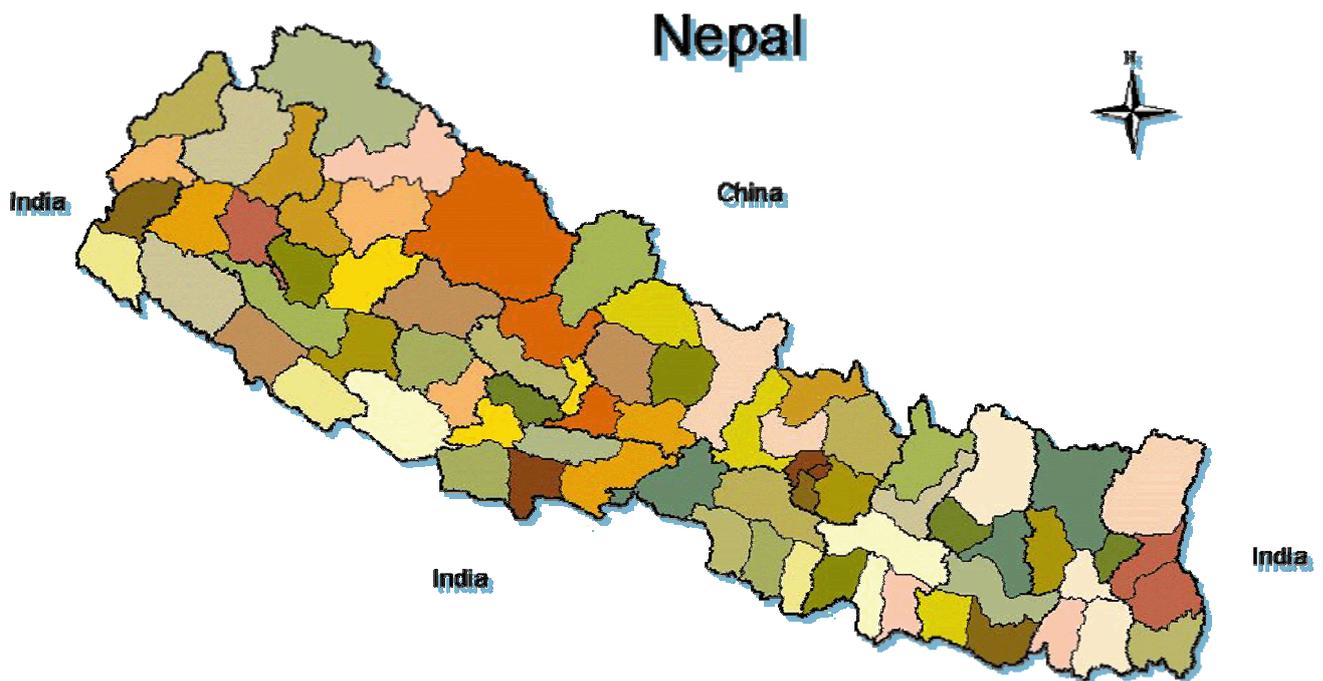




Annex 6

Disaster Reduction and Management in Nepal Issues and Prospects



A National Report of Nepal
presented to the World Conference on Disaster Reduction
Kobe, Japan
18-22 January 2005

HIS MAJESTY'S GOVERNMENT OF NEPAL

Ministry Of Home Affairs

Singh Durbar, Kathmandu, Nepal

Tel: +977-1- 4211219, +977-1- 4211212 fax: +977-1-4211281,

Email: planning@most.gov.np

URL: www.moha.gov.np

Kathmandu, January 2005

PREFACE

The National Report and National Action Plan will provide a comprehensive scenario and guidelines of disasters for the activities, which will follow the World Conference on Disaster Reduction (WCDR), 2005, in Nepal. We are looking forward to continue working in close with our partners in order to ensure that it will have a lasting impact on building the resilience of nation and communities to disasters.

This document is the outcome of series of consultations with key actors and responsible agencies of the government and non-governmental agencies Nepal. The valuable inputs and suggestions from all concerned have been incorporated in this report.

The Ministry of Home Affairs avails its opportunity to thank for the contributions made by concerning partners in finalizing the country paper and the National Action Plan

Finally, the draft committee deserves special thanks for taking troubles to preparing this document.

Thank you all.

January, 2005
Kathmandu.

Ministry of Home Affairs
Singha Durbar

PREFACE

The National Report and National Action Plan will provide a comprehensive scenario and guidelines of disasters for the activities, which will follow the World Conference on Disaster Reduction (WCDR), 2005, in Nepal. We are looking forward to continue working in close with our partners in order to ensure that it will have a lasting impact on building the resilience of nation and communities to disasters.

This document is the outcome of series of consultations with key actors and responsible agencies of the government and non-governmental agencies Nepal. The valuable inputs and suggestions from all concerned have been incorporated in this report.

The Ministry of Home Affairs avails its opportunity to thank for the contributions made by concerning partners in finalizing the country paper and the National Action Plan

Finally, the draft committee deserves special thanks for taking troubles to preparing this document.

Thank you all.

January, 2005
Kathmandu.

Ministry of Home Affairs
Singha Durbar

ACRONYMS

| | |
|---------|---|
| MoHA | Ministry of Home Affairs |
| MoAC | Ministry of Agriculture and Cooperatives |
| MoHe | Ministry of Health |
| MoLD | Ministry of Local Development |
| MoLJ | Ministry of Law and Justices |
| MoFSC | Ministry of Forest and Soil Conservation |
| MoPPW | Ministry of Physical Planning and Works |
| MoF | Ministry of Finance |
| MoEP | Ministry of Environment and Population |
| MoES | Ministry of Education and Sports |
| MoWCSW | Ministry of Women, Children and Social Welfare |
| MoFA | Ministry of Foreign Affairs |
| MoWR | Ministry of Water Resources |
| MoST | Ministry of Science and Technology |
| DWIDP | Department of Water Induced Disaster Prevention |
| DSCWM | Department of Soil Conservation and Watershed Management |
| DMG | Department of Mines and Geology |
| DHM | Department of Hydrology and Meterology |
| DHS | Department of Health Services |
| EDCD | Epidemic Disease Control Division |
| DoF | Department of Forest |
| DoLIDAR | Department of Local Infrastructures and Agricultural Road |
| DDC | District Development Committee |
| NPC | National Planning Commission |
| NRCS | Nepal Red Cross Society |
| NSET | National Society for earthquake Technology Nepal |
| NP | Nepal Police |
| APF | Armed Police Force |
| RNA | Royal Nepalese Army |
| I/NGO | International/ non-governmental Organization |
| CBO | Community Based Organization |
| CDRC | Central Disaster Relief Committee |
| RDRC | Regional Disaster Relief Committee |
| LDRC | Local Disaster Relief Committee |
| DDRC | District Disaster Relief Committee |
| SWG | Sectoral Working Groups |
| DP-Net | Disaster Preparedness Network |
| GO | Government Organization |
| TU/loE | Tribhuvan University/ Institute of Engineering |
| NASC | Nepal Administrative Staff College |
| SWC | Social Welfare Council |
| FNCCI | Federation of Nepal Chamber of Commerce and Industry |
| UN | United Nations |
| UNDP | United Nations Development Programme |
| WHO | World Health Organization |
| ICIMOD | International Centre for Integrated Mountain Development |
| NS | Nepal Scout |
| NCC | Nepal Cadet Corps |

TABLE OF CONTENTS

| | |
|--|------------|
| PREFACE | I |
| ACRONYMS | II |
| TABLE OF CONTENTS | III |
| A. INTRODUCTION | 1 |
| A.1. LOCATION: | 1 |
| A.2. GEOGRAPHY AND CLIMATE | 1 |
| A.3. GEOLOGY | 1 |
| A.4. POLITICAL SYSTEM AND ADMINISTRATIVE DIVISION | 2 |
| A.5. DEMOGRAPHY | 3 |
| A.6. ECONOMY | 3 |
| A.7. DEVELOPMENT INITIATIVES | 3 |
| B. HISTORY OF DISASTER | 4 |
| C. DISASTER SCENARIO | 6 |
| C.1. FLOOD | 6 |
| C.2. EARTHQUAKE | 7 |
| C.3. LANDSLIDE | 7 |
| C.4. EPIDEMIC | 7 |
| C.5. FIRE | 7 |
| C.6. DROUGHT | 8 |
| C.7. OTHERS | 8 |
| D. RISK ASSESSMENT | 8 |
| D.1. GENERAL | 8 |
| D.2. RISK ASSESSMENT AND IMPACT ANALYSIS | 8 |
| D.3. EARLY WARNING | 9 |
| E. DISASTER MANAGEMENT CAPABILITIES | 10 |
| E.1. GOVERNMENT INSTITUTIONS / PARTNERS/ PROCEDURES | 10 |
| E.2. ACHIEVEMENT SO FAR | 11 |
| E.2.1. CAPABILITY ASSESSMENT | 12 |
| E.3. KNOWLEDGE MANAGEMENT | 12 |
| E.4. PREPAREDNESS AND CONTINGENCY PLANNING/ EARLY WARNING: | 13 |
| F. GOOD PRACTICES | 13 |
| F.1. COMMUNITY BASED DISASTER MANAGEMENT IN NEPAL: | 13 |
| F.2. EARLY WARNING INTRODUCED IN TSHO ROLPA GLACIER LAKE OUTBURST FLOOD: | 13 |
| F.3. KATHAMNDU VALLEY EARTHQUAKE RISK MANAGEMENT PROJECT (KVERMP) | 13 |
| F.4. HOSPITAL VULNERABILITY REDUCTION | 14 |
| G. DISASTER MANAGEMENT CHALLENGES AND OPPORTUNITIES | 14 |
| H. NATIONAL, REGIONAL AND INTERNATIONAL COOPERATION | 15 |
| I. NATIONAL PRIORITIES | 15 |
| ANNEX I (A) | 16 |
| ANNEX -1 | 22 |
| ANNEX -2 | 35 |

A. INTRODUCTION

A.1. LOCATION

Nepal a Himalayan Kingdom, lies in between 80°4' to 88°12' East longitude and 26°22' to 30°27' North latitude. It has an area of 147,181 sq. km. extending roughly to 885 km. from East to West and varies from 145-241 km. North-South. The country is land locked bordering with India on the East, West and South, and China on the North.

Nepal lies in the central segment of the Himalayan mountain range. A combination of rugged topography, high relief, active tectonic process and intense monsoon rain has made its' fragile environment vulnerable to varieties of hazards and disasters. It is one of the disaster-prone countries in the world. Nepal has been experiencing several natural disastrous events such as floods, avalanches, landslides, hailstorms, droughts and earthquakes causing loss of lives and properties. As the country lies in the high seismic prone zone, large-scale earthquakes were frequent in the country in the past. Every year floods and landslides damage the vital infrastructures and ruin productive farmlands and natural resources. The disasters also create situations demanding emergency evacuation and relocation of people. As a consequence, a significant proportion of GDP is lost every year due to natural disasters.

A.2. GEOGRAPHY AND CLIMATE

Elevation of the country decreases from north to south while the temperature goes on decreasing from south to north along with the increase in altitude. The sharp differentiation in altitude displays extreme variations in natural environment ranging from tropical plain to alpine heights. The country has a unique altitudinal variation from 60 meters from mean sea level at Jhapa on the south to 8,848 meters at Mt. Everest, the top of the world, on the north within a short horizontal distance. Due to the east-west orientation of the mountain ranges, the country has a tropical climate on the south and temperate and alpine climate on the north. Accordingly, there are many different forest types in Nepal.

Nepal has five different types of climate namely; sub tropical, warm, cool, alpine and tundra. Climatic conditions in Nepal vary from region to region. The Terai, southern plains and the Siwalik range experience subtropical climate, while the northern mountainous regions have cold, dry continental and alpine winter climate. Summer and late spring temperatures range from about 28 degrees Celsius in the hilly region to more than 40 degrees in the Terai. In winter, average maximum and minimum temperatures in the Terai range from a brisk 7 degrees to a mild 23 degrees respectively. The central valleys experience a minimum temperatures often falling below the freezing point and a chilly 12 degrees maximum. Much colder temperatures prevail at higher elevation. Kathmandu, the capital, at an altitude of 1,450 meters, has a mild climate, ranging from 19 to 27 degrees in the summer, and 2 to 20 degrees in the winter with occasional temperatures below freezing point.

The main source of precipitation is the summer monsoon (late June to September) of which 80 per cent falls during this period, 15 per cent during the post-monsoon (October) and pre-monsoon seasons (April to May), and the remaining 5 per cent during the winter (November to February) periods. The annual rainfall in Kathmandu generally exceeds 1,300 mm. Most part of the country average between 1,500 and 2,500 mm in annual rainfall.

