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Focus on Participation and Inclusion



Disaster Preparedness Network -Nepal

Nepal Disaster Report, 2013

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Foreword

Nepal is ranked as one of the most vulnerable countries in the world to natural disasters. Our geographical difficulties have added further vulnerability to our national efforts. Nepal's approach to disaster management has changed since the initial challenges we have been facing since a decade. The fact that our Disaster Management Division has come together in a coordinated fashion to further strengthen our interventions is reflective of our improved understanding of disaster management issues and challenges. In 2012, significant efforts were made to identify disaster risk reduction activities in Nepal. The Government of Nepal, international and National community interested and involved, as well as communities and individuals, worked collectively through coordinated efforts to reduce risks and prevent disasters.

In line with this, the Ministry of Home Affairs is highly pleased to bring out this edition of the Nepal Disaster Report, 2013 – an important step in disaster management in Nepal. The report is an attempt to document Nepal's disaster management initiatives, hazards and disaster events, socio-economic impacts and pertinent issues, as well as sharing good practices. The report has been produced and published by Ministry and Disaster Preparedness Network-Nepal collaboration with various partners.

This report attempts to examine and analyze data and events of disasters occurred during 2012, identifies exposures and vulnerabilities through trend analysis and highlights some of the key areas. It is hoped that the publication of this report will stimulate improved data collection and research that will help bridge the gaps identified in disaster management. This should not be seen as a separate sector but as part of a holistic approach of development strategies and programs including strengthening the local institutions. It is expected, through the report, the fulfillment of the current desire of information collection, processing and distribution in the area of disaster management of the country.

Finally, I take this opportunity to extend sincere thanks to all the Ministry's staff members, Editorial Board, HECT Consultancy, partner organizations, experts and professionals involved in preparing this report. Our collective efforts can make a difference in building disaster resilient communities in Nepal.

Thank you.

A handwritten signature in black ink, appearing to read 'Janardan Nepal', written over a horizontal line.

Janardan Nepal
Secretary



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Acknowledgement

It gives me an immense pleasure to present the Nepal Disaster Report (NDR) 2013 to the national and international readers. The Disaster Preparedness Network Nepal (DPNet-Nepal), established in 1996, initiated the publication of the Nepal Disaster Report in 2009 with the leadership and guidance of the Ministry of Home Affairs. The NDR, which provides comprehensive disaster data, information, analysis and reflection of losses and damages that have occurred due to various disaster events across the country in the last two years, is expected to serve as a key reference document for different stakeholders.

On behalf of the publishers, the Ministry of Home Affairs (MoHA) and DPNet-Nepal, I would like to express my sincere appreciation to all the collaborating partners (Action Aid, Care Nepal, Caritas Nepal, CECI, DCA, LWF, Mercy Corps, Mission East, Nepal Red Cross Society, Oxfam, Plan Nepal, Save the Children, UNDP and World Vision International) for their financial contribution and technical support. My special thanks go to Plan Nepal for providing financial contribution for printing of the NDR 2013 and technical support while developing this report.

I take this as a privilege to extend my special gratitude to Mr. Janardan Nepal, Secretary, Ministry of Home Affairs (MOHA), Dr. Meen B. Poudyal Chhetri, former Chairperson of DPNet-Nepal, Mr. Lakshmi Prasad Dhakal, Joint Secretary, MoHA, Mr. Pradip Kumar Koirala, Under Secretary, MoHA, and Mr. Ram Chandra Neupane, Executive Editor for their advises, commendable inputs, contributions and guidance which substantially contributed to enable us to maintain the quality and publish this report. Similarly, my thanks go to all the intellectual members of the Editorial Board for their constructive engagement and invaluable contribution to bring the report into this form.

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I also take this opportunity to offer our sincere thanks to the consultants Mr. Deependra Joshi, Dr. Govinda Basnet and Mr. Narayan Babu Shrestha of HECT Consultancy for their hard work and professional output.

