanitation infrastructure, the interruption of public health services such as immunisation among children, interruption of sanitation measures in urban settings, and interruption of control of vectors like mosquitoes and rodents.

### Box 4: Management of Dead Bodies

One of the most common myths associated with earthquakes is that cadavers are responsible for epidemics. In many cases, the management of cadavers is based on the false belief that they represent an epidemic hazard if not immediately buried or burned. **The collection, disposal and cremation of corpses require important human and material resources. These resources should rather be allocated to those who survived and remain in a critical condition.** In fact, the health hazards associated with dead bodies are negligible. Contamination may occur in very limited cases when cadavers are in contact with the water system and transmit gastro-enteritis. In the case of cholera, cadavers do not usually interfere with the transmission of the disease. A relationship between cadaver and epidemics has never been scientifically demonstrated or reported. However, the scientific argument cannot override both the cultural obligations to take care of dead bodies and the mental health consequences that uncollected bodies produce on the population.

### 4.1.3 Post-Earthquake Mental Health

Rapid onset disasters such as earthquakes may negatively impact mental health. Those not directly injured will be vulnerable to mental shock from the death of loved-ones, separation, deprivation, etc. Mental health problems such as acute and post-traumatic stress disorder should be considered a public health issue that needs to be dealt with both in the short and long term. However, the extent and severity of anxiety, neuroses, and depression following sudden onset disasters vary from posing major, acute public health problems to something most families and neighbours can deal with on a temporary basis.

### 4.1.4 Impact on Hospital Services

A structural assessment of 14 hospitals in Kathmandu Valley has been conducted for MOH by WHO in collaboration with NSET. It involved both quantitative and qualitative analysis of hospital buildings and provides information essential to the development of realistic contingency plans. For different levels of earthquakes the performance of hospitals in Kathmandu Valley was found as follows:

- Frequent earthquakes of small intensity (MMI = VII): All or almost all hospitals may withstand the earthquake without collapse, 70% may be fully operational, and 30% partially functional.
- Occasional earthquakes of moderate intensity (MMI = VIII): Most of the hospitals may withstand the earthquake without collapse, 10% may be fully operational, 30% partially functional, and 60% out of service from which few of them (10%) may collapse.
- Rare earthquakes of high intensity (MMI = IX): Many hospitals may withstand the earthquake without collapse. However, only 10% will be partially functional, 60% out-of-service in complying with a life-safety performance, and 30% of the structures may collapse.

## 4.2 Health Effects of Floods and Landslides

The official disaster statistics from Nepal cluster floods and landslides in the same category (see chapter 2). In terms of health effects, it is necessary to differentiate between the two types of hazards due to their very different nature and consequences.

Slow flooding causes only limited immediate health effects. Drowning and fatal injuries are rarely reported and traumatic injuries caused by flooding require only limited health care. The observed injuries consist mainly of small lacerations or punctures due to the presence of glass debris and nails. A slight increase in deaths from venomous snakebites has sometimes been reported. Electric shocks can occur and contamination by toxic chemicals is theoretically possible. In the short term, the impact of floods on the transmission of communicable diseases is limited. Even though an increased risk for water and vector borne diseases exists, epidemics are rarely observed. **The most important health effects derive from the sometimes massive impact on the health infrastructure and all lifeline systems, which can result in interruption of basic public health services and food shortage.** Sudden massive flooding due to river breaches, glacial lake outburst or collapse of dam structures can cause many deaths due to drowning and related traumatic injuries.

Sudden landslides have serious immediate health effects due to catastrophic debris slides or mudflows. By burying villages and hillside houses they have a tendency to cause high mortality and few injuries. Suffocation by entrapment is commonly seen along with trauma and mental health effects. The lifeline systems present in the path of landslides can be severely damaged or destroyed. Indirect effects include loss of property value, livestock and crops, increased vulnerability and a reduced coping capacity of the affected population.

Floods and landslides often damage household food stocks and crops, disrupt distribution, and cause major local shortages. Nutritional status will need to be closely monitored for further deterioration, which makes the population - especially children - more vulnerable to epidemics.

## 4.3 Epidemics

Communicable diseases with epidemic potential may escalate into epidemics due to population displacement, over-crowding, environmental changes, loss of public utilities or disruption of basic health services. When pathogens are present in the environment disasters often create risky surroundings - notably refugee camps - due to sudden population displacement and high population density. Poor shelter and crowding may cause pneumonia, measles, meningitis, whooping cough, diphtheria, tuberculosis, skin diseases and eye infections. Crowding also increases the risk of water and food contamination. This is particularly relevant after disruption of pre-existing sanitary services - such as provision of safe drinking water and sewerage - and as a consequence of failure to maintain or restore normal public health programmes in the immediate post-disaster period. Unhealthy water and sanitation practices may cause acute gastro-enteritis, cholera, dysentery, salmonellas, polio and worm infestation.

## 4.4 Health Effects of Fires

The immediate physical health effects of fires are deaths and injuries, most notably burns but also cuts, lacerations and fractures caused by collapsing buildings. Exposure to smoke can lead to increased respiratory diseases and potentially carcinogenic diseases. Longer-term problems of infections and increased morbidity can result from interruption of food and medical supplies and lack of adequate shelter.

Mental ill-health is also a concern following fires. A feeling of helplessness can increase the psychological impacts as fires spread out of control. In addition, the long-term continuation of economic and social problems can hamper the population's rehabilitation.

## 4.5 Health Effects of Conflict Situations

The nature of injuries inflicted by ballistic missiles and bomb blasts are usually very destructive and fatal. Each mode of conflict disaster would cause very specific types of injury requiring specialised surgery and medical care. Lathi charge would cause head injuries, fractures and soft tissue injuries. Shells of tear gas would result in intoxicating effects on eyes and in the respiratory tract. Vulnerable groups like women, children, disabled and the elderly are the worst-affected by such conditions.

Severe conflict situations may cause a sudden and large population displacement. Forced population movements in other countries have shown a tendency towards increased sexual violence. Violence towards children may also increase, through forced inscription, accidental random violence and erosion of common decency in the rage of war.

## 4.6 Summary of the Health Effects of Various Hazards

The above description of the health effects of various hazards reveals that **a number of public health issues are common to most disasters**. Figure 10 summarises key health effects of the five (actually six due to the separation of floods and landslides) priority hazards.



Figure 10: Health Effects of Various Hazards

HEALTH EFFECTS	EARTH-QUAKES	FLOODS	LAND-SLIDES	EPIDE-MICS	FIRES	CONFLICT SITUATION
Deaths Severe injuries	Many	Few	Many	Many	Few	Many
requiring extensive treatment	Many	Few	Few	Few	Many	Many
Increased risk of epidemics	Yes	Yes	Yes	-	-	Yes
Damage to water systems	Severe	Light	Severe (but localised)	None	None	Limited (Depends on the factions fighting)
Damage to health facilities	Severe (structural and equipment)	Severe (equipment only)	Severe (but localised)	None	Depends on location	Limited (Depends on the factions fighting)
Demand of health services	High	High	Low	Moderate	Moderate	High
Food shortage	Possible (due to distribution problems)	Common	Common (but localised)	None	Possible (if crops destroyed)	Common (in prolonged conflicts)
Major population movements	Common (generally limited)	Common	Common (generally limited)	Rare	Unlikely	Common (generally limited)

(Source: Adapted from PAHO, 1999, 16-17).