Nepal can be divided into three major river systems from east to west: the Koshi, Gandaki and Karnali River respectively. All rivers ultimately become major tributaries of the Ganges River in the northern India. After plunging through deep gorges, these rivers deposit a large amount of sediment on the plains, thereby nurturing them and renewing their alluvial soil fertility. Once they reach the Terai Region, they often shift their course and overflow their banks onto wide floodplains during the summer monsoon season. The country is traditionally classified into three major geographic regions, notably, Mountain, Hill, and Terai regions.

A.3. GEOLOGY

Nepal can be divided into five major tectonic provinces from south to north separated by major thrusts and faults. These provinces extend to a general east-west direction. From south to north these include: Terai, Sub-Himalaya (Siwaliks), Lesser Himalaya, Higher Himalaya, and Tibetan-Tethys

Himalaya. These tectonic zones nearly correspond to the currently used five-fold classification of the physiography of Nepal into Terai, Siwalik, Middle Mountain, High Mountain, and High Himalaya. The Terai and Indo-Gangetic alluvial plain is separated from Siwalik Hills by the Himalayan Frontal Thrust (HFT); the Siwaliks are separated from the Lesser Himalayas by the Main Boundary Thrust (MBT); the Lesser Himalayas are separated from the Higher Himalayas by the Main Central Thrust (MCT); and the Higher Himalayas are separated from the Tibetan-Tethys Himalayas by the South Tibetan Detachment Fault (STDF). The boundary between the Indian and Eurasian plate is marked by the Indus –Tsangpo Suture Zone (ISZ) in Tibet.

The Terai is characterized by broad alluvial plains, and by extensive alluvial fans near the boundary with the Sub-Himalaya. The plain is composed of alluvial deposits that have been derived from the Hinterlands, and are estimated to be a few kilometers thick at the foot of the range.

The Siwaliks, comprising the Churia Hills consist predominantly of the uniformly dipping, openly folded members of the Tertiary Siwalik Group, which is composed of a thick series of mudstones, shales, sandstones, and conglomerates of mid-Miocene to Pleistocene age.

The Lesser Himalaya consist primarily of thick accumulations of low-grade metasedimentary rocks that include phyllites, quartzites, and carbonates, with minor amounts of granitic and metabasic rocks. Therefore, the age of the sequence is not well constrained, and is thought to range from Precambrian to Mesozoic age. Crystalline thrust sheets composed of schists, quartzites, and high-grade gneisses have overridden these metasediments.

The Higher Himalaya consist of a 3.5 to 10 km thick section of high-grade metamorphic rocks that has been thrust over the Lesser Himalaya to the south along the MCT. This crystalline basement consists of schists, gneisses, migmatites, etc., and is succeeded upwards by Tethyan fossiliferous rocks of Palaeozoic to Cretaceous age. These crystalline and sedimentary rocks were intruded by leucogranites 18 to 25 million years ago.

The Tethyan Himalaya, located between the Higher Himalaya and the ISZ, consists of a nearly continuous sequence of conformable sediments ranging in age from the Palaeozoic to early Tertiary. The sediments are up to 6 km thick and consist of shales, limestones, and flysch deposits.

In the broader sense, Himalayan region is characterized by the presence of highest peaks in the world covering about 14% of the total landmass, the mid hills with mountainous range and various river valleys covering about 68% and the southern plain region, Terai belt, which is considered as the grainary of Nepal covers about 17%. The Himalaya is said to be the most active and fragile mountain range in the world. The Himalaya is still rising and its rocks are under constant stress as the northward –moving Indian Plate is pushing it against the more stable Tibetan block. This pressure forces the Himalaya to rise and move horizontally southward along major thrusts. Frequent earthquakes also manifest the active nature of the range. Moreover, the inherently weak geological characteristics of the rocks make the Himalaya fundamentally very fragile. Triggering factors such as rainfall and earthquakes make the mountains highly vulnerable to landslides and other mass wasting processes. The combination of weak geology and a monsoonal climate makes each physiographic zone of Nepal unique in its vulnerability to landslides; at present the most active vulnerable parts of the Himalayas are the Siwalik and the Mahabharat ranges.

A better understanding of the geological nature of the terrain and the interplay of various triggering factors will greatly help in the development of safe infrastructures, mitigation of natural hazards, and the control of environmental degradation.

A.4. POLITICAL SYSTEM AND ADMINISTRATIVE DIVISION

Nepal is a multiethnic, multilingual, democratic and independent Hindu Kingdom with parliamentary democracy. The sovereignty of Nepal is vested in its people. The country is administratively divided into five development regions (Eastern, Central, Western, Mid-western and Far-western), which is further divided into 75 administrative districts corresponding to 14 Zones. A district consists of Municipalities and Village Development Committees (VDCs). There are 58 Municipalities and 3,915 VDCs in the country. Municipalities consist of 9 to 35 wards (the smallest administrative unit) and each VDC has 9 wards.

A.5. DEMOGRAPHY

Based on the results of the population census of 2001, Nepal has an estimated total population of 23,151,423. At present there are more than 60 ethnic groups residing in the country. The annual population growth rate is estimated at 2.24 percent. Urban centers, with well-developed public facilities, and lower fertile plains had relatively high population density (985.31 people per sq. km. in 2001). About 14.2 percent of total population live in urban areas. There are all together 4,253,220 households in the country. The overall literacy rate is 53.74 percent and 65.08 per cent of male population are found to be literate as against 42.49 per cent of females

A.6. ECONOMY

The economy of this country is mainly based on agriculture. The contribution of non-agricultural sector is gradually increasing in GDP. Over 58 per cent of the population fall under the category of economically active segment of population (in 2001). In the Terai, rice is the main cereal crop and other crops include pulses, wheat, barley and oilseeds. In the lower mountain valleys, rice is produced during the summer and wheat, barley, oilseeds, potatoes, and vegetables are grown in the winter. Corn, wheat, and potatoes are raised at higher altitudes, and terraced hillsides are also used for agriculture. Large quantities of medicinal herbs, grown on the Himalayan slopes, are sold worldwide.

Transportation and communication difficulties have hindered the growth of industry and trade. Hydropower is the main source of electricity in Nepal, and there are plans to further develop the potential of the nation's rivers. Nepal's trade is overwhelmingly with India. In recent years, significant deforestation and a growing population have greatly affected the country.

Poverty is pervasive in Nepal. According to unofficial sources there are still around 30 per cent of Nepalese people living below the poverty line. In Kathmandu Valley, the poverty rate is found only 4% and in other urban centres it is about 34%. The national average GDP per capita of Nepal is \$269, whereas that for the Kathmandu municipal area is around \$500. The overall urban unemployment rate is 7.4%, however, that for Kathmandu Valley is 9.6%. Informal employment rate of the country stands at around 375 per thousand.

A.7. DEVELOPMENT INITIATIVES

The Maoist insurgency in the country for almost one decade has caused to curtail the development works either dropped or lingered. Thus, human and nature induced disasters are jeopardizing the pace of development in the country. Despite these hurdles, the HMG/N, with its limited financial resources, along with its development partners are trying their best to meet the Millennium Development Goals (MDGs) by implementing its poverty reduction strategies.

Poverty alleviation is the overarching goal of the planned development initiatives of HMG/N. The Tenth Plan (2002 – 2007) has envisaged to reduce the poverty, unemployment, population growth as well as improving the basic need facilities of the people such as the supply of safe drinking water, electricity, food, health, housing facilities, etc. The long-term vision of the plan is also to increase the annual economic growth rate by 8.3 per cent, domestic production by 30 per cent and national investment by 34 per cent. The development of the physical infrastructure including road connectivity to be completed to all 75 districts, extension of irrigation facilities, expanding communication facilities to the rural areas are also on the priority agenda of the HMG/N.

As the country has been facing natural disasters every year, the Tenth Plan has given special emphasis to reduce disaster risk in the country. Attempts have been made to establish linkages between disaster and development. The government has also realized that the MDGs in general and poverty alleviation in particular cannot be achieved without reducing the disaster risk in the country. The Tenth Plan has allocated a separate sub-chapter on disaster risk management stating mainly the policies, approaches and broader strategies (refer Annex 3). The necessity of proactive approaches with greater emphasis on pre-disaster mitigation and preparedness planning has also been given adequate attention. Disaster management has been explicitly mentioned for the first time in the planned document in such manner and has provisioned for its proper implementation for the

sustainable, reliable and more effective mobilization of the resources to contribute to the safety of the people.

B. HISTORY OF DISASTER

The historical records show that Nepal has been suffering from various types of high degree disaster hazards. The entire country is prone to several types of disasters. The whole country is seismically active. The hilly areas, with rough topography and very young geology are very prone to landslides while the Terai¹ plains are prone to floods. Avalanches, Glacial Lake Outburst Floods (GLOF) and snowstorms affect high hills of Nepal

The biggest recorded disasters in Nepal are the earthquakes of 1934 and 1988 and the floods and landslides of 1993. The earthquake of 1934 put the country's economy in the shambles with 60 per cent of the houses damaged in Kathmandu Valley alone. Loss of lives due to different disasters in the country for last two decades is attached herewith in the table overleaf. Similarly, the earthquake of 1988 ruined the vital infrastructures in the eastern parts of Nepal. Similarly, damage caused by the flood and landslides of 1993 was about NRs 4 billion (equivalent to US\$ 55 million) in the five most affected districts among a total of 43 districts which had undergone through the impacts of it. This figure is equivalent to about 3 per cent of the country's annual government budget in that year. Besides disruptions in the normal life of the Nepalese the loss due to it in economic terms was 24 per cent of the total export earnings and 27 per cent of the gross fixed capital formation. Few predictions reveal that a major earthquake is in waiting in Nepal because of the nature of the seismic movements, which may affect the country severely.

It was estimated that the floods of 1993 retarded the country's development performance by at least two decades. Thus the disaster, among others, has been the instrument for underdevelopment and impoverishment process of the country. The recent on going predictions, based on the seismic movements, is that a major earthquake is due soon in the central hills and mountain region of Nepal, which is sure to affect the country severely.

¹ "Terai" is the plain and fertile land area of Nepal that stretches from east to west and is border to India to the south.

Table 1: Loss of Lives by Different Types of Disasters (1983-2003)

| Year/Types | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | Total |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Earthquake | 0 | 0 | 0 | 0 | 0 | 721 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 727 |
| Flood & Landslides | 293 | 363 | 420 | 315 | 391 | 328 | 680 | 307 | 93 | 71 | 1336 | 49 | 203 | 258 | 78 | 276 | 209 | 175 | 196 | 441 | 232 | 6714 |
| Fire | 69 | 57 | 52 | 96 | 62 | 23 | 109 | 46 | 90 | 97 | 43 | 43 | 73 | 61 | 45 | 54 | 46 | 53 | 26 | 11 | 8 | 1164 |
| Epidemics | 217 | 521 | 915 | 1101 | 426 | 427 | 879 | 503 | 725 | 1128 | 100 | 626 | 520 | 494 | 947 | 840 | 1207 | 141 | 154 | 0 | 0 | 11871 |
| Windstorms, Hailstorm & Thunder bolts | 0 | 0 | 0 | 0 | 2 | 0 | 28 | 57 | 63 | 20 | 45 | 47 | 34 | 75 | 44 | 23 | 22 | 26 | 38 | 6 | 60 | 590 |
| Avalanche | 0 | 0 | 0 | 0 | 0 | 14 | 20 | 0 | 0 | 0 | 0 | 0 | 43 | 4 | 9 | 0 | 5 | 0 | 0 | 0 | 0 | 95 |
| Stampede | 0 | 0 | 0 | 0 | 0 | 71 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 71 |
| Total | 579 | 941 | 1387 | 1512 | 881 | 1584 | 1716 | 913 | 971 | 1318 | 1524 | 765 | 873 | 895 | 1123 | 1193 | 1489 | 395 | 415 | 458 | 300 | 21232 |

Source: Ministry of Home Affairs, Disaster Management Section

C. DISASTER SCENARIO

Nepal faces a myriad of hazards, which combined with the growing population and severe lacking in education and awareness, result in very high degree of risks. Nepal, according to the recent study by UNDP/BCPR (UNDP, 2004) stands at 11th and 30th country with respect to relative vulnerability to earthquake and flood respectively. Another study ranks Kathmandu Valley as the at-risk city in the world with respect to risk measured in terms of potential death due to an earthquake.