We are also thankful to all the national and international DRR partners, various agencies, professionals and participants of review meeting who have contributed directly and indirectly. At the same time, I would like to extend my appreciation to DPNet-Nepal Executive Board and staff members Mr. Bhesh. B. Parajuli, Programme Coordinator, Mr. Safal Khatiwada, Admin/Finance Officer, Mr. Bikash Shrestha for their dedication and coordination in this endeavor.

At last but not least, on behalf of publishing partner, DPNet-Nepal, I would like to express my sincere appreciation and gratitude to the Disaster Management Division, MoHA for their guidance and cooperation to produce this report. We look forward to have continued collaboration and guidance in the days ahead.



Mr. Pitambar Aryal
Chairperson



Editorial

The Nepal Disaster Report 2013...Focus on Participation and Inclusion is a resource for understanding and analyzing national disaster risk today and in the future. Large and small disasters, ranging from the Seti flood of Kaski district in May 2012 to the cold waves in the Terai, continued to demonstrate the intimate relationship between disasters and poverty. Drawing on new and enhanced data, the 2012 report attempts to explore trends in disaster risk for each region and with different socio-economic development.

The NDR 2013 is a compilation of facts of disaster occurrences and efforts made in Nepal in reducing the impact of disasters and in getting prepared for future events. The document tries to make a case on why and how Nepal should address the issues of disaster management in order to preserve and enhance the well known resilience of the Nepalese people to adversaries and vagaries of nature, safeguard peoples' life and property, and ensure incorporation of disaster risk reduction measures into our developmental efforts.

The report has been structured in five major chapters. Chapter 1 presents an overview and lays out the context by elaborating global and national contexts of disasters. It also provides a chronology of the development of disaster management processes in the country, including the government's initiatives in creating suitable policy and legal environments for effective management and response planning. It presents national demographic characteristics along with the disaster resilience and hazard profiles and reflects co-relationships amongst hazards, resiliency and poverty in Nepal.

Chapter 2 analyzes the conceptual issues of disaster management and draws on the analytical frameworks for examining the risk-poverty relationships along with institutional mechanisms. It also caters to how do we ensure livelihoods, indigenous knowledge and community's coping strategy and how do we mainstream disaster management and climate change adaptation into Nepal's development planning process, implementation, monitoring and evaluation.

Chapter 3 analyzes the overall disaster trends occurred during 2012. It attempts to analyze disaster trends from the perspective of why is it increasing or decreasing at particular region; what is the gap and how it should be managed. The severity of disaster type varies in terms of fatalities, injuries and property damage. In terms of fatalities, thunderbolt has caused the largest number of deaths (119) and accounted for 29% of total deaths in 2012. Fire, landslide, floods, and epidemics are other major disaster types. These hazard types together accounted for 82% of deaths from disaster. However, in terms of affected families, fire has affected the largest number of families.

Chapter 4 focuses on making disaster management work for all, mainstreaming disaster management through participatory and inclusive management approaches; empowering at risk

communities; role and participation of all the sections of the society in disaster management and attempts to address rural-urban vulnerabilities. It points out the need to mainstream women and excluded groups as they are disproportionately vulnerable to the impacts of disaster risks. This chapter elucidates that in most cases, the needs and responsibilities of women and socially excluded groups are not adequately considered in the design and planning of response and recovery, making it critical to recognize the role of gender equality and social inclusion in crisis situations.

Chapter 5 dwells on highlighting good practices on disaster management in Nepal. Altogether, nine good practices have been described which illustrates successes of community-based approaches to disaster mitigation in the country. These community-based good practices highlight key success factors such as applying best practice methodologies of community development to community based disaster mitigation, tapping traditional organizational structures and mechanisms and capacity building activities with the community disaster committees and volunteers.

Last chapter concludes with a set of concluding remarks. It stresses on the need to consolidate gains by means of putting in place a concrete, effective, practical and proactive policy and ensure increased inter-sectoral coordination, education and awareness coupled with adequate resources through the effective implementation of agreed measures. Disaster mitigation, early warning system, emergency rescue and relief operations, rehabilitation and recovery plans have been identified with hands-on training, post-disaster evaluation, monitoring of relief works, review and cooperation and coordination of central, district and local level preparedness and research works.