Finally a word of warning: **Disasters should not be stereotyped**. Health effects differ not only according to the type of hazard but also according to the economic and political situation in the affected district and the degree to which its infrastructure and overall preparedness and response capabilities are developed.



## 5. Planning Guidelines and Activities

Experiences from other countries have shown that the health sector can play a vital role in emergency preparedness as well as in disaster response. The initial phase of a response operation is not only crucial for the survival and well being of the affected population but also for determining the future path of assistance. Only proper emergency preparedness can ensure that disaster response is delivered in an adequate manner.

Although major hospitals in the Kathmandu Valley and health institutions in disaster-affected districts have gained experience in dealing with small-scale incidents, little systematic institutional planning exists. *Guidelines on Emergency Preparedness & Disaster Management for Hospitals* have been disseminated. However, the majority of hospitals have not yet formulated plans and there is little coordination between hospitals. There is therefore an urgent need to extend the planning process beyond this health sector emergency plan. The following chapter summarises the planning guidelines and preparedness activities and describes the response tasks, which DHWG foresees.

### 5.1 Preparedness Guidelines

The following preparedness strategies reflect the basis on which DHWG operates:

P1) DHWG recognises MOHA as holding the overall responsibility of disaster management in Nepal. The Ministry is thus the co-ordinator of all activities relating to prevention, preparedness, response, mitigation, recovery and rehabilitation.

P2) In recognition of the fact that emergency preparedness is a much more effective and efficient undertaking than disaster response, **the health sector gives highest priority to vulnerability reduction and capacity building as well as to drafting this emergency preparedness and disaster response plan.**

P3) Different types of disasters are expected at any time. Worst among them is a severe earthquake affecting the Kathmandu Valley. **It is considered an eminent possibility, serious enough to warrant active and continuous readiness.** A large-scale earthquake is likely to be followed by many aftershocks and potentially subsequent quakes. It would impact the entire country and very likely parts of neighbouring India.

P4) The emergency preparedness and disaster response plan is **based on the worst-case scenario** presented in section 3.1.1, i.e. a major earthquake affecting the Kathmandu Valley. In addition, experiences from the flood disaster in 1993 and the Gujarat earthquake in 2001 have played an important role in terms of lessons learned.

P5) The emergency preparedness and disaster response plan corresponds to existing Government rules and regulations, paying special attention to the most vulnerable groups as defined in section 1.1.

P6) As a general assumption about scale, **it is assumed that in relation to a major earthquake up to one million people may require some kind of emergency assistance.** In case of other emergencies – notably floods and epidemics – the scale is considerably lower although the cumulative effects over the years are high.

P7) To ensure a rapid response, the health sector aims at ensuring **standing readiness** to provide initial survival assistance. **In the event of a major earthquake, within 24-48**

hours for 200,000 people for one month, and within 7 days for 500,000 people for one month. In the event of other disasters such as floods and epidemics, within 7-15 days for up to 100,000 people for one month.

**“In the event of a major earthquake, the health sector aims at ensuring standing readiness to provide initial survival assistance to 200,000 people for one month within 24-48 hours, and to 500,000 people for one month within 7 days”.**

P8) The emergency planning process must be participatory involving as many public and private health workers and health agencies as possible.

P9) A sectoral approach is applied during the emergency planning process in order to avoid duplication of efforts and maximise utilisation of existing resources.

**P10) MOH and DHS must give high priority to the preparation of its own health and medical personnel to respond to the emergency needs of the affected population.**

P11) In view of the threatening hazards, all health agencies should give high priority to the emergency planning process in order to ensure that the health sector is able to meet demand for care in the near future. **Preparedness is the responsibility of every health worker and health agency and not only of disaster managers and disaster units.**

In September 2001 the members of the DHWG Secretariat unanimously agreed to key recommendations for the future direction of the ongoing emergency preparedness in the health sector. These recommendations were sent to MOH via the Director of EDCD. The recommendations are shown in box 5.

#### **Box 5: Recommendations from the DHWG Secretariat**

- Emergency preparedness and disaster management should be included in the *10<sup>th</sup> Five Year Plan*.
- A National Disaster Management Council under the chairmanship of the Prime Minister should be established in order to facilitate inter-ministerial collaboration.
- While the response to disasters is multi-sectoral, the health sector must be given the highest priority.
- A functional Disaster Management section should be established in MOH with a clearly identified National Health Emergency Co-ordinator. Co-ordination needs to be backed by adequate and comprehensive policies.
- Adequate financial commitment from MOH is required in order to proceed with the emergency planning process and develop standing readiness.
- All levels of the health sector should prepare disaster response plans and standing operational procedures targeting various types of small- and big-scale disasters. Special attention needs to be given to critical care areas, facilities and lifelines in all health institutions.
- Memoranda of understanding should be developed between MOH and other agencies / sectors in order to ensure a timely and efficient disaster response.

- Higher building standards than average building codes should be introduced for critical health facilities and hospitals in view of their strategic importance in any disaster response operation.
- Emergency preparedness and disaster management should be included in medical curricula at all relevant academic institutions.

## 5.2 Preparedness Activities

During the previous years, the collaborative MOH/DHS/EDCD and WHO EHA Programme has been committed to enhancing health sector emergency preparedness in close collaboration with the DHWG Secretariat. The main achievements can be categorised in four areas of intervention: 1) Emergency planning, 2) Mass casualty management training, 3) Seismic vulnerability assessments of hospitals and 4) Training and awareness raising materials. The main achievements and ongoing activities within each area of intervention are as follows:

### 1) Emergency Planning

- WHO and UNDP were instrumental in the development of *UN Nepal's Disaster Response Preparedness Plan*, which was formally launched by then Prime Minister at the UN Day on 31 October 2001.
- WHO and MOH/DHS/EDCD revitalised DHWG in the year 2000. DHWG established a DHWG Secretariat, which gathers competent and committed emergency planners in Nepal who meet on a regular basis.
- WHO, MOH/DHS/EDCD and the DHWG Secretariat were instrumental in the development of this *Health Sector Emergency Preparedness and Disaster Response Plan Nepal*. The plan is conceptualised in accordance with *UN Nepal's Disaster Response Preparedness Plan* in order to achieve a coherent national planning format.
- WHO, MOH/DHS/EDCD and the DHWG Secretariat are in the process of developing *Health Institutions Emergency Preparedness & Disaster Response Procedures Nepal*. The procedures provide operational guidance on how key hospitals / agencies / institutions are committed to respond to anticipated hazards.