Despite such bleak scenario, Nepal has made a steady and sustained stride towards disaster risk management in the last decade. The country responded positively to the Yokohama Strategy and Plan of Action, and has initiated several commendable strategies and initiatives, at government and non-government levels. Several initiatives in disaster risk management implemented by Nepalese NGOs have been regarded as successful cases and replicated in other countries of the region and the world. Such works includes, earthquake risk assessment, action planning, implementation of school level earthquake risk management programme, community-based local and district level disaster planning and preparedness, emergency response to high altitude hazardous events such as snow avalanches in the Mt. Everest region and so on. However, considering the magnitude of the problem there remains still other areas to be adequately addressed with additional efforts by HMG/N and non-governmental sectors.

This paper presents a brief account of Nepalese achievements and aspirations, and also portrays a scenario of challenges that needs to be addressed. It also contains the need for developing synergy among stakeholders from within and outside the country including the UN system, bi-lateral and multi-lateral agencies to cope with the impending disasters in the country. The paper also identifies priorities that Nepal, would like World Conference on Disaster Reduction (WCDR) to discuss for enhancing and strengthening Nepal's capability in disaster risk management including development of an effective emergency response system.

Nepal is exposed to several types of disasters ranging from earthquakes, floods, landslides, droughts, wind storms, avalanches, debris flow, GLOF, cloudburst, hailstorms, fires, epidemics, lightning (thunderbolts) and ecological hazards. A wide range of physiological, geological, ecological, meteorological and demographic factors contributes to the vulnerability of the country to disasters. Other major factors contributing to disasters are rapid population growth, slow economic development, high degree of environmental degradation, fragility of the land mass and high elevation of the mountain slopes. The recent disaster trends in the country are as following:

C.1. FLOOD

In Nepal floods affect mainly the Terai plains and some of the hilly valleys. The topographical feature of Nepal allows for flash flood during the rainy season. Even the small and dry streams can cause havoc during monsoon. As the altitude of Nepal decreases from north to south, the heavy rain in the northern hill areas and the catchment area of major rivers generate heavy flood in the Terai plains, which is densely populated. It is also found that the rapid melting of snow and ice in high mountains often trigger the floods. Every year, during the monsoon season flood of minor and major types affect a large area of agricultural land and leads to a colossal loss of various types of crops.

Beyond these, GLOF, torrential rainfall/cloudbursts in the middle mountains and foothills, landslides/debris flow in the rugged mountain regions also cause floods in Nepalese southern plains. Floods are found to be frequent incurring heavy damages to the life and property during the monsoon seasons in Nepal.

The ever-increasing settlements along the riverbanks, encroaching the rivers, and valleys are creating more hazards by floods in recent years. During the last ten years (1994–2003), 2,115 people were reported killed and 288,205 families were affected due to the floods and landslides in the country. In this way, floods and landslide disasters are the contributing factors of around 35 per cent of the total death and 65 percent of the total affected families from all kinds of natural disasters in the country.

C.2. EARTHQUAKE

Nepal is at high-risk from the point of view of earthquakes. One main reason for Nepal's vulnerability to earthquake is the poor construction of public buildings and private houses especially in densely populated areas like Kathmandu. Situated in the Himalayas and sitting squarely atop several thrust and fault zones, it experiences several tremors of earthquakes every year.

Nepal falls under the seismically active zone mainly due to the subduction of Indian plate under Tibetan plate. The country's high seismicity is related to the presence of active faults between tectonic plates along the Himalayas, mainly in the main boundary fault and the main central thrust. Chains of active faults run for around 100 km, interrupted by inactive sections. There are also active faults in the lower Himalayas and along the southern slope of the Siwaliks. The earthquake reported in Nepal dates back from 1255 A.D. However the first-ever severe earthquake had occurred in 1833 A.D. The most disastrous earthquake so far had hit the country in 1934, with 8.4 Richter scale in magnitude, and had completely or partially collapsed more than 38,000 buildings. It also took away human lives of 8542 people. In 1980, a tremor of 6.5 Richter scale magnitudes with its epicentre lying in Bajhang claimed 178 human lives and about 40,000 houses were damaged. Even more devastating earthquake with 6.6 Richter scale in magnitude struck the country in 1988 with epicentre in Udayapur district and a total of 721 lives were lost and several physical infrastructures damaged.

C.3. LANDSLIDE

Landslide is a chronic problem faced by Nepal encountering heavy losses of lives and properties, obstructions in development works and so on. The causes of landslides in Nepal are mainly due to the complex interaction of several natural and man-made factors. The natural phenomena like high relief, concentrated rainfall, soil erosion withdrawal of underlying as well as lateral supports by toe cutting and bank erosion, intense folding and fracturation of rocks, active geotectonic movements are responsible for landslides and debris flow. The human activities like deforestation, improper agriculture and irrigation practices, overgrazing on the slopes, unplanned quarrying for construction materials and building infrastructures on the hills slopes overlooking the bearing capacity are also responsible factors. Mainly during monsoon season, large area of mountain region succumbs under landslides and debris flow causing immense damages to agricultural lands and human settlements.

In Nepal floods, landslides and soil erosions are often interrelated. Some landslides are triggered by riverbank erosion and similarly landslides in the adjoining riverbanks aggravate most of the times the flash floods. Both these phenomenon occur during the monsoon season.

C.4. EPIDEMIC

The epidemic of cholera, gastroenteritis, encephalitis, meningitis are common during hot and rainy seasons. It is usually on the peak during the month of May and June (beginning of the rainy season). But the recent studies have revealed that the epidemics got into peak during the month of August also. The remote villages are found to be highly affected by epidemics outbreak in the community, every year, during short span of time by the diseases like diarrhoea, measles, typhoid and cholera and so on. During the last ten years (1994 – 2003) a total of 4,933 people have lost their lives due to such epidemics.

C.5. FIRE

Most of the fire problems occur during the dry season (March to May), especially in the Terai region when the temperature is high and the occurrence of strong winds. A total of 959 people were reported killed and about 60,243 houses were destroyed by fire during the last ten years. Some of the reasons for the fire outbreaks are improper use of fire for cooking and other domestic purposes and lack of adequate fire safety measures. As about 90% of the population of the country inhabit in the rural areas mainly in thatched houses and closely clustered, the fire hazards in the settlement area are more common.

On the other hand, every year fire has been destroying considerable amount of forest resources in Nepal. Forest fires occur annually in all major physiographic /climatic regions of Nepal, including the Terai, Siwalik and High Mountainous regions mainly during the dry season. Forest fire is the sole

cause of degrading biological diversity in Nepal's forests. It also causes soil erosion and induces floods and landslides due to the destruction of the natural vegetation indirectly. The main causes of forest fire are anthropogenic due to negligence and occasional deliberate burning of bushes to induce succulent grass growth for domestic animals. The embers from forest fire also causes fire in nearby villages, especially in the Terai region where the roofs are made of thatched grass.

The management of forest fire is a new phenomenon in Nepal. Though with a limited knowledge of planning for the systematic prevention and control of fire it is appreciable that the community forest user groups are exercising control over the forest fires through indigenous methods.

C.6. DROUGHT

The uneven distribution of monsoon rainfall is responsible for the drought situation. The northern part of the kingdom is generally dry. Primarily, the Terai region and western hilly areas are affected by drought almost every year. The insufficient irrigation facilities make the problem even more serious as prolonged drought condition has adverse effect in crop production. The process of desertification is also noticed in the northern hilly areas mainly in Mustang and Manang districts.

Unfortunately, the country lacks a clear and systematic picture of the effect of the drought in the country. However, the rough estimates show around 5,000 families are affected in different parts of the country due to drought and a significant amount of food grain production particularly the cereal production is decreased.

C.7. OTHERS

The hailstorm, windstorm, thunderbolt, glacier lake outburst floods and cold as well as hot wave are other forms of natural disasters that occur frequently with localized effects. The sudden avalanche and heavy snow fall in fair season sometimes cause heavy losses of human lives. Thousands of villagers in Nepal's remote mountainous districts fall in the grips of an unprecedented famine, which demands for the government's additional efforts to ensure the emergency food supplies. Unexpected and heavy hailstones and rainfall occasionally destroy seasonal crops of paddy, millet, wheat and maize leading to widespread hunger in remote mountain districts. Famines are not frequently reported as other natural disasters but it has been increasingly affecting the people every year. However, there has not yet been recorded any loss of human life due to famine so far.

D. RISK ASSESSMENT

D.1. GENERAL

Assessment of hazards and risk is a continuous process. In developing country, a blanket and uniform coverage by hazard mapping of all types of disasters may not be easy. But the initiation of hazard mapping of the country in a systematic manner is the best way to mitigate. The most adaptable strategies in the country, like Nepal, for mapping and assessment of hazard, vulnerabilities and risk, should be a consensus strategy based on a perfect understanding of the country's requirements. Such directives have not yet been developed in the country. However, there are few instances where some government agencies as well as few agencies in the non-government sector have prepared hazard maps based on their requirements. See Table 2 for some of the available hazard map informations.

D.2. RISK ASSESSMENT AND IMPACT ANALYSIS

So far, the country has not adopted any systematic approach for risk assessment. In this connection, UNDP has recently completed the disaster information/ inventory of the entire country for the last 33 years (1971 – 2003). The data/inventory could be shared among the concerned stakeholders benefitting the partners within and outside the country.

Nepal also lacks the impact analysis of disasters. The country has the information and analysis pertaining to the damage assessment of few disasters, mainly the larger ones.

The DHM, DWIP and MOAC have also done some exemplary works in analysing the risk and its impact in concerned areas including drought related hazards.

D.3. EARLY WARNING

There is no well-developed and well-structured early warning system in Nepal. However, a basic early warning system was erected in 1996/97 after the threat of Tsho-Rolpa GLOF in northern part of Nepal. It is considered as a perfectly installed system, which needs to be strengthened.

Though, Department of Hydrology and Meteorology provides basic weather forecast on a daily basis through the media, the degree of its reliability is not sufficient. Hence, the weather forecast system of the country needs to be upgraded.

Based on the weather forecast from national media, NRCS headquarters alerts district branches to be prepared for the probable disaster. Quickest communication channels are used for this purpose. As soon as the district chapters receive the information, possible means are immediately taken by the district chapters to inform the communities. Locally appropriate and available communication channels such as hand mikes, shouting, crying aloud or indigenous practices are used by the communities to make people aware and prepare themselves for the probable disaster. Community people themselves take initiatives in such activities.

Ministry of Health has established Early Warning Reporting System (EWARS) for reporting of major communicable disease outbreak i.e. epidemic. This system is functioning well in 28 districts of the country.

Table 2: Availability of Geologic and Hydrologic Hazard Maps and early warning system in other sections.

| Type | Available Map scales | Coverage | Agency | Remarks |
|---|----------------------|--|---|---|
| Geological Mapping | 1:50,000 | Almost the whole country | Department of Mines & Geology | |
| | 1:125,000 | Whole country | Dept. of Survey | |
| Landslide Hazard Maps (Inventory maps) | 1:125,000 and others | Mountainous parts of eastern and central development regions, and for Bajhang, Baitadi, Bajura, Doti, and Dadeldhura Districts | Department of Mines & Geology, ICIMOD, TU, UNDP, DOLIDAR and others | |
| Topographic maps | 1:125,000 | Whole country | Dept. of Survey | |
| | ONE INCH | Gorakha, Myagdi, districts | RCUP (MOLD) | |
| Hydrologic, Climatic maps | Small scale | Nation-wide | DHM | Hydro-met details can be obtained for very large to large basins. |
| Earthquake Hazard Map: Epicentre Map | 1:1 and 1:2 million | | DMG | |
| Earthquake Hazard Map: Microseismicity map | 1:1 and 1:2 million | | DMG | |
| Earthquake Hazard Map: Potential Max. Magnitude Map | 1:1 million | | DMG | |
| Earthquake Hazard Map: Liquefaction susceptibility map | 1:50,000 | Kathmandu | MOHA | |
| Health/Early warning reporting system for epidemic communicable disease | System in place | 28 districts | MOH/DHS/EDCD | Supported by WHO |
| Fire | In place | Whole country/Media information | MOHA | |
| Flood | At local level | Some districts of CBDMP | MOHA/DDC/DDRC | Supporting agency UNDP |

E. DISASTER MANAGEMENT CAPABILITIES

E.1. GOVERNMENT INSTITUTIONS / PARTNERS/ PROCEDURES

Currently, various agencies of HMG/N are assigned with different aspects of disaster risk management in Nepal. The Ministry of Home Affairs (MoHA) is designated as the lead agency responsible for implementation of the Natural Calamity (Relief) Act, 1982, which has provision for adequate legal backups to implement HMG/Ns policies and strategies addressing to overall disaster management and risk reduction. As per the Act, the other partners in this process are National Planning Commission Secretariat, Ministries for Finance; Foreign Affairs; Information and Communication; Water Resources; Physical Planning and Works; Health; Defence; Population and Environment; Forest and Soil Conservation; Women Children and Social Welfare; Industry Commerce and Supplies. A host of other government and non-government agencies including RNA, NP, DMG, DHM, SWC, NRCS, NS are also included in the present set up. The notable omissions, regarding organizational representation, in the Act is discovered to be the Prime Minister's Office and cabinet secretariat, Ministries of Local Development; Agriculture and Cooperatives; Education and Sports, DWIDP, APF in the government sector and none of the organizations presently contributing from the NGO sector. however, the important ones are represented in the Committee as the invitees.