Lakshmi Prasad Dhakal
Editor In-Chief
Joint Secretary and Chief, Disaster Management Division
Ministry of Home Affairs, Singha Durbar, Kathmandu

Abbreviation and Acronyms

AAN	ActionAid Nepal
ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Centre
ADRA	Adventist Development and Relief Agency
AEPC	Alternative Energy Promotion Centre
AINTDGM	Association of INGOs in Nepal Task Group on Disaster Management
AMCDRR	Asian Ministerial Conference on Disaster Risk Reduction
APF	Armed Police Force
APN	Asia-Pacific Network
AUDMP	Asian Urban Disaster Mitigation Program
BDMT	Basic Disaster Management Training
CBDRMN	Community Based Disaster Risk Management in Nepal
CBO	Community Based Organization
CBS	Central Bureau of Statistics
CCDRR	Child-Centred Disaster Risk Reduction
CDO	Chief District Officer
CDRF	Central Disaster Relief Fund
CDS	Centre for Disaster Studies
CEAARRC	Central Earthquake Affected Areas Reconstruction and Rehabilitation Committee
CNDRRC	Central Natural Disaster Relief Committee
CRED	Centre for Research on the Epidemiology of Disasters
DAO	District Administration Office
DDC	District Development Committee
DDRC	District Disaster Relief Committee
DHM	Department of Hydrology and Meteorology
DHS	Department of Health Services
DiMANN	Disaster Management Network Nepal
DIMS	Disaster Inventory/Information Management System
DMC	Disaster Management Committee
DPC	Disaster Preparedness Committee
DPNet-Nepal	Disaster Preparedness Network-Nepal
DPRP	Disaster Preparedness and Response Plan
DPSS	Disaster Preparedness for Safer Schools
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRRSP	Disaster Risk Reduction through Schools Project
DSCWM	Department of Soil Conservation and Watershed Management
DUDBC	Department of Urban Development and Building Construction
DWIDP	Department of Water Induced Disaster Prevention

EAARRP	Earthquake Affected Areas Reconstruction and Rehabilitation Project
ECHO	European Commission's Humanitarian Aid Department
EPC	Environment Protection Council
ESD	Earthquake Safety Day
EU	European Union
EWS	Early Warning System
FAO	Food and Agriculture Organization
GAR	Global Assessment Report
GDP	Gross Domestic Product
GHI	Geo-Hazards International
GIS	Geographic Information System
GLOFs	Glacial Lake Outburst Floods
HFA	Hyogo Framework for Action
HVCA	Hazard, Vulnerability and Capacity Assessment
IASC	Inter Agency Standing Committee
ICIMOD	International Centre for Integrated Mountain Development
IATF/DR	Inter-Agency Task Force on Disaster Reduction
IDNDR	International Decade for Natural Disaster Reduction
IFRC	International Federation of Red Cross and Red Crescent Societies
INGO	International Non-Governmental Organization
INSARAG	International Search and Rescue Advisory Group
IPCC	Inter-governmental Panel on Climate Change
IRA	Initial Rapid Assessment
ISDR	International Strategy for Disaster Reduction
JICA	Japan International Cooperation Agency
JYRC	Junior Youth Red Cross
KVERMP	Kathmandu Valley Earthquake Risk Management Project
LSAR	Light Search and Rescue
LSGA	Local Self-Governance Act
LWF	Lutheran World Federation
MDG	Millennium Development Goal
MHPP	Ministry of Housing and Physical Planning
MMI	Modified Mercalli Intensity Scale
MoAC	Ministry of Agriculture and Cooperatives
MoFSC	Ministry of Forest and Soil Conservation
MoHA	Ministry of Home Affairs
MoWR	Ministry of Water Resources
NAPA	National Adaptation Plan of Action
NAST	Nepal Academy of Science and Technology
NBC	Nepal Building Code
NCDM	Nepal Centre for Disaster Management
NCDM	National Council for Disaster Management
NCRA	Natural Calamity (Relief) Act 1982