### 2) Mass Casualty Management Training

- WHO acquired a sophisticated and inter-active computer-software from the Royal Danish Embassy in Kathmandu to train mass casualty management. The software is called Multi-User System for Training Emergency Response (MUSTER). A WHO MUSTER training guideline is currently under preparation.
- WHO, MOH/DHS/EDCD and the DHWG Secretariat conducted computer-based simulation exercises and training seminars on mass casualty management for more than 500 medical doctors, nurses, students, paramedics and volunteers.
- WHO, NSET and the DHWG Secretariat localised the computer-based approach by developing a desktop mass casualty management simulation exercise.
- WHO, NSET, MOH/DHS/EDCD and the DHWG Secretariat field-tested the computer-based and desk-top approaches by implementing mass casualty management training programmes and mock drills for approximately 200 participants while involving approximately 1000 volunteers. Simulation tool kits, donated by OFDA / USAID, played an important role in making the simulations real.

- WHO, MOH/DHS/EDCD and the DHWG Secretariat implemented a SARS mock drill in April 2003 to test the capacity of the referral hospital in the Kathmandu Valley to receive suspected cases.
- WHO, NSET, MOH/DHS/EDCD and the DHWG Secretariat designed a national template for triage tags along with guidelines on its use. 2000 copies of the triage tags were printed and are in the process of being distributed to hospitals throughout the country.

### **3) Seismic Vulnerability Assessments of Hospitals**

- WHO, NSET, MOH/DHS/EDCD and the DHWG Secretariat conducted a structural assessment of 14 hospitals in the Kathmandu Valley in collaboration with a structural engineer identified by PAHO.
- WHO and the DHWG Secretariat presented the findings to the Minister of Health and senior Government officials and hospital staff at a high-level meeting on 4 December 2001.
- WHO, NSET, MOH/DHS/EDCD and the DHWG Secretariat finalised a technical report on the structural assessment of major hospitals in the Kathmandu Valley.
- WHO, NSET, MOH/DHS/EDCD and the DHWG Secretariat are currently implementing a non-structural assessment of 10 hospitals throughout the country.
- WHO, NSET, MOH/DHS/EDCD and the DHWG Secretariat expect to publish *Guidelines on Earthquake Safety for Health Facilities*. These guidelines provide technical guidance on how health facilities should prepare for earthquakes to ensure they remain functional.

### **4) Training and Awareness Raising Materials**

- WHO and MOH/DHS/EDCD designed a poster on myths and realities of natural disasters based on a PAHO-concept.
- WHO, MOH/DHS/EDCD and the DHWG Secretariat developed a training video on mass casualty management for health sector personnel. A Nepali soundtrack is currently under preparation.
- WHO, MOH/DHS/EDCD and the DHWG Secretariat developed *Guidelines on Emergency Preparedness and Disaster Management for Hospitals*.
- WHO, MOH/DHS/EDCD and the DHWG Secretariat designed a rapid disaster response health assessment format and guidelines, which are currently being distributed to district health offices throughout the country.
- WHO, MOH/DHS/EDCD and the DHWG Secretariat are currently preparing *Public Health Guidelines on Emergency Preparedness & Disaster Management*. These public health guidelines provide operational guidance on how to prepare for and respond to disasters in accordance with international Sphere standards.

## **5.3 Response Guidelines**

The health sector's response to emergencies is based on the following basic strategies:

R1) DHWG monitors health hazards and potential emergencies in order to issue early warnings and ensure rapid response. In relation to epidemics, the health sector aims to be the first sector, which traces early warning and takes necessary action.

R2) The disaster response operation will be directed from MOHA. MOHA has a 24-hour Emergency Control Room (phone: 4226044) located at Singha Durbar.

R3) UN Nepal's Emergency Operation Centre (phone: 01-5523200) located at the UN premises in Pulchowk is expected to work in close collaboration with MOHA's Emergency Control Room.

R4) In small-scale disasters the affected families themselves, NGOs and local authorities will meet basic needs. In the event of large-scale disasters, international support may be required.

R5) The disaster response operation must reflect fixed priorities and programmes agreed upon during the emergency planning process.

R6) Due to the fact that resources are limited, the health sector gives priority to the following **five types of response: Rapid health assessment, emergency relief, mass casualty management, curative care and public health.**

“The health sector gives priority to the following five types of response: Rapid health assessment, emergency relief, mass casualty management, curative care and public health”.

R7) When disasters occur, **the health sector aims to participate in rapid field assessments within 24 hours of reported incidents.** The rapid health assessment format and guidelines, which EDCD is currently distributing to district health offices throughout the country, are expected to facilitate the field assessments.

R8) Foreign health relief assistance should be made only in consultation with officials designated by MOH to co-ordinate such assistance. **International assistance should complement, not duplicate, measures applied by the affected country. Priorities must be clearly stated,** making a distinction between immediate needs and those for rehabilitation and reconstruction.

R9) **Donors will be informed of what is not wanted or needed.** This is as critical as giving specifications for requirements. Guidelines will be circulated to all potential suppliers of assistance and diplomatic and consular representatives abroad to prevent ineffective contributions.

R10) Donors should be discouraged from competing with each other to meet the most visible needs of the affected population. **The quality and appropriateness of the assistance are more important than its size, monetary value or the speed with which it arrives.**

R11) The disaster response operation must be transparent in relation to beneficiaries and partners.

R12) The disaster response operation must facilitate mitigation, rehabilitation, reconstruction and eventually sustainable development. Plans, programmes and funding to support long-term rehabilitation will be developed on an as needed basis, after a specific disaster has occurred.



In recent years there has been a move within the international community to establish principles for emergency response. The Sphere Project's *Minimum Standards in Disaster Response* provides useful guidelines for the provision of humanitarian assistance in emergencies. The Minimum Standards represent the collective opinion of hundreds of experts in humanitarian practice and are meant to be universal and applicable in any operating environment. Box 6 summarises the Sphere Project's key recommendations regarding health sector disaster response.

## Box 6: Sphere Project Regarding Health Sector Response

### 1. ANALYSIS

- a) **Initial assessment** – The initial assessment determines as accurately as possible the health effects of a disaster, identifies the health needs and establishes priorities for health programming.
- b) **Data collection** – The health information system regularly collects relevant data on population, diseases, injuries, environmental conditions and health services in a standardised format in order to detect major health problems.
- c) **Data review** – The health information system data, and changes in the disaster-affected population, are regularly reviewed and analysed for decision-making and appropriate response.
- d) **Monitoring and evaluation** – Data collected is used to evaluate the effectiveness of interventions in controlling diseases and in preserving health.
- e) **Participation** – The disaster-affected population has the opportunity to participate in the design and implementation of the assistance programme.