As the lead responsible agency, MoHA is accountable for preparing national policies and ensuring its implementation. MoHA is also responsible for rescue and relief works, data collection, dissemination and collection and distribution of funds and resources to the affected population through the structured process.

Natural Calamity (Relief) Act 1982 is the legal instrument for handling disasters in the country. The Act provides for the establishment of Disaster Relief Committees at the central, regional, district and local levels. However, for all practical purposes the committees at the central level (CDRC) and district level (DDRC) are functional and the local level (LDRC) have yet to operate on a regular basis. Efforts are underway to operationalize the Regional (RDRC), which is chaired by the Regional Administrator.

CDRC, the committee consisting of 25 representatives from above mentioned government and non-government organizations and Chaired by the Minister for Home Affairs, is the apex body in the field of disaster management. CDRC is mostly found to engage in formulating short-term directives and approaches for dealing with disasters, particularly large event. While the CDRC has the privilege to meet as many times as required, it is found to be meeting at least two times a year, normally before and after the monsoon season.

The district-level DDRC have been constituted in all 75 administrative districts of the country. DDRCs draw representatives from the district level offices of the various line agencies related with law and order, emergency response (army, police and the district chapter of Nepal Red Cross Society), critical facilities and development institutions such as irrigation, road, livestock, health, etc. The Chief District Officer (CDO) is the chairperson of the committee, who is empowered to be the highest-level government official to take disaster-related decisions including rescue and distribution of relief materials following a disaster. S/he is also responsible for collecting disaster data with aim of assessing the disaster and providing rescue and relief.

DDRC also enjoys the privilege of meeting as many times as required. The decisions taken by DDRC include assessment of the situation and the need of government support. If the impact area is larger than a district, the CDOs have to recommend the matter to RDRC and MoHA for further appropriate actions.

In view of the fact that the NCRA, 1982 basically focusses on the rescue and relief works and does not specify the duties and responsibilities of other stakeholders, including the non-governmental sector. The Act is in need of comprehensive amendment to articulate the roles and accountabilities of key actors in disaster management. There is also an urgent need to formulate subsequent regulation to back up the provisions of the Act to be translated into action. The fire codes have to be formulated and the Fire Brigades should be strengthened. Similarly it is felt necessary to develop the civil defence system to replace the existing heavy reliance on army and police as the emergency responders.

E.2. ACHIEVEMENT SO FAR

Despite ongoing insurgency and paucity of resources, Nepal has been gradually picking up the momentum towards improving the disaster management in the country. Policy makers/ planners have shown interest in looking into the problems of disaster management from the economic and developmental point of view, an approach that is gaining broader support in the country.

A further positive feature is the considerable experience accrued by various levels of government in managing risk, reducing vulnerability and increasing preparedness and response capabilities at the community level. However, these experiences are not yet systematically analysed to extract lessons and feed into the macro-level policy and decision-making. The same can be observed at the sectoral level, where some sectors have advanced towards a more comprehensive approach to managing risk.

During the decade of 1990-1999, as the International Decade of Natural Disaster Reduction (IDNDR), HMG/N responded with the formation of IDNDR-National Committee within the MoHA auspices, which developed a National Action Plan for Disaster Management. This Action Plan includes important policy and institutional perspectives such as the establishment of the National Disaster Management Council and National Disaster Information System, which were supposed to be accomplished by the year 2000 but not have been materialized yet. This Action Plan was also approved in principle by HMG/N in 1996. A copy of the, recently, revised Action Plan is *Annexed in 1*. Nevertheless, there have been significant developments in the disaster management arena in the country during the decade and afterwards as following:

1. Disaster management has been incorporated with due preferences in the Tenth Plan.
2. Increasing involvement of the academicians, researchers, INGOs, NGOs, local bodies and civil societies in the disaster response;
3. Establishment of the Disaster Prevention Technical Centre (DPTC) which has been transformed into the Department of Water Induced Disaster Prevention;
4. Establishment of the Emergency Operations Centre within the UN premises;
5. Establishment of optimum seismic monitoring system within the Department of Mines and Geology;
6. Formulation of National Action Plan on Disaster Response; Implementation of pilot community led disaster mitigation programmes with the support of UNDP and Nepal Red Cross Society (NRCS);
7. The successful conduction of Community Based Disaster Management (CBDM) Programmes for the 300 communities in 33 districts by the NRCS.
8. Development of disaster related Action Plans in the 5 districts by the DDCs with support from UNDP.
9. Development and implementation of cost-effective water induced disaster such as landslide and participatory disaster mitigation measures by DSCWM;Preparation of management plan of sub-watersheds of some districts by DSCWM;
11. Detailed hazard maps of 4 districts by DWIDP.
12. Development of River Policy and Water Induced Action Plan by DWIDP
13. Establishment of National Mobilization Centre within MoHA in accordance with UNDAC provisions;
14. Formation and functioning of sectoral working groups in Food and Agriculture, Health and Logistics;
15. Health Sector Emergency Preparedness and Disaster Response Plan prepared and implemented since 2003 by the MoHe.
16. MoAC has also prepared its Response Plan.
17. Preparation of sectoral working manuals and sector specific work plans. This exercise helps facilitate the communication between HMG/N and other stakeholders, actors in following manners:
 - Exploring local financial and technical support;
 - Assisting HMG/N to assess the losses, identifying needs and formulating response strategies;
 - Liasoning with HMG/N to explore the external financial and technical supports;
 - To help monitor disaster situations on continual basis; and
 - To provide a forum for information exchanges.

18. Increasing realization on the part of the HMG/N and policy makers towards updated institutional set up to undertake Total Disaster Risk Management;
19. ADRC supported, and MoHA organized, Public Awareness Raising Program was highly applauded by the trainees of ten disaster prone districts. The beneficiary of this program included over 600 people from different parts of life including local leaders, schoolteachers, social workers and women leaders of the area.
20. MoHA, in joint collaboration with JICA, concluded a widely accepted Kathmandu valley earthquake study which paved the way for HMG to devise appropriate strategies to prepare and cope with the earthquake hazard.
21. Emergence and commendable works of institutions like the Nepal Engineering Association, Kathmandu Municipal Corporation, National Society for Earthquake Technology (NSET), Nepal Centre for Disaster Management (NCDM), Centre for Disaster Studies (CDS) in the Institute of Engineering, Nepal Geological Society, Nepal Landslide Society, Nepal Disaster Management Forum, etc.
22. Enactment of Local Self-governance Act, 1999 which bestows the responsibilities of disaster management at the local level by the local bodies (DDC/VDC);
23. Creation of Disaster Preparedness Network (DP Net) represented by government and non-government stakeholder, basically to exchange the information and experiences among the partners in the field of disaster management;
24. The successful implementation of the programs carried out by NSET such as KVERMP, SESP, SVAHN etc,
25. Pre monsoon Disaster Preparedness works carried out by NCDM
26. Compilation of the local and indigenous knowledge on local disaster management;
27. Promulgation of Building Act, 1999 and the formulation of the Building Codes. These Codes are implemented by Lalitpur Sub-Metropolitan City since 2003, which paved the way for HMG/N, by a decree, to make such Codes mandatory to all public buildings.

E.2.1. CAPABILITY ASSESSMENT

1. In 1997, UNDP has done a national level empirical study on the disaster management capability of different organizations. There is a need of updating these information as many new organizations have initiated activities in the field of disaster management.
2. MoHe has recently conducted an earthquake vulnerability assessment of the major nineteen hospitals of the Kathmandu valley. The findings of the study are available and indicate that majority of the hospitals in the Kathmandu Valley are in vulnerable conditions.
3. Several other stakeholders have also done assessments of different areas of the country. These information are scattered and scanty.

E.3. KNOWLEDGE MANAGEMENT

Several studies in the field of indigenous knowledge reveal that indigenous knowledge in the field of disaster management also exists in the country. Likewise, good practices also prevail in different parts of the country in the field of disaster preparedness, mitigation and prevention. However, such information and knowledge are scattered and scanty in the country.

Recently, UNDP has supported to prepare DesInventor software and database for time- series geo-referenced disaster information for the last 33 years (1971 – 2003).

The courses relating to disaster management is introduced at the secondary level and the undergraduate level in the schools and some colleges respectively.

Governmental and non-governmental organizations have been organizing disaster management training programmes especially in the field of total disaster risk management, training for instructor, community-based disaster management, hospital emergency preparedness management, collapse search and rescue, medical first responders, first aid, etc. at the regional, central, district and local/ community levels.

Earthquake Safety Day (Second week of January/ 2 Magh of the Nepali Calendar) and ISDR Day on the second Wednesday of October is continuously observed at the central and district levels, which have helped to raise awareness among the people.

E.4. PREPAREDNESS AND CONTINGENCY PLANNING/ EARLY WARNING:

Several agencies involved in the field of disaster realm have been organizing different types of disaster management training programmes at various levels such trainings include; basic disaster management, community-based disaster management, total disaster risk management, collapsed search and rescue, hospital emergency preparedness, mass casualty management, etc. Likewise, in the recent past few District Development Committees have prepared district disaster management action plans in GIS based multi-hazard mapping and vulnerability assessment.

At the macro level, contingency planning is still a new area to be ventured. Few development agencies like UN, bilateral agency like USAID has prepared contingency planning for their own agency specific mandate and/or need. However, there is a great need to expand the contingency planning at both the macro and micro/ agency level.

At the central level there is Central Disaster Relief Fund as an emergency fund, with the HMG/N, to be disbursed to the disaster victims. Similarly, the Nepal Red Cross Society also possesses some emergency funds to be distributed primarily to the disaster victims. Nepal Red Cross Society also maintains stocks of relief materials at different strategies locations.

So far, the country is still utilizing the traditional mechanisms to monitor the weather movement and lacks the latest technology (both the devices and trained human resources) for reliable weather forecasting and warning system. Because of the lack of latest weather forecasting devices and trained human resources, the extreme weather events are sudden and not possible to issue any effective warning in due time. This is aggravated due to the poor communication mechanism in the country. The communication mechanisms, both the system and devices, have suffered in the recent past due to the insurgency in the country. This also jeopardized the effective warning system in the country.

F. GOOD PRACTICES

F.1. COMMUNITY BASED DISASTER MANAGEMENT IN NEPAL:

Since 1996, UNDP and Nepal Red Cross have initiated the Community Based Disaster Management (CBDMP) programme to address the challenges of recurrent disasters in the country. CBDMP is centred around people, not technology. Therefore, it relies on social mobilization process and promotes indigenous/ local knowledge on disaster mitigation and preparedness ensuring participatory, sustainable and cost effective measures. It has tried to link disaster with development and help local disaster victims, the men and women, to be organized.

F.2. EARLY WARNING INTRODUCED IN TSHO ROLPA GLACIER LAKE OUTBURST FLOOD:

Tsho Rolpa Glacier Lake, situated at an altitude of 4,580 meters a.s.l., with 80 million cubic meters of water is a living threat to 18 Village Development Committees of Dolakha and Ramechhap districts. Upon receipt of the experts warning that the lake could outburst any moment, the Central Natural Disaster Relief Committee (CNDRC) had immediately taken essential countermeasures in 1997 to save the lives and properties of the villagers. These measures include, reducing volume of water by installing five siphons, moving the settlements to higher elevations from vulnerable riverbanks, installing eleven early warning sirens, establishment of surveillance posts and 24 hr radio announcement to warn the community of foreseen danger. The outburst of the glacier lake has not yet occurred.

F.3. KATHAMNDU VALLEY EARTHQUAKE RISK MANAGEMENT PROJECT (KVERMP)

KVERMP, a model of earthquake risks assessment for the city of developing countries, included a wide variety of activities aiming at self-sustaining earthquake risk management program for Kathmandu Valley. It has developed an earthquake scenario and recommended an action plan for earthquake risk management in the Valley. The other components included School Earthquake Safety Program (SESP) and awareness raising and institutional strengthening.

Under the SESP, more than 60 percent of the school buildings were found highly vulnerable to use even in normal conditions. In this regard, a pilot demonstration of retrofitting of a school in 1999 and

training to the masons in the technology of earthquake resistant construction have helped encourage several schools to undergo retrofitting and the spreading of this technology to the wider part the community and institutions in Nepal. These initiations have also helped develop a technical manual for designers and the builders to undertake earthquake safety measures. It has drawn wide international attention and exchanges made with similar initiatives in Kobe, Istanbul, Bandung and Uttaranchal in India.