NDMA	National Disaster Management Authority
NDMF	Natural Disaster Management Forum
NDMP	National Disaster Management Policy
NEOC	National Emergency Operations Centre
NEPAP	National Environmental Policy and Action Plan
NGO	Non-Governmental Organization
NGS	Nepal Geological Society
NPC	National Planning Commission
NPDRR	National Platform for Disaster Risk Reduction
NNCDMC	National Network of Community Disaster Management Committee
NRCS	Nepal Red Cross Society
NRRC	Nepal Risk Reduction Consortium
NSDRM	National Strategy for Disaster Risk Management
NSET	National Society for Earthquake Technology Nepal
PVA	Participatory Vulnerability Assessment
SAR	Search and Rescue
SOP	Standard Operating Procedure
UNCHS	United Nations Centre for Human Settlements
UNDMT	United Nations Disaster Management Team
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
USAID	United States Agency for International Development
VDC	Village Development Committee
WCDR	World Conference on Disaster Reduction
WECS	Water and Energy Commission Secretariat
WFP	World Food Program
WHO	World Health Organization
WMO	World Meteorological Organization
WVI	World Vision International

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CHAPTER 1

Background Context: Disaster Risk Management in Nepal



Introduction

Nepal is situated on the southern slopes of the Central Himalaya and occupies a total area of 147,181 km². The country is located between latitudes 26^o 22' and 30^o 27' N and longitudes 80^o 40' and 88^o 12' E. The length of the country is 885 km from west to east and its width varies from 145 km to 241 km with a mean of 193 km north-south. About 86% of the total land area is covered by hills and high mountains, and the remaining 14% are the flat lands of the Terai¹ region with less than 300m in elevation. Altitude varies from some 67m above the sea level at Kechana Kalan, Jhapa district in the south-eastern Terai, to 8,848m at the peak of the world's highest mountain, Mount Everest (*Statistical Pocket Book Nepal 2010, CBS Nepal*).

With its unique geo-physical settings and socio-economic conditions, Nepal is highly vulnerable to disasters. The country is prone to disasters due to a number of factors, both natural and human-induced, including adverse geo-climatic conditions, topographic features, environmental degradation, population growth, urbanization,

unsustainable development practices, etc. As far as the geographic dimension of the country is concerned, five ecological regions of the country exhibit their own specific problems. Due to geographical and other climatological conditions, rugged and steep topography, extreme weather events and fragile geological conditions, the country is regarded as a disaster hotspot because of vulnerability of the population together with regular and frequent occurrences of different natural hazards (*NDR, 2009*). As Nepal is extremely vulnerable to water-related hazards, its hydrology is highly variable, with the monsoon bringing 80% of Nepal's rainfall in less than three months during summer season (*World Bank, 2012*).

Nepal is divided into five physiographic regions which are almost parallel to each other, running from west to east. They are: high Himalayan region, high mountain, middle mountain, Siwaliks² and Terai. (*Fig. 1.1*). However, in common parlance, Terai, hill and mountain is generally used.

¹The Terai is characterized by broad alluvial plains 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.

²The Siwaliks, comprising the Churia Hills, is composed of a thick series of mudstones, shales, sandstones and conglomerates of mid-Miocene to Pleistocene age.