### 2. CONTROL OF COMMUNICABLE DISEASES

- a) **Monitoring** – The occurrence of communicable diseases is monitored.
- b) **Investigation and control** – Diseases of epidemic potential are investigated and controlled according to internationally accepted norms and standards.
- c) **Measles Control** – Measles vaccination campaigns should be assigned the highest priority at the earliest time in emergency situations.

### 3. HEALTH CARE SERVICES

- a) **Appropriate medical care** – Emergency health care for disaster-affected populations is based on an initial assessment and data from an ongoing health information system and serves to reduce excess mortality and morbidity through appropriate medical care.
- b) **Reduction of morbidity and mortality** – Health care in emergencies follows primary health care principles and targets health problems that cause excess morbidity and mortality.

### 4. HUMAN RESOURCE CAPACITY AND TRAINING

- a) **Competence** – Health interventions are implemented by staff who have appropriate qualifications and experience for the duties involved, and who are adequately managed and supported.
- b) **Support** – Members of the disaster-affected population receive support to enable them to adjust to their new environment and to make optimal use of the assistance provided to them.
- c) **Local capacity** – Local capacity and skills are used and enhanced by emergency health interventions.

(Source: SPHERE, 2000)

Although these key recommendations are not country-specific, they can be of great use to the health sector in Nepal. The recognition and use of internationally recognised guidelines not only has the potential to improve the health sector's response but will also facilitate co-ordination with external agencies in an emergency situation.

## 5.4 Response Activities

Following any major disaster there are a number of specific health needs which must be addressed and in chapter 4 those of importance to Nepal were discussed. The activities that can be carried out in order to respond effectively are outlined below.

The immediate health priorities in the wake of a disaster are likely to include search and rescue, first aid, curative care, medical evacuation and public health. Coordination and prioritisation are crucial to maximise the use of existing medical resources.

In order to reduce the health impacts of a disaster, water supply and sanitation issues must be addressed. Since the most frequently observed increases in disease following a disaster are caused by faecal contamination of water and food, **the most important public health measures after a large-scale disaster are the restoration of safe drinking water and the institution of sanitation measures.** MOH should monitor water quality in order to cross-check the results of the Department of Water Supply & Sanitation.

As a result of rumours, considerable pressure may easily be put on the health authorities to undertake mass vaccination campaigns against typhoid or cholera. However, there is no sound technical reason for such campaigns. **Immunisation as a short-term measure is considered a waste of resources** and cholera vaccine has not been shown to be beneficial to earthquake affected populations. Only measles immunisation could be considered a priority intervention due to overcrowding, low vaccination coverage and reported outbreaks. This campaign – as well as the regular immunisation programmes - should not be initiated before the cold chain has been properly restored and lost vaccines replaced. Usual post-disaster sanitation measures combined with the strengthening of the disease surveillance system, dissemination of appropriate health education messages and timely and effective treatment of cases are generally sufficient for preventing transmission of communicable diseases with epidemic potential.

Maintenance of nutritional standards is of significant importance following a disaster. Food distribution can be a major and urgent need, especially if agricultural land or food storage areas have been affected. However, large-scale distribution is not always necessary. **While health donors tend to recommend increased inputs of food aid for the relief efforts, food donors have developed the mandate of not providing food aid in quantities that might upset the agricultural economy.**

Maintaining or re-establishing public health practices will enable the health sector to address both the direct and indirect health needs of the affected population. Delivering assistance to health facilities and re-establishing surveillance systems to detect any increase in disease occurrence are also of importance.

Health education should be immediately and regularly disseminated through radio and newspapers as well as through the mobilisation of trained teachers, students, scouts, local leaders and social workers. Public health campaigns must focus on simple sanitation measures such as acquiring and storing safe drinking water, building and using cheap and sanitary latrines, and maintaining personal and domestic hygiene.

Whereas the public health tools are known, they are often difficult to use due to constraints encountered by health personnel in their work. Factors reducing the impact of public health measures include logistical problems, access to casualties and, in the case of conflict situations, a lack of security both for victims and for health workers. Public health personnel working in complex emergencies have to take on responsibilities that go well beyond simple application of the rules of public health.

The following sections describe specific areas of intervention at some lengths:

### 5.4.1 Search and Rescue

Entrapment under collapsed buildings is the most common cause of death and causes most injuries to survivors in disasters such as earthquakes and landslides. Inherent delay in reaching trapped patients and lack of an appropriate triage process are common medical care problems. **Behaviour after a major earthquake is rarely generalised panic or passivity.** More frequently, after individuals recover from initial shock they rapidly and spontaneously apply themselves to do whatever they perceive is necessary to help those in distress. Disaster survivors often begin search and rescue minutes after an impact, and within hours may have organised themselves in groups to conduct light rescue and to transport the injured to health facilities. Thus, untrained individuals who happen to be at the disaster site carry out most search and rescue in disasters. **Actively antisocial behaviour such as widespread looting occurs only in exceptional circumstances.**

Apart from survivors and volunteers who are able to immediately start working at the emergency site, some trained emergency first response teams may take part in search and rescue and medical response operations. **It is important that rescue teams are well organised and have adequate logistical support.** The Nepal Royal Army and Nepal Police, the source of Nepal's limited search and rescue units, are involved in training to improve their search and rescue skills and operational services. Dog handlers and dog teams are also being trained to search for and locate people buried under rubble. Nepal Royal Army, Nepal Police, NRCS and DHS personnel are conducting training in medical first response capacities. These combined teams will eventually – in collaboration with volunteers – be able to locate and stabilise victims, remove them from unsafe locations to collecting points (if necessary), assess their status (on-site triage), provide first aid (if necessary), and transfer them to advance medical posts or hospitals (if necessary). Depending on the scope and readiness of the presently barely nascent professional units, they may be available in future disaster situations.

Overall experience has shown that **85 to 95% of casualties rescued from collapsed buildings are rescued in the first 24-48 hours after the earthquake.** Although there have been instances of "miracle" rescues after one week of entrapment, there is a consistent and dramatic drop-off in the percent of victims found alive after these *golden hours*. This suggests that the community is the most important level for timely and efficient response. **Training the community in light rescue and first aid and stabilisation techniques should be a priority. Field hospitals and rescue teams usually arrive too late to have significant life-saving impact.**

### 5.4.2 Mass Casualty Management

To most untrained volunteers, the best emergency medical care is equated with transportation to the closest hospital as quickly as possible. In the process, field first aid and triage areas are typically bypassed because their existence is not known, or because



they are considered an inferior level of medical care. The present trend is that casualties are brought to hospitals by private vehicles. This *scoop and run approach* has serious disadvantages. Often the closest hospitals - or the one most locally renowned for giving emergency care - receive most casualties while other area hospitals receive few or none. In addition, patients with minor problems tend to appear first, potentially consuming resources more appropriate for the more critical patients arriving later. Once stabilised, transport of casualties to other hospitals is often compromised by the absence of previously negotiated transfer agreements. **The roles of the first response team arriving on the scene will be to stop spontaneous evacuation in unsafe, uncontrolled conditions to any unprepared health care facility and replace it with an organised rescue chain.** This rescue chain should be based on the following five principles of evacuation: 1) Strict control of the rate of evacuation. 2) Stabilize victims before moving. 3) Prepare victims adequately for transfer. 4) Advance information passed to receiving facilities. 5) Use of the best possible vehicles.