Under the awareness-raising component, demonstration of an improvised shake table to enhance the personalized earthquake risk perception has become very popular in Nepal and in the Asian countries. NSET, a Nepali NGO, has received Tech Museum Laureate (Microsoft Education Category) award by the Tech Museum of San Jose California for this innovative venture.

F.4. HOSPITAL VULNERABILITY REDUCTION

The Disaster Health Working Group created a National Disaster Preparedness and Emergency Response Plan, and embarked upon seismic vulnerability assessment of the major hospitals of Nepal. The task was preformed jointly by the Ministry of the Health and the World Health Organization (WHO-Nepal). This effort has resulted in the development of structural and non-structural seismic vulnerability assessment of hospital system including the building, the content and their functionality. The work was the first of its kind in South Asia and hence the methodology has been published for wider access in the region.

G. DISASTER MANAGEMENT CHALLENGES AND OPPORTUNITIES

Nepal is exposed to several types of disasters every year. It is found that there are 1.06 reported events of disasters per day on the average in Nepal causing the loss of lives and properties as well as destructing the development works. HMG/N is compelled to spend large amounts to recover such losses but very little have been done to reduce the risk of it so far.

The plans and policies also lack adequate attention in the field of pre-disaster works. Large parts of the population in the country are still not aware of natural disasters. Though, the country is suffering from disasters on a continual basis the studies regarding to identify most vulnerable places and types of disasters are still inadequate. Prioritized disaster events/hazards and their preparedness and mitigation parts are completely lacking except for few urban centers. Similarly, the prior, during and post disaster activities for different hazards are yet to be established.

In Nepal, the disaster related works are done on an ad-hoc basis. The priority, so far, is mostly focussed on the post disaster activities i.e. rescue and relief works.

The past decade has witnessed several achievements made by Nepal in the field of disaster risk reduction. These include development of methodology for risk assessment and action planning at municipal and district levels for the implementation of complex community-based programs successfully. In order to efficiently manage the disaster in the pre, during and post period, Nepal has also tried to get engaged into it in a more professional manner. As a result there had been enough efforts made in formulating perspective and periodic plans of disaster management. Nepal is generally regarded very proactive in:

- a) Implementation of community-based programs,
- b) Earthquake risk management and implementation of school earthquake safety programs,
- c) Informal education and awareness, and
- d) Successes in implementing joint programmes by local bodies and NGO/INGO.

Inadequate policy and legal environment is the biggest impediment. Such condition inhibits replication of the successful cases to other places although there are high potentials for the same. Development of an efficient and effective institutional mechanism had always been preferred but without any successes. Absence of organizational outfit at the highest level that could be tasked to provide intellectual and administrative leadership is seriously noted in Nepal. In fact, the country could learn from the experiences of the other countries like Japan, India, Bangladesh and many other nations to provide a strong and efficient leadership to undertake all issues of disaster reduction and management. Thus, improving on the role of leadership and the creation of the National Disaster Risk

Management Council or National Emergency Operations Centre, backed by appropriate legislative instrument, seems to be the priority agenda for Nepal. UN system may also be interested to assist in such ventures.

Responsible stakeholders have been meeting frequently at the governmental as well as non-governmental level to review the performances of the programs. The monitoring and evaluation of disaster-related projects and programmes have also been conducted on regular basis. Such serious attentions of all stakeholders have brought a sense of belongingness with the sector to guide its future priorities and actions.

H. NATIONAL, REGIONAL AND INTERNATIONAL COOPERATION

Several government agencies are involved in disaster prevention and mitigation works in close cooperation with various international agencies such as: JICA, ADRC, ADPC, UNDP, WHO, UNISDR, UNOCHA, UNDAC, USAID/OFDA, UMN, CARE, WFP, SCF alliance, GTZ, LWF, Action Aid Nepal, ADRA, etc. Besides, various other professional and non-governmental organizations like NRCS, NS are providing highly valuable support at the time of natural disasters. Some other professional and non-governmental organizations of Nepal like DWIDP, NSET, NCDM, NGS, NLSS, NDMF, and few others have contributed significantly by conducting research and capacity building programmes to enhance public awareness in the country.

The IFRC, through the Nepal Red Cross Society, is actively engaged in community-based activities and raising disaster management capacity at the community and district levels. ICIMOD has also been assisting to develop hazard maps assessing the risks and analyzing vulnerability in the Hindu Kush area. The Government of France provided assistance to the Department of Mines & Geology to establish 21 microseismic stations to record the magnitude of the earthquake.

I. NATIONAL PRIORITIES

Following are the main priority areas of the country:

- Emergency response planning and capacity enhancement,
- Strengthening policy and legal environment
- Efficient and effective reconstruction and rehabilitation.
- Institutional reform
- Human resources development in disaster preparedness

ANNEX I (A)

Component-1

Political Commitment and Institutional Aspects

1.1. Are there National policy, strategy and legislation addressing disaster risk reduction?

Nepal has enacted Natural Calamity (Relief) Act in 1982, which is amended thrice. Being enacted earlier it has focused basically on the relief/ rescue activities and opts to be amended in the field of comprehensive disaster risk management in general and preparedness and mitigation in particular.

1.2. Is there a national body for multi-sectoral coordination and collaboration in disaster risk reduction, which includes ministries in charge of water resource management, agriculture/land use and planning, health, environment, education, development planning and finance?

Under the Disaster Relief Act there is the provision of Natural Relief Committees at Central, Regional, District and Local levels. The Central Natural Disaster Relief Committee is comprised of as a national body for multi-sectoral coordination and collaboration in disaster management. This committee is primarily comprised of government agencies excluding the Ministry of Education and Sports, Ministry of Local Development and Ministry of Agriculture and Cooperatives. However, there are few other forums such as Sectoral Working Groups (Food and Agriculture, Health and Logistics) and Disaster Preparedness Network (DP-Net), where government agencies, multilateral, bilateral and I/NGOS are also the members.

1.3. Are there sectoral plans or initiatives that incorporate risk reduction concepts into each respective development area (such as water resource management, poverty alleviation, climate change, adoption, education and development planning)?

For the first time in Ninth Plan (1997-2002) the base paper was initiated for disaster management. His Majesty's Government of Nepal has initiated activities for integrating disaster risk reduction into development initiatives. The Tenth Plan (2002 -2007) has made it compulsory that there should be environment impact and natural disaster appraisal of each infrastructure or projects before its implementation. However, it is much more essential for its proper implementation and regular monitoring aspect of the plan.

1.4. Is disaster risk reduction incorporated into your national plan for the implementation of the UN Millennium Development Goals (MDGs), Poverty Reduction Strategy Paper (PRSP), National Adaptation Plans of action, National Environmental Action Plans and WSSD (World Summit on Sustainable Development) Johannesburg Plan of Implementation?

In the recent past several sectoral ministries/ agencies have initiated to incorporate the disaster risk reduction initiatives in their plan. In the recent the review exercises of the MDGs and PRSP, disaster aspect has been identified as one of the threat to achieve the MDGs and poverty reduction in the country.

1.5. Does your country have building codes of practice and standards in place, which takes into account seismic risk?

Yes, Nepal developed National Building Code in 1994. However, due to several factors (technical, social and economic) it is not yet implemented effectively. Nonetheless, few Municipalities, particularly in the Kathmandu Valley have initiated to implement parts of its in their respective locality/ area.

1.6. Do you have an annual budget for disaster risk reduction?

In the national budget, the government has not allocated separate budget line for disaster risk reduction. There are some mechanisms to respond post disaster scenario such as the provision of the Central Disaster Relief Fund and Prime Minister Relief Fund, which are used on relief, reconstruction

and rehabilitation activities. Likewise, several non-governmental organizations are contributing significantly in the field of disaster risk reduction efforts through the direct implementation of activities and/or working/ supporting government initiatives.

1.7. Are the private sector, civil society, NGOs, academia and media participating in disaster risk reduction efforts?

Yes: Private sectors, civil society, I/NGOs, Academia and Media are participating in disaster risk reduction efforts in many ways. Civil Societies are also active and creative in disaster prone areas for safeguarding people's wealth and property. Academicians have shared their knowledge and experience to minimize the possible losses due to disasters. Similarly, media also has played significant role pointing out the crucial aspects of disaster management at the national level. Several I/NGOs and other actors are actively working in the field of disaster management since the natural disasters of 1993. In every districts (75) there is a District Natural Disaster Relief Committee (DDRC) chaired by the Chief District Officer, which gives attention on the possible measures of disaster risk reduction.

Component -2

Risk Identification.

2.2 Has your country carried out hazard mapping/assessment?

Yes, Department of Mines and Geology, Department of Water Induced Disaster Prevention and United Nations Development Programme have carried out GIS based hazard mapping and vulnerability assessments at very micro level. However, there is a need to carryout the GIS based multi-hazard mapping and vulnerability assessment at the national level.

2.3 Has your country carried out vulnerability and capacity assessments?

To date, we have not carried out capacity assessment in details. Sporadic assessments have taken place from time to time by different organizations according to their needs. Such capacity assessments are not adequate and don't represent the assessment of the entire country.

2.4 Does your country have any mechanisms for risk monitoring and risk mapping?

We have some mechanisms at the micro level, such as the Glacial Lake Outburst Flood mechanism initiated by the International Center for Integrated Mountain Development, however, lacks the macro level for risk monitoring and mapping mechanism.

2.5 Is there a systematic socio-economic and environmental impact and loss analysis in your country after each major disaster?

So far several agencies both governmental and non-governmental are engaged in collecting post-disaster related information. However, there is lack of systematic socio-economic and environmental impact analysis of such collected information and disaster.

2.6 Are there early warning systems in place?

Not at the national level. But one early warning system was put in place in 1996/97 after the threat of Tsho-Rolpa Glacial Lake Outburst Flood (GLOF) in northern part of central Nepal. Likewise, Department of Hydrology and Meteorology provides basic weather information daily. However, the weather forecast mechanisms need to be upgraded.

Component -3

Knowledge Management

3.1 Does your country have disaster risk information management systems (governmental and /or non-governmental)?

The Ministry of Home Affairs and the Nepal Red Cross Society (NRCS) collect the post disaster information of the entire country through the DDRC, district police offices and district and sub-district

chapters of NRCS respectively. The collected information is disseminated through different government/non-government agencies. Recently, UNDP has also prepared a DesInventor software and database for geo-referenced disaster information of the last 33 years (1971–2003).

3.2 *Are the academic and research communities in the country linked to national or local institutions dealing with disaster reduction?*

Disaster is not taken as the issue of the priority. Therefore, at present neither academic institutions nor the research organizations have given due attention in this field. Nevertheless, such institutions have shown interest to work in this area. However, in the government sector DWIDP has conducted the survey of the water induced disaster prone areas in the country. Similarly, Ministry of Home Affairs has carried out research work on the earthquake menace of the Kathmandu valley in collaboration with JICA Nepal.

3.3 *Are there educational programmes related to disaster risk reduction in your public school system?*

Yes, we have initiated educational programmes relating to disaster risk reduction in the level of secondary schools. Some of the colleges also have introduced disasters management in their curriculum at the undergraduate level.

3.4 *Are there any training programmes available?*

Yes, several governmental and non-governmental organizations have been organizing different types of disaster management training programmes such as total disaster risk management, training for instructor, community-based disaster management, hospital emergency preparedness management, collapse search and rescue, medical first responders, first aid, etc. at the regional, central, district and local/ community levels.

3.5 *What kind of traditional indigenous knowledge and wisdom is used in disaster-related practices or training programmes on disaster risk reduction in your country?*

Several kinds of indigenous knowledge on disaster management exists in regularly disaster hit isolated remote areas of the country. Unfortunately, we have not documented such practices. Such practices include, early warning, river training/ flood control/landslides control/management with the use of locally available materials. There is a great potentiality to enhance/ replicate such low cost mechanisms to reduce disaster risk in the country.

3.6 *Do you have any national public awareness programmes or campaigns on disaster risk reduction?*

Every year we commemorate the Earthquake Safety Day (Second week of January / 2 Magh of the Nepali Calendar) and ISDR Day on the second Wednesday of October. For the several years such days are celebrated not only at the central level but at the district levels as well. IDNDR day was commemorated in the previous decade through out the country. The Ministry of Home Affairs is seriously paying attention to raise awareness basically in the disaster prone areas.

Component –4

Risk Management Applications/Instruments

- 4.1** *Is there any good example of linking environmental management and risk reduction practices in your country (key areas of environmental management may include coastal zone, wetland and watershed management, reforestation and agricultural practices amongst other's)?*

So far no, however, the Tenth Plan has cast eyes over disaster reduction and environment linkage.