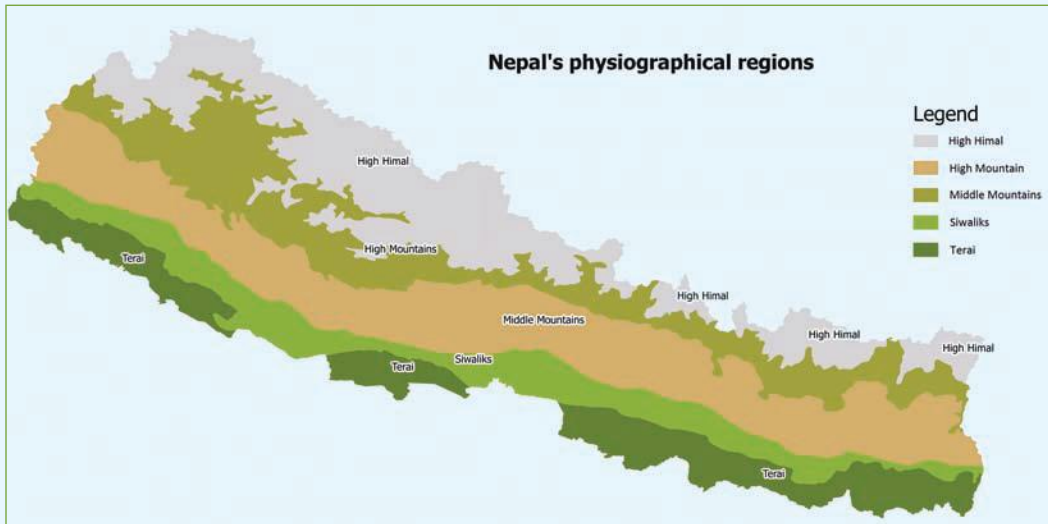


Fig. 1.1: Physiographic regions of Nepal

Climate

A wide range of climatic conditions exist in Nepal within a short distance primarily due to its variation in altitude. This is reflected in the contrasting habitats, vegetation, flora and fauna. The average annual rainfall is about 1,600 mm (mean annual precipitation varies from more than 4,000 mm along the southern slopes of the Annapurna Himalayan range to less than 250 mm in the rain-shadow areas near Tibetan plateau); about 80% of which falls between June to September in the form of summer monsoon (*Nepal 4th National Report to the Convention on Biological Diversity/MoFSC, 2009*).

The Terai and the Siwalik ranges experience sub-tropical climate while the northern mountainous regions have cold, dry

continental and alpine winter climate. Summer and late spring temperatures range from about 28^o C in the hilly region to more than 40^o C in the Terai. In winter, average maximum and minimum temperatures in the Terai range from a brisk 7^o C to a mild 23^o C respectively. The central valleys experience a minimum temperature often falling below the freezing point. Much colder temperatures prevail at higher elevations (*ICIMOD, 2007*).

River Systems

Nepal has three major river systems from west to east—Karnali, Gandaki and Koshi rivers respectively. All the rivers ultimately become major tributaries of the Ganga River in northern India. After plunging through deep gorges, these rivers deposit a large amount of

sediments 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 flood plains during summer monsoon season (*ICIMOD, 2007*).

Land Use

Nepal is a land scarce country in terms of availability of cultivable land. In 2008, per household land availability was 0.6 ha. In 2001, this was 0.8 ha. With the doubling of population every 30 years, land availability per capita is also declining more or less at the same rate as there is less scope to move to non-farm sector (*CBS, 2009*). Land and other natural resources like forest are still important for the livelihood of a large majority of rural population (60% of the total population), even though the contribution of primary sector (especially agriculture) on the total Gross Domestic Product (GDP) of the country is declining and it is at present 32%.

From 1986 to 2000, there is a significant change in land use pattern. The area under agricultural use has increased significantly (by 20%) and forest area by 9% (*FAO, 2011*). Despite increase in area under agricultural land and forest land between 1986 and 2000, the per capita availability of agricultural land and forest land has been declining in this period. This decline is due to population growth and dependence of a large majority of population for their livelihoods. Depending upon the different

sources of data, the agricultural land in Nepal varies from 23% to 28% of total land (*Nepal Land Use Policy and Planning, 2010*).

Risk-sensitive land use planning is thus at the centre for reducing exposure, the factor causing most increase in disaster risk and for which the least progress has been made in achieving HFA³ objectives (*UNISDR, 2011*).

1.1 Nepal: Economic and Social Contexts

Nepal occupies only 0.03% and 0.3% of total land area of world and Asia respectively. According to the National Population Census 2011, the annual population growth rate is 1.35% and the total population of the country in 2011 has reached about 26.5 million. The census estimates that some 379,000 households are in the mountains, 2.644 million in hills, and 2.637 million in the Terai. The percentage of the population living in the Terai has increased about 2% (from 48 to 50%) and decreased about 1% in the hills and mountains (from 44 to 43% in hills and from 7 to 6.5% in mountains respectively). The average household size has decreased from 5.44 in 2001 to 4.7 in 2011. In mountains, the average household size is 4.74; in hills, it is 4.34 and in the Terai, it is 5.06 (*CBS, 2011*).