The rescue chain is part of a mass casualty management system defining procedures for how to adequately cope with any disaster resulting in a number of victims large enough to disrupt the normal course of emergency and health care services. A mass casualty management system is based on the following principles: **Adaptation of regular, pre-established emergency procedures, maximisation of the use of existing resources, multi-sectoral preparation and response and pre-planned and pre-tested co-ordination.**

A primary tenet of the mass casualty system is to bring health personnel to the emergency site instead of victims going to the hospital on their own. This could be achieved by setting up an advance medical post in a safe area: 1) within walking distance of the impact zone; 2) with direct access to the evacuation road; 3) at a short distance from the command post; and 4) in a clear radio communication zone.

The technique of triage is the essence of a mass casualty management system. Triage derives from the French verb "trier" meaning "to sort" indicating that the point of triage is to prioritise between acute and non-acute cases in order to minimise loss of life and disabilities. The field triage process will be conducted at three levels: **On-site triage** (triage one), **medical triage** (triage two) and **evacuation triage** (triage three). Most of the field triage can be conducted by Red Cross volunteers or by army, police or fire service personnel who are familiar with triage principles and techniques. However, a medical doctor should do the second and third triage. The following colour classification scheme is widely used and officially approved by MOH for distinguishing between acute (red and yellow) and non-acute (green and black) casualties:

- **Red:** Victims whose injuries demand urgent medical attention, after resuscitation, or, as soon as practicable.
- **Yellow:** Victims whose injuries require medical care but can be somewhat delayed.
- **Green:** Victims whose injuries are so slight that they can be managed by self-help or volunteer assistance.
- **Black:** Victims dead.

When search and rescue and evacuation are uncoordinated, so is the entry of casualties into the emergency medical services system. Hospitals rarely receive timely and useful information from the disaster scene. Further, they are rarely prepared for an influx of unsolicited medical volunteers and donations.

**The largest surgical demand and need for health care occur within the first 24 hours of an event.** Experience elsewhere has shown that patients may appear in two waves, the

first consisting of casualties from the immediate area around the medical facility and the second of referral cases as humanitarian operations in more distant areas become organised. Victims of secondary disasters (aftershocks and fires for example) may arrive at later stages, as may the fortunate few who survive longer and are rescued after 48 hours. However, patterns have a tendency of returning almost back to normal a week after the impact of a disaster.

### 5.4.3 Post-Disaster Hospital Facility Assessment

Not only must hospitals survive a disaster; they must also be able to function and meet the increased patient care needs that are very likely to ensue. If severe physical damage to the buildings occurs, which is likely during disasters such as earthquakes, evacuation of the facilities will be necessary. **Evacuation routes and procedures should be pre-established as part of the hospital emergency plan. Due to the assessed vulnerability of the current health infrastructure, mobile hospitals are very likely to be required in order to cope with the health effects of an earthquake.**

Essential but damaged health infrastructure will need immediate repair and rehabilitation. The reconstruction of other facility areas must be based on a detailed assessment of damages and prioritisation exercises. Before a hospital can receive casualties, it must be determined if the hospital itself has sustained any structural damage or loss of utility as a result of the disaster. Outside access problems, blocked corridors, inoperable lifts, failure of utilities, contamination of drinking water, loss of equipment or supplies (including oxygen), and potential for fire, explosion or building collapse are common concerns. The triage colours are often applied for assessment of buildings reflecting the shift in focus from human beings to physical structures: Red tags are only given on the basis of structural damage. Yellow may be given either on the basis of light structural damage or of severe structural damage limited to particular areas. While denoting a building safe to enter, the green rating is only applied to inspected buildings where there was some concern regarding damage.

### 5.4.4 Disaster Epidemiology and Public Health

Disaster epidemiology is an essential tool when studying the immediate and long term health effects of a disaster and when suggesting control measures to limit health risks, support relief efforts and provide information for decision making. Rapid assessments and action-oriented surveillance of preventable deaths, illnesses and injuries help to identify and understand health problems and health needs. Epidemiology is not only a means for setting disease control priorities and suggesting appropriate medical interventions but also a tool to effectively monitor and evaluate relief programmes. **The characteristics of a good epidemiological surveillance system are simplicity, acceptability, sensitivity, accuracy, timeliness and reliability.**

In emergencies there is always a call for an immediate strengthening of disease surveillance and public health programmes. Acute diarrhoeal disease control programmes include monitoring of drinking water quantity and quality, personal hygiene, sanitation and proper waste disposal, replenishing and distribution of relevant stocks, and an urgent public health campaign.

Although the exact quantities of water needed for domestic use may vary, **ensuring 20 litres of potable water per person per day is central to any public health strategy.**

Emergency water supply needs to ensure an adequate number and distribution of water points; the more users of a source, the easier the contamination. **There should at least be 1 water point per 250 people and the maximum distance from any shelter to the nearest water point should not exceed 500 metres.** At the same time, communities must become empowered to maintain water sources, e.g. by provision of user-friendly pumps, spare parts, buckets and chlorine and by providing maintenance and chlorination guidance.

The water quality must be monitored to ensure that it poses no health risks. **If there is a significant risk of water source or post-collection contamination, water should be treated with a residual disinfectant such as chlorine.** Emergency disinfection programmes of community water supplies (wells and boreholes) need to be carefully planned and co-ordinated with the full participation of local health posts and rapid response teams. Making maximum use of local knowledge and human resources and ensuring that logistical support and needed materials are available are keys to success.

Another major risk to people's health is posed by inadequate sanitation and solid waste disposal. It is imperative to ensure appropriate facilities for excreta disposal, meaning that there should be a **maximum of 20 people per toilet, and these should be placed no more than 50 metres from where people live.** In addition, a system should be in place for removing or burying solid waste on a daily basis.