- 4.2** *Are financial instruments utilized in your country as a measure to reduce the impact of disasters (e.g. insurance/reinsurance, calamity funds, catastrophe bonds, micro-credit finance, community funds etc.)?*

Such financial mechanisms (Insurance etc) are non-existent in the country. However, at the national level there is a Disaster Relief Fund, which supports disaster relief/ rescue activities. The Central Disaster Relief Fund is managed by the Central Disaster Relief Committee, which is chaired by the Home Minister. Such fund is provided to the natural disaster victims as a means to meet the immediate need of the victims.

- 4.3** *Please identify specific examples of technical measures or programmes on disaster risk reduction that have been carried out in your country.*

Several initiatives have been implemented by different agencies in the country such as school earthquake safety measures, sabo countermeasures, bioengineering, embankment, terrace improvement and so on.

Component –5

Preparedness and Contingency Plan

- 5.1** *Do you have disaster contingency plans in place? Are they prepared for both national and community levels?*

Yes, we have prepared national plan of action on disaster management in 1996 and now we are in final stage to update it. Likewise, for the first time in Nepal, District Disaster Management Action Plans have been developed for few districts based on GIS multi-hazard mapping and vulnerability assessment.

- 5.2** *Has your government established emergency funds for disaster response and are there national or community storage facilities for emergency relief items-mainly food, medicine, tents/shelters?*

At the central level there is a Central Disaster Relief Fund, which is established according to the Natural Calamity (Relief) Act, 1982. This fund is disbursed to the disaster victims. Likewise, the Nepal Red Cross Society also has provision of such funds primarily for the disaster victims. Nepal Red Cross Society has also maintained storage facilities in different strategic location of the country, where they have stockpiles of such relief materials. From the Government side the expansion of the warehouses in five development regions is proposed to establish sooner.

- 5.3** *Who is responsible for the coordination of disaster response, preparedness and is the coordination body equipped with enough human and financial resources for the job? Please comment on the effectiveness of the coordination work done so far?*

So far, the Ministry of Home Affairs is responsible for the coordination of disaster relief/ rescue activities. Due to paucity of financial resources and inadequate legal backups the Ministry of Home Affairs is lacking to address the issue effectively. Therefore, there is a felt need in the country to enhance the comprehensive disaster relief/ rescue and preparedness/ mitigation activities in the country.

Component –6

Call for good Practices in disaster risk management

1. **Early warning system introduce in Tsho Rolpa Glacier Lake Flood**

Tsho Rolpa Glacier Lake is situated at an altitude of 4580 meters from the sea level. Water volume in this lake has been estimated to be 80 million cubic meters. It has been observed that the physical size of this lake has increased by five times since 1960. In 1997 Glacier Lake Outburst (GLOF) Specialist warned that the lake might burst in the summer of the same year, which may affect 18 VDCs of Dolakha and Ramechhap districts. Therefore, in view of the above danger, CDRC decided to adopt necessary countermeasures and constituted a "Tsho Rolpa Glacier Lake Water Induced Disaster Prevention Committee". As a result, some countermeasures were adopted in June 1997 which include:

- Reduction of the volume of water in the glacier by fixing five siphons and cutting down the mouth of the lake.
- Moving up the possible affecting inhabitants of the downstream by 20 meters from the Rolwaling riverbank.
- Establishment of the early warning system by installing sirens in 11 vital points.
- Establishment of surveillance posts and the team comprised of Royal Nepal Army, communication personnel and specialists from the DHM to carry out regular monitoring of the glacier out flow and to provide instant information to the concerned authorities.

2. **Community Based Disaster Management Programme (CBDMP)**

Inaccessibility to remote parts of the country causes most of the victims and injured ones to die in absence of medical care. The emergency relief materials often arrive too late or not at all.

Since 1996, UNDP and Nepal Red Cross have initiated the CBDMP in order to meet the annually increasing challenges of recurrent disaster in the country. This is a major shift from a stereo typed disaster management approach to a more holistic one that strengthens the community's capacity to cope with hazards by encouraging them to live with disaster. CBDMP model is heavily relied on social mobilization promoting indigenous knowledge on disaster mitigation and preparedness, which is based on more participatory, sustainable and cost effective approaches. The CBDMP is successful to mobilize the local expertise and resources through extensive consultations locally. It is also found to emerge as an avenue to link disaster with development and to help lessen the social conflicts in the country. In addition, this approach has not only helped the communities to be prepared to mitigate disaster but also helped the local disaster victims to be organized.

3. **The Kathmandu Valley Earthquake Risk Management Project (KVERMP)**

KVERMP is implemented with the objectives to evaluate Kathmandu Valley's earthquake risk and prescribe an action plan for managing it. The other areas of consideration included reduction of the public school's earthquake vulnerability; raising awareness among the people residing in the valley and building local institutions that could sustain the work of this project.

KVERMP has drawn a suggestive action plan to address the risk of earth quake in the Kathmandu valley. The other components such as School Earthquake Safety Program (SESP), Mason Training Program, Awareness Raising are regarded as the comprehensive programs with several advantages. The experiences through this programme are replicated in several cities around the world under the UN project RADIUS, and in several municipalities in Nepal as the Municipal Earthquake Risk Management Project.

Under SESP component, based on the survey of vulnerability assessment of about 1100 buildings of 643 public schools, it was discovered that the public schools that more than 60% of the buildings were highly vulnerable to operate even in normal conditions. It encouraged having a pilot program for retrofitting of one of the public schools in 1999, which lead more than 20 other schools in different parts of the country to retrofit their buildings. This Programme has also helped educate local masons in earthquake resistant construction techniques who later became the trainers to their own

communities. The experiences of this program have been translated into a technical manual in designing and implementing earthquake resistant school building constructions. Presently, exchanges have been made with similar initiatives in Kobe (Japan), Istanbul (Turkey), Bandung (Indonesia) and Uttranchal (India).

Awareness raising component of it has also been widely acclaimed. The notable among it is the 'Shake Table' model with earthquake-resistant elements produced by NSET, which usually sustains minor damage even at higher levels of shaking. These damages, when in real buildings, can be easily repaired after the earthquake without expecting any outside resources. This model is popular among the international NGOs, US agencies, Iran, Uttranchal and Himanchal Pradesh in India, Tajikistan, Afghanistan. This model has been recognized by the Tech Museum of San Jose, USA as an innovative technology and has awarded the prestigious Tech Museum Award under the Microsoft Education Award category.

4. Seismic Vulnerability Assessment of Hospitals of Nepal

The studies, based on its sample analysis, have shown that about 80% of the hospitals fall in the unacceptable performance category for new construction and remaining 20% of the hospitals are at life safety to collapse prevention performance level. It had recommended that the improvement in the seismic performance were very much necessary. The securing of all equipment and contents, strengthening of critical systems, training for hospital personnel and provisions of some backups in critical systems were proposed for implementation in the first phase. Seismic retrofitting of hospital buildings, further strengthening of critical systems and provision of extra back up systems were the activities for second phase. Considering the opportunity of immediate implementation of non-structural risk mitigation, some examples of mitigation options to solve the problems were developed during the study. As a result of its acceptability by the concerned agencies the Guidelines are also produced, which are being used as the training materials for such assessments.

Component –7

Priorities to be addressed at world conference on disaster reduction.

Following are the priority areas of the country:

- Emergency response planning and capacity enhancement,
- Strengthening policy and legal environment
- Efficient and effective reconstruction and rehabilitation.
- Institutional reform
- Human resources development in disaster preparedness

ANNEX -1

DISASTER RESPONSE ACTION PLAN MATRIX

| S. No. | Priority Segment | Item and Activity | Current Status | Future Plan | Completion date | Lead Agency | Supporting Agency |
|--------|-------------------------------|---|---|--|--|--------------------|--------------------------|
| A. | Evacuation, Search and Rescue | A1. Preparation of evacuation plan of public and other establishments | Incorporated in the housing policy. | <ul style="list-style-type: none"> Implementation of evacuation plan for public buildings Replication of such plans in other establishments Enforcement of evacuation plan for all buildings through local authorities. | <ul style="list-style-type: none"> 2006 2008 2006 | MPPW | MoHA, MoLD |
| | | A1.1 Rehearsals/simulation exercise | Already started | Will be extended to more geographical locations | Ongoing | MoHA, NRCS | UN, NGOs |
| | | A2. Identification of emergency evacuation sites at local level | In process of identification in vulnerable districts | At least one site will be identified in the vulnerable district headquarter | 2005 | DDRC | CBOs |
| | | A3. Formation of permanent search and rescue team at district and local levels. | Already formed in some identified vulnerable districts | Strengthen the teams with logistic and equipment support | Ongoing | MoHA, RNA, APF, NP | NRCS, DDRC, NGOs, CBOs |
| | | A4. Capacity enhancement in search and rescue operation | Training for rescue personnel are conducted on annual basis | Training for rescue personnel, municipal police and other stake holders will be continued | Ongoing | MoHA, RNA, NP, APF | NS, NCC, SWC, NGOs, CBOs |
| B. | Emergency Need Assessment | B1. Formation of a permanent need assessment team at district level | Formed in all districts during disaster. | Permanent teams will be formed and capacity enhanced. | Ongoing | DDRC | |
| | | B2. Preparation and dissemination of standard format on need assessment | Already prepared and disseminated to DDRCs | Further improvement will be done as required | Ongoing | MoHA, NRCS | |
| | | B3. Training and orientation on need assessment | Already started in some districts | To be extended in other disaster prone districts | On going | DDRC | Other line agencies |

| | | | | | | | | |
|----|--|-----|--|---|---|---|---------------------|--|
| C. | Communication and Transportation | C1. | Establishment of Emergency Operations Centre (EOC) at district level with access to the centre level | Not yet established; DDRRC communicates RDRRC and CDRC on an ad hoc basis | Establishment of well equipped and functional EOC at district and Central level | Central level EOC by 2005. District level in a phased manner. | MoHA | |
| | | C2. | Equip EOC with necessary communication facilities | NA | Installation of necessary communication facilities at EOC | At the central level by 2005 | MoHA | |
| | | C3. | Communication network at the district level | Communication network exists for general purpose only | Installation of reliable communication facilities in the districts and the EOC | 2006 | MoHA | |
| | | C4. | Preparation of inventory on logistics/ transportation facilities and its updating. | Already prepared in 1997 | Will be updated | 2005 | UNDP | Other donors |
| | | C5. | Procurement of appropriate transportation vehicles for rescue and relief operations | Only limited number of ambulances are available mostly in the urban areas | Procurement of more ambulances and vehicles for rescue and response | 2008 | CDRC, NRCS | DDRRC, private sectors and civil societies |
| D. | Temporary Settlement | D1. | Include open spaces in urban planning for post disaster temporary settlement sites | Identified in some districts | Will be identified in all districts | 2006 | MoPPW, Local bodies | |
| | | D2. | Prepare settlement plan at local level | Already started in some areas | Will be continued | Ongoing | MoHA, MoPPW | |
| | | D3. | Establish warehouses and stockpile light shelter materials (Plastic sheets, tents etc) at district level | Already established by NRCS in some strategic locations | Increase number of warehouses and stockpile light shelter materials | 2008 | NRCS, MoPPW | |
| E. | Health Preparedness for Survivor Response and Coping | E1. | Health Sector Emergency Preparedness and Response | | | | | |
| | | a) | Include emergency preparedness and response component in health sector program implementation plan. | Process already initiated | Implementation of health sector emergency preparedness and response programme | Ongoing | MOHe | WHO |
| | | b) | Develop Standing Operating Procedures (SOPs) to respond to health sector disaster. | Tools and reference for health emergency responders on progress | Develop full fledged SOPs | 2005 | MOHe | WHO |
| | | c) | Extend emergency preparedness programs from central to regional and district level. | Training for district rapid response teams initiated | Will be continued | Ongoing | MOHe | NGOs |

| | | | | | | |
|-----|--|---|--|---------|-----------------------------------|--|
| d) | Enhance capacity of hospitals and health facilities for responding to disasters. | Several medical and health workers have been trained | Capacity and health facilities of hospital will be enhanced | 2006 | MOHe, Hospitals, medical colleges | WHO, |
| e) | Formation of medical assistance team to counsel depressed victims. | Teams are formed as and when required | Strengthen capacity of the teams | Ongoing | MOHe, Hospitals, medical colleges | WHO, NGOs |
| f) | Implement seismic vulnerability reduction (structural and non-structural) measures in the major hospitals. | Assessment of 19 major hospitals (14 in Kathmandu Valley and 5 outside) already completed | Piloting of seismic vulnerability reduction in some hospitals. | 2006 | MOHe, Hospitals, medical colleges | WHO, NGOs |
| g) | Storage of emergency medicines and medical instrument at local level | Implemented | The storage of emergency medical supplies will be ensured | Ongoing | MOHe, Hospitals, medical colleges | WHO, NRCS, |
| h) | Setting up of mobile medical teams to respond to disaster. | Mobile health teams are deployed as and when necessary | Training to medical officers and nurses including other health workers will be continued | Ongoing | MOHe, Hospitals, medical colleges | NRCS, NGOs, WHO, |
| i) | Establish disaster unit in each public hospitals | Established in some hospitals | Establishment of disaster units in all hospitals | 2006 | | MOHe, Public Hospitals |
| E2. | Sanitation and drinking water | | | | | |
| a) | Storage of bleaching powder for chlorination of water in temporary resettlement sites | Procured and stored according to the needs. | Will be maintained with adequate quantity | Ongoing | MOHe | Hospitals, medical colleges, UNICEF, WHO, I/NGOs |
| b) | Storage of polythene pipes at local level for drinking water supply | Provisioned in some districts. | Will be replenished | Ongoing | MoPPW | MoLD, NRCS, |
| E3. | Enhance coping mechanism skills | Some micro level training programmes have been organized | At least 50 local people are trained every year in sanitation in each district. | Ongoing | DDRC, NRCS, | I/NGOs, WHO, |
| E4. | Establish temporary Local Emergency Management Authority. | Established as and when required. | Will be continued | Ongoing | MoHA, | Other line agencies, NGOs |