Agriculture sector contributes nearly 35% of Nepal's GDP and supports the livelihood of more than 74% of Nepal's population (*CBS, 2012; NLSS, 2007*). Only about 25% of Nepal's surface area is suitable for agricultural purpose.

³HFA is a ten-year global strategy to make the world safer from natural hazards and provides the first systematic and comprehensive approach to reducing disaster risks and losses.

Suitable agricultural land is unevenly distributed across ecological belts. Less than 10% of the cultivable land is in the mountains with the remaining 90% nearly equally divided between the hills and the Terai. About 21% of the land is cultivable of which 54% has irrigation facilities (*MoAD, 2012*) with per household land holding being 0.7 ha. Most of the Nepalese population depends on agriculture for its livelihoods, which is based on a rich diversity of useful species. The diversity of livestock (both improved and indigenous breed) plays a vital role in contributing to the well-being of rural communities .

The census report shows trends that need to be taken into account in the context of policy formulation for disaster risk reduction in Nepal. One of the most important findings is the reduction in the net population in 23 districts in hills and mountains in Eastern, Central and Western Development Regions. There has been a rapid increase in the absentee population. Of the total absentee population of 1.66 million, 52% are from hills, 42.3% from Terai and the remainder from the mountains. Among the absentee population, 86.7% is male. In terms of regional origin of out-migration, 85.4% of the absentee population is from rural areas. Ten years ago, the absentee population was only 0.76 million (*CBS, 2011*). The rapid increase in the absentee population denotes an increase in the pace of ‘feminization’ of society. Moreover, as youths largely contribute to the absentee population, it reflects an aging society.

Jointly, these processes create additional burden on women for managing local resources. This implication is also reflected in the change in sex ratio (number of males for every 100 females). The national average sex

ratio has decreased from 99.8 in 2001 to 94.41 in 2011. Among the ecological regions, the sex ratio in 2011 in the Terai, hills and mountains has remained 97, 92 and 94 respectively. Sex ratio has been recorded as low as 76 in Gulmi district. The considerable decline of sex ratio implies that more women have to undertake the responsibility of disaster response, management in the absence of male population who has left Nepal for foreign employment. Therefore, the trend of demographic change needs consideration while assessing the vulnerability of the population and designing disaster risk reduction measures (*CBS, 2011*).

1.1.1 Economic Development Profile

Nepal has undergone political and economic transformations. The country’s economy was adversely affected by the decade-long conflict. In 1992, a major shift was made in making free markets through liberalization as the chief engines of economic development. Nepal’s economy depends largely on natural resources but the distribution of resources and use in socio-economic development remains uneven. Further, while Nepal has introduced policies to ensure fairer distribution, implementation has remained slow because of political constraints.

In the past 20 years, Nepal has focused primarily on economic development and poverty reduction. For decades, Nepal’s GDP growth rate has fluctuated between 3-5% per year. The growth rate was 4.9%, 3.6%, 3.4% and 4.5% during the Eighth, Ninth, Tenth and the Three Year Interim Plan periods, respectively (*CBS, 2011*).

Preliminary estimates of per capita GDP at current price stands at NRs. 57,726 (US\$ 735) for 2011/12. The economic growth of the

country measured by GDP is 4.63% per year in 2011/12. About one fourth of the population (25.16%) lives below poverty line as per the Nepal Living Standards Survey 2010/11 and the Gini-Coefficient; which indicates inequality in income distribution is 0.328 (CBS, 2011). Nepal has made good progress in terms of poverty reduction and towards achieving most of the Millennium Development Goals (MDGs). The Human Development Index (HDI) value for Nepal is 0.463 (UNDP, 2013). The country still has a long way to go in terms of sustainable development as both the social and environmental pillars remain weak.