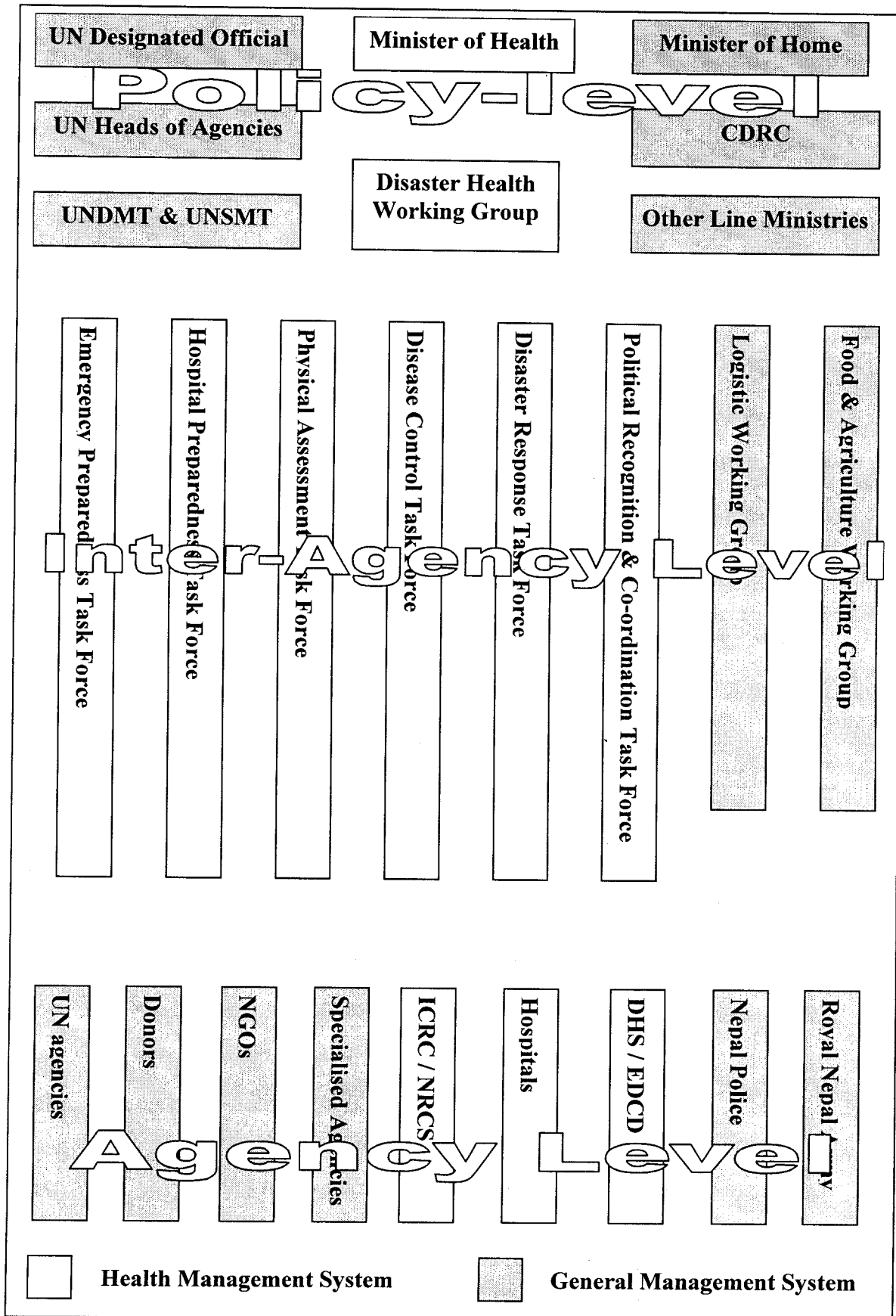
Where both water and sanitation are concerned, the affected community should be included in the decision-making process and the everyday maintenance. It is also important to consider aspects of safety for particularly women and children in order to ensure their safe access to water pumps and toilets both night and day.

WHO has long discouraged post-disaster mass immunisation campaigns, recommending instead that health authorities take advantage of the temporary gathering of usually scattered populations to improve the coverage of normal immunisation programmes. After the immediate replacement of vaccination stocks along with the restoration of the cold chain, plans for an expanded programme on immunisation should be properly considered. **In general no special programme should be initiated unless there is sufficient guarantee for its continuation over a longer period.** Unplanned, improvised, and poorly supervised mass campaigns are not without medical risks. However, as with the disposal of dead bodies, the primary negative result is the false feeling of security misleadingly imparted. The result is that the population is distracted from the only effective measures: improving sanitation and controlling water and food quality.

## **5.5 The Health Sector's Disaster Management System**

The health sector aims at providing a co-ordinated inter-agency response in close collaboration with the Government, UN, donors, NGOs, and specialised agencies. The organisational structure and capacity of MOH and DHS is shown in appendixes. To co-ordinate the health sector's disaster response six inter-agency task forces covering the areas of emergency preparedness, hospital preparedness, physical assessment, disease control, disaster response and political recognition & co-ordination will be activated. To co-ordinate the national disaster response three sectoral working groups covering the areas of food & agriculture, logistics and health (herein discussed) will be activated. Figure 11 on the following page shows an organogram of the health sector's disaster management system.

Figure 11: The Health Sector's Disaster Management System



## 6. Overall Co-ordination and Partnerships

The following chapter summarises the existing mechanisms for ensuring co-ordination between the Government, UN, donors and NGOs together with national disaster response arrangements.

### 6.1 The Ministry of Home Affairs

MOHA is the nodal agency for natural hazard management in Nepal. It formulates and implements emergency preparedness and disaster management policies. It also carries out immediate rescue and relief works in the event of disasters through the Department of Narcotics Control & Disaster Management and in collaboration with district offices in all 75 districts of Nepal. The Department of Narcotics Control & Disaster Management commenced its functions in February 2001. The main function of the department is to actively and efficiently co-ordinate and carry out emergency preparedness and disaster management activities with concerned agencies. At district level, the Chief District Officer acts as the emergency manager in times of disaster.

The Royal Nepal Army and Nepal Police play important roles in rescue operations. Police officials collect first hand information of the event and inform concerned officials. In the event of a catastrophic disaster, Nepal Police establishes command posts to facilitate rescue operations. Moreover, Nepal Police collects most of the disaster data and information.

The Government has formulated a number of natural disaster preparedness plans, programmes and strategies during the last 20 years. Most prominent among them is the *Natural Calamity (Relief) Act, 1982*, and the *National Action Plan, 1996*. The Act defines the official disaster management system at the central, regional, district and local levels. The system is summarised in the following section.

### 6.2 The Disaster Relief Committees

The Central Disaster Relief Committee (CDRC) is the apex body of the disaster response system in Nepal. This committee, headed by the Minister of Home Affairs, consists of the Minister of Health, the Minister of Physical Planning & Works, Secretaries of other ministries, representatives from the Royal Nepal Army and the Nepal Police, the Director Generals from the Department of Mines & Geology and from the Department of Hydrology & Meteorology as well as representatives from the Social Welfare Council, NRCS and the Nepal Scouts. Following a disaster, CDRC meets as and when required to address the needs of the affected population. The committee is also involved in the co-ordination of rehabilitation efforts.

At the district level, the District Disaster Relief Committee (DDRC) is the active agency for co-ordinating relief support. This committee, chaired by the Chief District Officer, consists of representatives from public sector organisations, such as the District Health Office, NRCS and similar agencies. DDRC is responsible for co-ordinating the district-level relief efforts including the provision of medical support and the distribution of food and other essential supplies.

*The Natural Calamity (Relief) Act* also includes the provision for the establishment of regional and local disaster relief committees as and when required.