DISASTER PREPAREDNESS ACTION PLAN MATRIX

| S.No. | Priority Segments | Items and Activities | Current Status | Future Plan | Completion date | Lead Agency | Supporting Agency/supporting agencies |
|--|---|--|--|---|---|-------------|---------------------------------------|
| A. | Reformulate appropriate Policy and Planning | A1. Identify responsible institutions. | Institutions are identified | Will be continued | Ongoing | MoHA | |
| | | a) Establishment of the National Disaster Management Council (NDMC) | Not yet constituted | Establishment of a fully functional NDMC | 2005 | MoHA | NPC, MoF |
| | | b) Finalize organizational structure, role and responsibility for disaster Management Committees/ Units/ agencies at central, regional, district and local levels. | Not yet developed. | Will be developed | 2005 | MoHA, MoLD | MoLJ, MoWR |
| | | A2. Providing legal framework | | | | | |
| | | a) Review existing laws on disaster management | Under progress. | A high-level committee will be formed for such reviews. | 2005 | CNDRC | NPC, MoHA, MoLJ, MoLD |
| | | b) Prepare draft amendment and formulate new laws and by-laws on sustainable disaster management | Preliminary draft on River Management Policy and Disaster Management Policy are prepared. | Will be approved and implemented | 2005 | MoHA, CNDRC | MoLJ, NPC, MoWR, |
| | | A3. Adapting National Policy and Plan | | | | | |
| | | A3-1 Incorporate Disaster Management policy in 10 th Plan | A sub-chapter is especially entrusted for disaster management in the 10 th Plan | | | | |
| | | A3-2 Review of National Action Plan (NAP), 1996 on Disaster Management | Under progress | National Action Plan will be reviewed | 2005 | MoHA, NPC | Line ministries |
| | | a) Prepare TOR for task force to review the NAP | Under progress | A comprehensive National Action Plan will be developed | 2006 | MoHA, NPC | Line ministries |
| b) Appoint national consultants/ task force for the review | Under progress | Will be appointed | 2005 | MoHA, | Line ministries and other disaster actors | | |

| | | | | | | | | | |
|----|---|------|---|---|--|---------|-------------|--------------------|--|
| B. | Measures related to Geological, Hydrological and Meteorological Hazard Assessment | c) | Adoption of the NAP | | Will be adopted | 2006 | NPC, MoHA | | |
| | | d) | Publish the NAP | | Will be published and disseminated | 2006 | NPC, MoHA | | |
| | | B1 | Earthquake Hazard | | | | | | |
| | | B1-1 | Collect compile and disseminate Earthquake hazard maps | Seismic Hazard Map; Microseismic Epicentre Map and Himalayas and Adjoining Region, Epicentre Maps of Nepal have been completed. | Hazard maps will be update and distributed to line agencies. | 2005 | DMG | | |
| | | B1-2 | Training support to National Seismological Network of DMG | Professional staffs have received trainings in different aspects of Seismological works. | Training support will be continued to include new emerging fields. | Ongoing | DMG | | |
| | | B1-3 | Technical and financial support for micro seismic zonation study on selected geographical locations | Some initiations were made by installing several broadband and seismic stations. | Collection and analysis of data will be continued | Ongoing | DMG | | |
| | | B1-4 | Establish and operate National Accelerometer Network. | Not yet done | This network will be used to study the effects of earthquakes. | 2007 | DMG | | |
| | | B1-5 | Vulnerability assessment and retrofitting of selected public buildings such as hospitals, schools etc . | Carried out in several public buildings and the technique is disseminated to the concerned agencies. | Further vulnerability assessment of the public buildings will be initiated | 2006 | MoPPW, MoHe | DMG | |
| | | B1-6 | Active fault inventory and monitoring | Active fault inventory of Nepal Himalaya is prepared. | Detailed studies will be carried out in new areas. | 2008 | DMG | | |
| | | B2. | Landslide hazard assessment | | | | | | |
| | | B2-1 | GIS based Landslide hazard mapping of selected districts | Completed in Chitawan and Rupandehi districts | Will be continued in more disaster prone districts | Ongoing | DWIDP, DMG | DOLIDAR, DSCWM, TU | |
| | | a) | Identify priority areas | Priority areas identified, few hazard maps developed and information disseminated to concerned agencies. | Will be continued in more disaster prone areas. | Ongoing | DWIDP, DMG | DOLIDAR, DSCWM, TU | |

| | | | | | | | |
|----|--|---|--|---|----------|------------|----------------------------|
| | b) | Establish standards for landslide hazard mapping | Completed | | | DMG | DOR,DSCWM, DOLIDAR |
| | c) | Assess existing data on landslides | Data collected in some districts | Will be conducted in more districts | Ongoing | DWIDP, DMG | |
| | d) | Introduce GIS/ remote sensing techniques for the detection of landslide prone areas | Completed in Chitwan district | Will be conducted in more landslide prone districts | Ongoing | DMG, DWIDP | NGOs, UN and other donors. |
| | e) | Collect, compile, produce and disseminate landslide hazard maps and reports | Landslide hazard maps prepared for some districts and disseminated | Will be conducted in more landslide prone districts | Ongoing | DWIDP, DMG | Other disaster actors |
| | B3. | Planned Engineering and Environmental Geological Studies | | | | | |
| | B3-1 | Engineering and environmental geological mapping | Completed in few districts | Will be done in Makwanpur and Morang districts. | 2007 | DMG, DWIDP | |
| | a) | Kathmandu and Pokhara valley mapping | Completed | Will be conducted in other urban areas. | 2007 | DMG | |
| | B4. | Hydrological and meteorological hazard Studies | | | | | |
| | B4-1 | Preparation of flood hazard map | Flood hazard maps of Bagmati and part of Tinau completed | Will be conducted in more areas | 2006 | DWIDP | MoWR, DHM, ICIMOD |
| | a) | Koshi, Mahakali, Babai, West Rapti, Rato, Lakhandehi, Kankai, Ratuwa etc | Not yet done | Will be carried out according to the priority | 2007 | DWIDP | MoWR, ICIMOD, DHM, JICA |
| | B4-2 | Preparation of debris flow hazard map of Bagmati, Palung Khola, Trishuli, Agra, Belkhu, Malekhu etc | Not yet done | Will be carried out | 2007 | DWIDP | MoWR, TU, ICIMOD, JICA |
| C. | Health Preparedness for Survivor Response and Coping | C1. Health Sector Emergency Preparedness and Response | | | | | |
| | a) | Include emergency preparedness and response component in health sector program implementation plan. | Process already initiated | Implementation of health sector emergency preparedness and response programme | On going | MOHe | WHO |

| | | | | | | | | |
|----|--|-----|--|---|--|----------|------------|---|
| D. | Fire | b) | Develop Standing Operating Procedures (SOPs) to respond to health sector disaster. | Tools and reference for health emergency responders on progress | Develop full fledged SOPs | 2005 | MOHe | WHO, DHWG |
| | | c) | Extend emergency preparedness programs from central to regional and district level. | Training for district rapid response teams initiated | Will be continued | On going | MOHe | NGOs |
| | | d) | Enhance capacity of hospitals and health facilities for responding to disasters. | Several medical and health workers have been trained | Capacity and health facilities of hospital will be enhanced | 2006 | MOHe | WHO, Hospitals, Medical colleges |
| | | i) | Establish disaster unit in each public hospitals | Established in some hospitals | Establishment of disaster units in all hospitals | 2006 | MOHe | WHO |
| | | D-1 | Fire hazard mapping | Not initiated | Will be carried out | 2007 | MoHA, MoLD | CAAN |
| | | D-2 | Research and mitigation of fire hazard during building construction and infrastructure | Not yet done | Will be conducted | 2006 | MoHA, MoLD | CAAN |
| E. | Awareness Raising Programmes (up to community level) | E1. | Awareness raising through mass media (Television, newspapers, radio bulletin etc) | Initiated at the central level | Will be expanded throughout the country | Ongoing | MOIC | MoHA, DWIDP, MoLD, and other disaster actors |
| | | E2. | Distribution of disaster management awareness raising pamphlets, posters and other materials | Different types of materials has been published and distributed | Additional materials will be prepare and widely circulated. | Ongoing | MOIC | MoHA, DWIDP, MoLD other disaster actors |
| | | E3. | Preparation of documentary film, slides for public show | Initiated by few organizations | Will be continued | Ongoing | | All disaster actors |
| | | E4. | Inclusion of disaster management related course in secondary schools and Higher level syllabus | Already commenced in few establishments. | Will be extended to higher level degree programmes | 2007 | MoES | |
| | | E5. | Informal forms of awareness education such as poetry, debate and essay competition etc | Initiated in some schools | Will be extended to new educational institutions and the selected localities | Ongoing | MOES, NGOs | Other disaster actors |
| | | E6. | Regional workshop, and national conference | Organized as and when needed | Will be organized annually | Ongoing | | All actors including GO, NGOs, INGOs and professional societies |

| | | | | | | | | |
|----|---|-----|---|--|--|----------|-------------------------|--------------------------------|
| F. | Training/Rehearsals/ Simulation | F1. | Community-based disaster management training programme at local level | Organized regularly | Will be extended to more districts. | On going | MoLD, NRCS | NASC, UNDP, DDRC, other actors |
| | | F2. | Training on disaster management at various level | Regularly organized by different organizations | Will be expanded in a large scale | Ongoing | | All disaster actors |
| | | F3. | Conduct rehearsals and simulations in vulnerable areas | Have been initiated at the Kathmandu Valley | To be expanded in more vulnerable districts/ areas of the country | Ongoing | RNA, Police, NRCS, NGOs | DDRC |
| G. | Disaster Management Information System | G1. | Establish and maintain a communication system in all 75 districts (HFNHF/IJHF-Transceiver System) with access to centre | Already started | Strengthen the capability | Ongoing | MOIC | MOHA, RNA, NP, APF, etc. |
| | | G2. | Encourage, support and expand community level communication practice. | Exists in some disaster prone districts. | Will be extended to additional areas | On going | MOIC | MoLD |
| | | G3. | Establish a National Disaster Management Information System for better disaster management planning. | Process has been initiated | A fully functional information management system will be established | 2006 | MoHA | NGOs, UN and other donors |
| H | Stockpiling emergency relief supplies and rescue equipments and personnel | H1. | Establish/manage emergency supply warehouses in 5 development regions at strategic location | Process has been initiated to establish at least one in Eastern Development Region | One Regional level warehouse will be established. | 2005 | MoHA, NRCS, | |
| | | H2. | Replenish relief materials in warehouses | Regularly replenished | Will be continued | Ongoing | MoHA, NRCS | I/NGOs, UN and other donors |
| | | H3. | Strengthen rescue team's capability | System is in place | Provide more equipments and training to upgrade the skills | Ongoing | MoHA, RNA, NP, APF, | NCC, Scout, I/NGOs, CBOs |
| | | H4. | Training on warehouse management and supply of relief materials | NRCS has been conducting such trainings | Will be strengthened. | Ongoing | NRCS | DDRC, I/NGOs, |