Traditional farming practices, dependence on monsoon, growing shortages of farm labour and poor access to markets are some major factors leading to low development growth. The structure of Nepali economy has been changing. While the service sector has grown, the share of industry and agriculture sectors has declined. The share of agricultural GDP decreased from 47.68% in 1990/91 to 35.66% in 2010/11. Similarly, the share of industrial sector decreased from 17.53% in 1990/91 to 14.58% in 2010/11 (NPC, 2011).

However, the share of services has increased from 34.79% in 1990/91 to 49.76% in 2010/11. Service sector growth was mainly brought about by changes in the financial intermediation and education sub-sectors. The implication of slow growth in agriculture is shrinking of employment and income-generating opportunities and the inability to foster broad-based growth. Still the benefit from the existing development and economic policies is to reach to a larger section of population (NPC, 2011).

Nepal's economy is gradually becoming consumption-oriented mainly pushed by remittance thereby causing a decline in savings

and investment rates. Consumption to GDP ratio that was 88.3% in FY 2000/01 went up to 93.3% in FY 2010/11. As a result, the rate of domestic savings has come down to 6.7% from 11.7% (GoN/MoF, 2011). A consumption-oriented economy leads to dependency resulting in shortages of resources for investment, particularly in environmental sustainability. Hence, creating the foundation for economic growth through enhanced savings and investments by discouraging unnecessary consumption remains an issue.

1.1.2 Social Context

Despite developmental challenges, progress on a number of social indicators has been impressive. However, the gains which have been hampered by conflict and political instability have not been extensive enough to make a significant impact on poverty and inequality.

Nepal has made significant progress in achieving its MDGs and has received international praise for doing so. Considering the difficult context—the decade-long armed conflict, political instability, and preoccupation with major national political agenda, including peace-building, constitution writing, and state-restructuring—these achievements should be considered remarkable. The majority of health-related MDGs have already been achieved, or are on track to being achieved, except two indicators in MDG 5, the contraceptive prevalence rate and the unmet need for family planning, and one in MDG 6, the proportion of population with advanced HIV receiving anti-retroviral combination therapy (ART). The targets related to poverty and hunger, universal primary education, gender equality and women's empowerment, are also likely to be achieved by 2015, and though the targets concerning environmental sustainability and

global partnership are unlikely to be achieved. In totality, lessons to facilitate their achievements have been learnt (*Nepal MDG, Progress Report 2013*).

On the other hand, social sector (education and health) has performed reasonably well. While access to education and health services has improved, significant challenges remain, such as the vast disparity between boys and girls and between different social communities in access to primary school education, or the lack of health workers in remote geographical regions. Furthermore, the need for child protection is on the rise as a large number of children are exposed to violence, abuse and exploitation (*European Union's Nepal Country Strategy Paper, 2007-2013, Mid-Term Review Document, April 2010*).

1.2 Global Context

Disasters are harsh situations which overwhelm local capacity, necessitating national or international level for assistance. Data gathered worldwide since 1980s suggest that, while the number of people killed by natural disasters has leveled out at around 80,000 per year, the number affected by disasters and associated economic losses have both soared. During 1990s, an annual average of around 200 million people was affected by natural disasters, which is nearly three times higher than 1970s. Economic losses from such disasters in 1990s averaged US\$ 63 billion per year which is nearly five times higher in real terms than the figure for 1970s (*Centre for Research on the Epidemiology of Disasters-CRED*).

While the figures sound sobering, they disguise the devastating effects that disasters can have on poorer nations' development as disasters

undermine development by contributing to persistent poverty. The full scale of disaster losses is still not fully understood. Today's globalised production systems and supply chains have created new vulnerabilities. Global trade, financial markets and supply chains have become increasingly inter-connected. When disasters occur in globally integrated economies, the impacts ripple through regional and global supply chains causing indirect losses to businesses on the other side of the globe (*Global Assessment Report on Disaster Risk Reduction, 2013*).