## 6.3 The Government and the International Community

This section outlines a plan for co-ordinating between the Government and the international community. The plan was discussed among the sectoral working groups several years ago. The proposed plan calls for **three distinct levels of support**:

- 1) **Donor co-ordination** in collaboration with MOHA and the Sectoral Working Groups in order to ensure efficient and effective international assistance.
- 2) **Technical support** by highly skilled professionals who will provide assistance to various institutions belonging to different sectors.
- 3) **Grassroots field level support** by NGO project staff who will provide specific on-site assistance and monitoring.

It is important to note that these activities will be carried out under the direct guidance and supervision of MOHA. One of the most important rationales for a workable co-ordination mechanism between the international community and the Government is that it allows the Government to channel international assistance in such a way that it will be complementary to its own on-going activities.

There are **three main areas of activity** where the international community can support the Government's own disaster management efforts in order to improve the overall disaster response. These areas of activity include:

- 1) **Assessment** of the extent of damage, the immediate and long-term needs of the affected populations, and the necessary programmes and resources for rehabilitation and reconstruction. Upon request from the Government, the early fielding of assessment teams comprised of government officials and members of the international community can help to strengthen the confidence in rapid assessments upon which the requests for aid from the international community are based.
- 2) **Co-ordination** of the international community's response efforts in order to ensure that such assistance is appropriate, focused, and in accordance with the Government's own priorities and procedures for disaster management.
- 3) **Monitoring** of the response efforts upon the request of the Government. The international community provided this assistance to the Government during the 1993 floods. It allowed an objective assessment of the relief efforts and helped to ensure an equitable distribution of aid.

## 6.4 Sectoral Working Groups

In case of a disaster, it is important for UN, donors and NGOs to immediately establish a mechanism to co-ordinate their efforts amongst themselves and with the Government. Any delay in this process is likely to reduce the effectiveness of the overall disaster response. Thus, **well before a disaster occurs, it is essential for organisations that have a comparative advantage in delivering and co-ordinating relief support to meet periodically in order to discuss potential roles and strategies for response operations.**

For that reason, in 1994 the Government requested the international community to assist them in re-focusing the three sectoral working groups - established during the flood response of 1993 - in order to prepare sectoral contingency plans regarding future disasters. The responsibility of the sectoral working groups - which include representatives from the Government, UN, donors and NGOs - is to provide complementary support to the Government's own on-going relief efforts in the sectors of food & agriculture, logistics and health.

In 1995, the sectoral working groups produced three manuals that were revised in 1999. These manuals - intended to be rolling documents - have not yet been published. The meeting regularity and activities of the Food & Agriculture Working Group (FAWG) and the Logistics Working Group (LWG) have decreased during the last years. However, at the end of 2000, EDCD / DHS and WHO decided to revitalise DHWG. During this process, the ownership of the meetings was transferred to the Government. **DHWG is currently preparing this *Health Sector Emergency Preparedness and Disaster Response Plan Nepal* in accordance with *UN Nepal's Disaster Response Preparedness Plan*. This is a promising initiative as it indicates the necessity of a mutual understanding and planning exercise among potential disaster responders. If all sectoral working groups would apply the same methodology, a major improvement in the current disaster management system would be achieved.** UNDP and WFP have recently taken some initiatives to re-activate FAWG and LWG but the long-term results are yet to be seen.

## 6.5 Disaster Preparedness Network

In 1998, a number of organisations arranged a Disaster Preparedness Network (DP-Net). The network is a loose association of organisations (mainly NGOs) concerned with disaster issues. The goal of the network is to enhance emergency preparedness and disaster management in general and the self-reliance and safety of disaster-prone communities in Nepal in particular. It is intended to serve as a mutually beneficial service, resource and information centre and focal point for agencies involved in various types of disaster programmes. During previous years, DP-Net was maintained by NRCS, which acted as the secretariat. At the beginning of 2002, NRCS took several initiatives to reactivate this network.

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## Appendix A: Confronting Disaster Myths

Several sections of chapter 4 indicate that many mistaken assumptions are associated with the impact of disasters on public health. The following myths and realities have been identified by PAHO as important to counteract through health education.

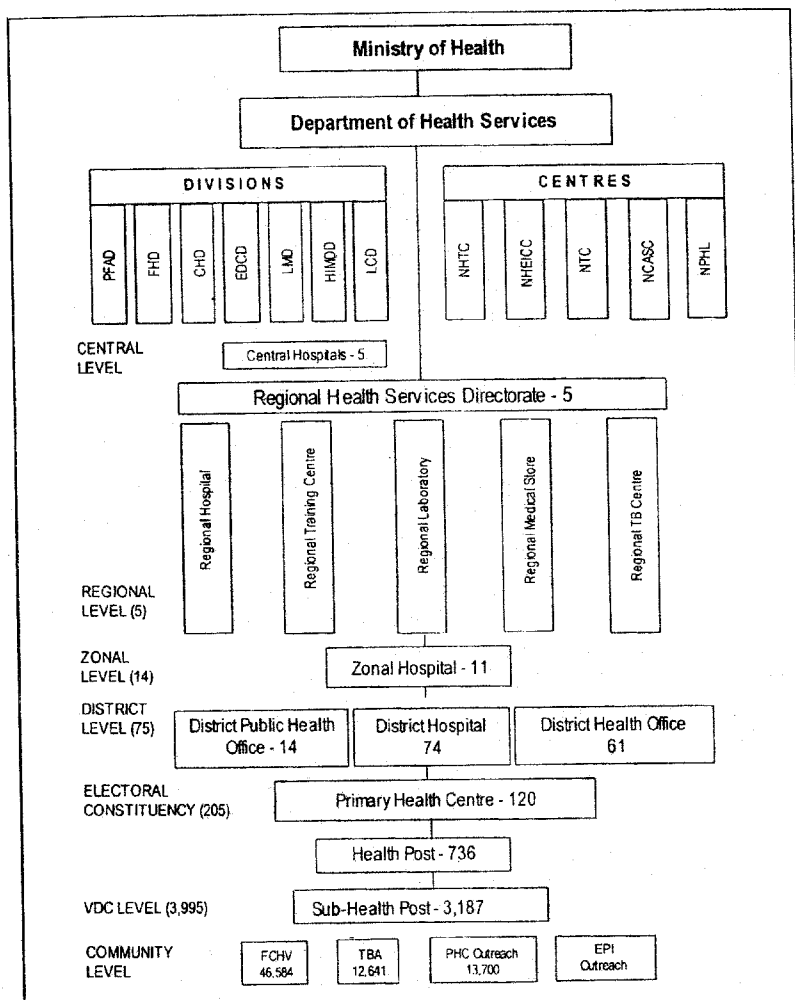
MYTHS	REALITIES
Disasters are random killers.	Disasters strike hardest at the most vulnerable group, the poor – especially women, children and the elderly.
The affected population is too shocked and helpless to take responsibility for their own survival.	The affected population finds new strength during an emergency, as evidenced by the thousands of volunteers who spontaneously unite after an earthquake to sift through the rubble in search of victims.
Disasters bring out the worst in human behaviour.	Although isolated cases of antisocial behaviour exist, the majority of people respond spontaneously and generously.
Any kind of international assistance is needed, and it's needed now!	A hasty international response that is not based on an impartial evaluation only contributes to the chaos. It is better to wait until genuine needs have been assessed.
Foreign health volunteers with any kind of medical background are needed.	The local population almost always covers immediate lifesaving needs. Only medical personnel with skills that are not available in the affected country may be needed.
Epidemics are inevitable after every disaster.	Epidemics do not spontaneously occur after a disaster and dead bodies will not lead to catastrophic outbreaks of exotic diseases. The key to preventing disease is to improve sanitary conditions, ensure water supply and educate the public.
Locating disaster victims in temporary settlements is the best alternative.	It should be the last alternative. It is better to use funds normally spent on tents to purchase local building materials, tools, and other construction-related support.
Things are back to normal within a few weeks.	The effects of a disaster last a long time. Disaster-affected countries deplete much of their financial and material resources in the immediate post-impact phase. Successful relief programmes gear their operations to the fact that international interest wanes as needs and shortages become more pressing.