DISASTER RECONSTRUCTION AND REHABILITATION ACTION PLAN MATRIX

| S.No. | Priority Segment | Priority Activities | Current Status | Future Plan | Completion date | Lead Agency | Supporting Agency |
|-------|--|--|--|---|-----------------|--------------------------|---|
| A. | Damage Assessment | A1. Preparation of standard and updated damage assessment format for recurring types of disasters developed by DDRC, in consultation with central level agencies, for rehabilitation and reconstruction. | MoHA and MoAC, have developed and updated the standard format in 2003. NRCS's format is updated in 2004. The formats are presently under implementation. | The format will be developed and updated on an annual basis. | Ongoing | <u>MOHe, MoHA</u> | MoPPW, MoAC, MoLD, NRCS, CDRC, DDRC, CBOs, NGOs |
| | | A1.1 Pretesting of the damage assessment format. | Occasionally done by NRCS and MoHA. | Will be continued | Ongoing | <u>NRCS, MoHA</u> | MOHe MoPPW, MoAC, DDRC |
| | | A2. Formation of permanent team for damage assessment at district level | Teams are formed only during the disasters. | Set up a permanent structure at the district level | 2005 | <u>CDRC, DDRC</u> | RDRC and local authorities |
| | | A3. Orientation training for damage assessment format users | Very few so far. | Large scale training to cover more users | Ongoing | <u>NRCS, MoHA</u> | MOHe MoPPW, MoAC, MoLD |
| | | A4. Collect, compile and disseminate information on extent of damage | System is in place | Update database system based on ATF and disseminate on yearly basis | Ongoing | <u>MoHA</u> | MoLD, DWIDP, DDRC, and other concerned agencies |
| B. | Planning/Programme for Rehabilitation and Reconstruction | B1. Formation of permanent technical subcommittee of DDRCs, inclusive of selected NGOs and CBOs, for rehabilitation and reconstruction planning and implementations at district level | Not yet done | Set-up such technical subcommittee under the chairmanship of LDO at district level. | 2005 | <u>MOHA, MoPPW, DDRC</u> | MoLD and all other HMG and none governmental institutions |
| | | B2. Setup permanent sector wise/ disaster wise expert group for review of damage assessment for planning and programming. | Not yet done | Will be established | 2005 | <u>MOHA, MoAC</u> | MoHe, MoLD, MoES, other line agencies UN and other donor agencies |

| | | | | | | | | |
|----|--------------------------------------|-----|---|--|--|----------|-----------------|--|
| | | B3. | Prepare, guidelines for resettlement rehabilitation and reconstruction | Some work has been initiated | Need to implement at all sites by all actors | | <u>MoPPW</u> | NRCS, NGOs |
| | | B3. | Prepare guideline and manuals for resettlement and rehabilitation of victims and for rehabilitation and reconstruction of physical infrastructure (eg. low cost disaster resistant housing, low cost sanitation measures etc.). | Some works including drafting of the manuals have been done. | Separate guidelines will be prepared for resettlement and rehabilitation of victims and for rehabilitation and reconstruction of physical infrastructure | 2005 | <u>MoPPW</u> | Line agencies as above and NRCS, NGOs |
| | | B4. | Formulation of reconstruction and rehabilitation plans. | Not yet done | Such plans will be developed | 2006 | <u>DDRC</u> | As in B3 |
| | | B5 | Implementation of above plans under the supervision of DDRCs technical sub committees. | Not yet done | Will be implemented | Ongoing | <u>DDRC</u> | DDRC's, Technical sub committees |
| | | B6. | Formulation of rehabilitation plan for victims (disabled and orphan) | Not yet done | Specific rehabilitation plan for disable and orphan victims will be developed | 2006 | <u>MoES</u> | SWC, MoLT |
| | | B7 | Provisioning of adequate budget to implement the above plans and programmes. | NA | Adequate budget will be allocated on an annual basis. | Ongoing | <u>MoHA</u> | Concerned HMG agencies including and MoF |
| C. | Income Generating Activities | C1. | Identified possible area of income generating activities at local level. | Initiated in some districts | Will be carried out on priority basis | On going | <u>DDRC's</u> | CBO's, NGOs, |
| | | C2. | Design special directives for loan with subsidized interest rate to disaster victims | System is in place | Will be updated | 2006 | <u>MoF, NPC</u> | Commercial banks |
| D. | Capability Assessment/ strengthening | D1. | Capability assessment of HMG organizations, NGOs CBOs and other concern stakeholders. | Capacity assessed in 1997 | Will be updated annually | Ongoing | <u>MoHA, UN</u> | other donor agencies |
| | | D2 | Capacity strengthening of HMG organizations, NGOs, CBOs and other stakeholders | Not yet done | Will be strengthened | On going | <u>MoHA, UN</u> | other donor agencies |
| | | a) | Disaster Inventory | Exists in micro level | Need to be expanded to the macro level | 2006 | <u>UN</u> | GOs, NGOs |

DISASTER MITIGATION ACTION PLAN MATRIX

| S.No. | Priority Segments | Priority Activities | Current Status | Future Plan | Completion date | Lead Agency | Coordinating Agency |
|-------|---|---|---|---|-----------------|--------------------------|-------------------------------------|
| A. | Mitigation Strategies | A1. Identification of major types of natural hazards | Already completed | | | <u>CDRC</u> | |
| B. | Financial Strategies | B1. Allocate financial resources annually for disaster mitigation activities in the national budget | Only few GOs have allocated resources for mitigation purpose | More resources have to be allocated to the concerned line ministries. | ongoing | <u>NPC, MOF</u> | |
| | | B2. Encourage donor communities to contribute more resources in disaster mitigation activities. | Few agencies have been involved in disaster mitigation activities at micro level. | <ul style="list-style-type: none"> • Develop national disaster management strategy, • Identify national priority areas on DM, • Disseminate the strategy and priority areas to the donor communities for their consideration | 2005 | <u>MOF, NPC, MoHA</u> | MoFA |
| C. | National Land Use and Land cover Plan | C1. Formulation of National Land Use and Land cover Plan and Policies at central and district level | Not yet done | Plan will formulated | 2006 | <u>MoFSC, NPC, MoWR,</u> | MoLRM, MoLD, DDC, Municipality, VDC |
| | | C2. Implementation of Plan | NA | Will be Implemented | 2007 | <u>MoFSC, MoWR,</u> | MoLRM |
| D. | Construction of Earthquake resistant Building | D1. Formulation of building code and by-laws | National Building Code has been formulated | Will be implemented in all areas | 2006 | <u>MoPPW</u> | MoLD |
| | | D2. Implementation of relevant national legislation | Not yet done | Will be formulated and implemented. | 2006 | <u>MoPPW</u> | MoLD and concerned GOs |
| E. | Risk Assessment | E1. Develop risk assessment programme for all types of disasters. | Initiated in small scale | Will be expanded. | Ongoing | | Disaster stakeholders |
| | | E2. Incorporate the results of risk assessment in development activities | NA | Will be taken up as an integral part of development initiatives | Ongoing | | NPC and all development actors |
| F. | Policy on Disaster Reduction Measures | F1. Formulation of disaster reduction policies. | | | | | |
| | | F1-1 National Disaster Reduction programme | | | | | |
| | | a) Landslides debris flows and Floods | Has been initiated in micro level | Will be expanded to cover large geographical areas. | Ongoing | <u>DWIDP, DSCWM</u> | DoF |

| | | | | | | | | |
|----|---|-----|---|--|---|---|------------------------|--|
| | | b) | Earthquake | Seismic zonation has been completed and 21 earthquake monitoring centers have been established | Earthquake monitoring centres will be strengthened | Ongoing | <u>DMG</u> | MoPPW |
| | | c) | Drought, epidemics, GLOF, cold wave, and other hazards | Very little done so far | Will receive adequate attention | Ongoing | | Concerned line ministries and agencies |
| | | F2. | <ul style="list-style-type: none"> Developing National Fire Code Strengthening fire fighting capabilities | Not yet done | <ul style="list-style-type: none"> Comprehensive national fire code will be developed and implemented Fire fighting capabilities will be strengthened | <ul style="list-style-type: none"> 2006 Ongoing | <u>MoHA, MoLD</u> | |
| | | F3. | Adoption of integrated policies for preparedness and mitigation | NA | Comprehensive policy for disaster preparedness and mitigation will be developed | 2006 | <u>NPC, MoHA, MoLD</u> | MoAC, MoFSC |
| G. | Partnership enhancement amongst stakeholders | | Formulation of national plan on involvement of NGOs, CBOs, and private sectors in disaster risk reduction following areas | | | | | CDRC (NPC, SEC, FNCCI) |
| | | a) | Community based disaster management approaches | Few agencies have developed policies on community-based disaster management | A comprehensive policy on Community-based disaster management will be developed and implemented | 2005 | <u>MoLD, NRCS</u> | NGOs, and other actors |
| | | b) | Involvement of women and other socially disadvantaged groups | National level study has been completed on the impact of disaster on gender | Future programmes/ projects will be developed based on the specific needs of women and men | 2005 | <u>MoWCSW</u> | SWC, MoLD and Disaster actors |
| | | c) | Local non-government organization | NA | Local NGOs/ CBOs will be consulted in formulating DM policies programmes | 2005 | <u>DDC</u> | GOs, SWC, NGOs |
| | | d) | Efforts of private sector | NA | Private sectors will be consulted in formulating DM policies programmes | 2005 | <u>DDC</u> | GOs, FNCCI, NGOs |
| H. | Environment and Indigenous skills on Disaster Reduction | H1. | Incorporation of Environmental Impact Assessment and disaster impact assessment in all in development initiatives | EIA has been mandated in major development projects | DIA will be developed and made mandatory to all development projects | 2005 | <u>NPC</u> | MoF, MoEP, MoHA |

| | | | | | | | | |
|----|---|-----|--|--|--|------|---------------------|---|
| | | H2. | Application of traditional knowledge, practices and values of local community for disaster reduction | NA | Will be carried out | 2005 | | NPC, concerned line ministries and agencies |
| | | a) | Study on Indigenous knowledge and its dissemination | Information on IK on DM is scattered and scanty | Design and implement a national empirical study IK on DM and disseminate the results. | 2006 | <u>TU</u> | IoE, NASC |
| I. | Promotion of Regional and Sub-Regional Cooperation among Countries Exposed to similar hazards | I1. | Setup a joint committee of bilateral and multilateral on disaster risk reduction at the national level | Not yet done | A joint committee of bilateral and multilateral organizations will be formed to support initiatives in disaster risk reduction | 2006 | <u>NPC, MoHA</u> | |
| | | I2. | Exchange information and share experiences on disaster risk reduction issues | Forums like Sectoral Working Groups and Disaster Preparedness Network are serving as information exchange platforms. | Strengthen and expand the works of such platforms | 2005 | <u>SWG, DP-Net,</u> | DDRC |
| | | I3. | Implement disaster reduction strategies | Major issues related to disaster reduction are incorporated in the 10 th Plan | Comprehensive disaster risk reduction strategies will be developed and implemented | 2006 | <u>NPC, CDRC</u> | |
| J. | Establishment of Documentation Centre on Disaster management | J1. | Establish documentation centre for compiling collecting, publishing and disseminating information on disaster management | Not yet established | Well equipped disaster resource centre will be established | 2006 | <u>MoHA</u> | MoLD, NRCS |

ANNEX -2

Synopsis of the provisions on Disaster Management in the Tenth Plan (2002-2007)

OBJECTIVES

- To make development and construction works sustainable, reliable and effective
- To keep life of the common people secured.

STRATEGIES

- Adopting suitable technology to minimize environment effects and losses due to disaster.
- Making rescue and relief reliable and effective
- Carrying out effective public awareness activities.
- Strengthening Earthquake measurement stations.
- Preparing hazard maps of vulnerable areas.
- Designating MoHA as the focal point of disaster activities.

PROGRAMME.

- Develop integrated information system in coordination with national and international agencies.
- Develop reliable database.
- Prepare institutional inventory
- Operate five regional warehouses with sufficient stockpile of relief materials.
- Develop national fire code.
- Prepare landslide inventory based on hazard maps and create epicenter map.
- Provide immediate information to common people of any mode of disasters.
- Adopt disaster preventive system.
- Offer instant counseling and rehabilitation to the victims.

WORKING POLICY

- Assessments of environmental and disaster impacts
- Enhance people's participation in watershed management and river control
- Timely reform legal and institutional frameworks.
- Effective implementation of regional programmes.
- Harness participation of stakeholders in all areas of disaster reduction.
- Increase public awareness

EXPECTED ACHIEVEMENTS

- Cordial relations will be established among national and international partners.
- Effective sharing of disaster information and experiences.
- Reduction of damages
- Hazard maps will help identify vulnerability thereby contributing to lessen the loss of lives and property.
- Strengthened rehabilitation works and immediate availability of relief materials to the victims.