## Appendix B: National Health System

The National Health System is organized in the following four tiers:

Level	Main Components
Central Level	The Ministry of Health and the Department of Health Services with 7 Divisions and 5 Centres covering various health issues.
Regional Level	5 Regional Health Directorates headed by Regional Directors for Health and 11 Zonal Hospitals.
District Level	59 District Hospitals, 61 District Health Offices headed by Medical Doctors and 14 District Public Health Offices headed by Public Health Officers.
Community Level	172 Primary Health Care Centres / Health Centres, 710 Health Posts, and 3132 Sub-Health Posts serve the peripheral level along with primary health care out-reach services through Female Community Health Volunteers, Traditional Birth Attendants etc.

(Source: DHS, 2002).



Organisational Structure of the Department of Health Services according to DHS, Annual Report 2054 / 55 (1997 / 98).

Figure 1b.1

Acronyms	
PFAD	Planning and Foreign Aid Division
FHD	Family Health Division
CHD	Child Health Division
EDCD	Epidemiology and Disease Control Division
LMD	Logistics Management Division
HMDD	Health Institution & Manpower Development Division
LCD	Leprosy Control Division
NHTC	National Health Training Centre
NHEICC	National Health Education, Information
NTC	National Tuberculosis Centre
NCASC	National Centre for AIDS and STD Control
NPHL	National Public Health Laboratory
FCHV	Female Community Health Volunteer
TBA	Traditional Birth Attendant
PHC	Primary Health Care
EPI	Expanded Programme on Immunization

## Appendix C: Capacity of the Health System

The capacity of the health sector is indicated in the following tables and statistics:

Skilled Manpower under MOH	Number
Doctor	1,259
Nurse / ANM	6,216
Paramedic / Health Assistant	5,295
Village Health Worker	4,015
Maternal and Child Health Worker (MCHW)	3,190
Pharmacist	21
Pharmacy Assistant	15
Ayurvedic Physician	391
Baidhya (Ayurvedic Paramedic)	347
<b>Health Volunteers</b>	-
Female Community Health Volunteer	53,999
Trained Traditional Birth Attendant	14,951

(Source: MOH, 2002)

The population per doctor is 18,439, per nurse 4,987, and per hospital bed 2,349. The population per health care provider (doctor, nurse / assistant nursing midwife (ANM), health assistant / axially health worker (AHW)) ratio is 2,071 (2001 calculation) (MOH, 2002).

Government Health Facilities	Number
Specialised / Central Hospital	5
Regional Hospital	1
Sub-Regional Hospital	1
Zonal Hospital	9
District Hospital	67
District Health Office	75
Primary Health Care Centre (PHC-C)	180
Health Centre	13
Health Post (HP)	711
Sub-Health Post (SHP)	3,179
PHC Outreach Clinic	15,548

Other Government Hospitals	Number
Birendra Army Hospital	6
Dipendra Police Hospital	1
Teaching Hospitals	8

Hospital Beds in Total		Number
Government hospitals including Army, Police, Ayurvedic and Homoeopathy		4512
Teaching hospitals	Government Sector	1058
	Private Sector	2285
Community hospitals		70
Non-government hospitals		961
Eye hospitals		995

## Appendix D: Hospitals with 50 or more Beds in Kathmandu Valley

Name of Hospital	Type	District	Location			No of Beds	Total Doctor	Total Nurses	Expected Structural Damage in an Earthquake	
			Municipality	Ward No.	Place				MMI= VII	MMI=IX
Bir Hospital	General	Kathmandu	Kathmandu	30	Mahaboudha	392	180	210	Substantial to destruction	Very heavy to destruction
Brendra Army Hospital	General	Kathmandu	Kathmandu	14	Chauni	380	80	85	Negligible to moderate	Moderate to heavy
Brendra Police Hospital	General	Kathmandu	Kathmandu	3	Maharajanij	150	40	42	Very heavy	Destruction
Sukra Raj Tropical and Infectious Disease	Infectious	Kathmandu	Kathmandu	12	Teku	103	13	50	Moderate to heavy	Substantial to very heavy
Kanti Hospital	Children	Kathmandu	Kathmandu	3	Maharajanij	250	75	107	Negligible to heavy	Moderate to very heavy
Maternity Hospital	Maternity	Kathmandu	Kathmandu	2	Thapathali	310	60	110	Substantial to very heavy	Very heavy to destruction
Patan Hospital	General	Lalitpur	Lalitpur	5	Lagankhel	200	60	250	Negligible to moderate	Moderate to heavy
Bhaktapur Hospital	General	Bhaktapur	Bhaktapur	17	Dudh Pati	50	11	25	Negligible to heavy	Moderate to very heavy
Military Hospital	General	Kathmandu			Mohaboudha					
Teaching Hospital	General	Kathmandu		3	Maharajanij	401	200	350	Negligible to slight	Moderate
Nepal Medical College	General	Kathmandu		7	Aterkhel	394	140	87	Negligible to very heavy	Moderate to destruction
Kathmandu Medical College	General	Kathmandu	Kathmandu	7	Sinamangle		62	54	Substantial to heavy	Very heavy
Medicare National Hospital & Research Center	General	Kathmandu	Kathmandu	1	Naxal	60	70	39	Negligible to heavy	Moderate to very heavy
B & B Hospital	Orthopedic	Lalitpur	Lalitpur	7	Gwarko	100	50	110	Substantial to heavy	Very heavy
Model Hospitals	General	Kathmandu	Kathmandu	31	Baghbazar	50	8	34	Substantial to Destruction	Very heavy to destruction

(Source: NSET).