Further to the declaration of the International Decade for Disaster Reduction (1990-1999), the UN General Assembly in 2000 founded the UNISDR (United Nations International Strategy for Disaster Reduction), a coalition of governments, UN agencies, regional organizations and civil society organizations. In 2002, the UN published a document entitled *Living with Risk: A Global Review of Disaster Reduction Initiatives*. In 2005, a major reform within the UN system resulted in some UN agencies, in particular UNDP, becoming increasingly concerned about disaster risk issues by actively engaging in enhancing DRR programmes at national level.

The road map towards the implementation of the United Nations Millennium Declaration (*Secretary General's report to the General Assembly, 2005*) touches on areas which are closely linked to vulnerability to natural hazards such as ensuring environmental stability, eradication of extreme poverty and hunger and promoting gender equality.

The United Nations Convention to Combat Desertification (UNCCD) also provides the international community with a framework for sustainable development. The objective of the Convention is to secure long-term

commitment of its parties through a legally binding document. It provides an international framework for States affected by desertification to work jointly with industrialized countries to implement National Action Programmes. The Convention is a powerful instrument for sustainable natural resource management in affected regions and for ensuring long-term, mandatory external support for these efforts.

In furtherance of UN's efforts, several governments and NGOs championed the issue of disaster reduction. During the second world conference on disaster reduction held in Kobe, Hyogo, Japan, world governments agreed on the Hyogo Framework for Action (2005-2015) which was formulated as a comprehensive action-oriented response to international concern about disaster impacts on communities and national development. For its part, the World Bank launched the Global Environment Facility in the mid 1990s and ProVention Consortium⁴ in 2000, which works towards a more effective public-private dialogue on disaster risk.

The Millennium Development Goals (MDGs) declared by the international community to halve extreme poverty and hunger, combat infectious diseases, ensure universal primary education and sustainable development are critical to disaster management. Bearing in mind the importance of disaster management, the UN declared in 1990 the International Decade for Natural Disaster Reduction (IDNDR) following the adoption of Resolution 44/236 in December 1989. It has been realized that environmental threats could result in serious socio-economic and human costs.

Clearly, disasters are a major threat to the Nepalese society. The old view of disasters as

temporary interruptions on the path of social and economic progress, to be dealt with reactive humanitarian relief, is no longer credible. Disaster reduction should be treated as an integral part of poverty reduction through mainstreaming disaster management in national planning process.

1.3 Regional Context

South Asia is exposed to a variety of hazards due to the geo-climatic characteristics ranging from avalanches and earthquakes to Glacial Lake Outburst Floods (GLOFs) in the Himalayas in the north, droughts and floods in the plains, and cyclones that originate in Bay of Bengal and Arabian Sea. South Asia's geography is very diverse, ranging from high elevations in the Himalayas to long coastal lines formed by Arabian Gulf, Indian Ocean and Bay of Bengal. Importantly, many countries in the region share common geological formations and river basins, and natural hazards frequently transcend national boundaries.

Cyclones, earthquakes, tsunamis, extreme precipitation, especially during monsoon, droughts, landslides and GLOFs, are all common natural hazards in the region. The variety and level of hazards is shaped by some key geographic, climatic as well as geological features.

Countries in the South Asia region have regularly been experiencing a number of major disasters in the last decades, which have taken millions of lives and caused huge economic losses and massive destruction in the economy. Among others, major reasons in increasing people's vulnerability in the region is largely related to the demographic conditions, rapid technological and socio-economic changes,

⁴The ProVention Consortium was created in February 2000 to reduce the social, economic and environmental impacts of natural disasters on vulnerable populations in developing countries.

fast expanding urbanization and development within high-risk environment (*SAARC Framework for Action, 2006-2015*).

Recurring disasters pose a great development challenge for all SAARC countries. In this context, a SAARC Comprehensive Framework on Disaster Management and Disaster Prevention was developed in 2006, which is also aligned with the implementation of the Hyogo Framework of Action 2005-2015.

1.4 National Context

Nepal lies in one of the most fragile eco-regions of the world and is prone to natural and human-induced disasters. The country is highly prone to natural hazards such as floods, landslides, fires, extreme weather events, including thunderstorms, epidemics, cold waves, GLOF and earthquakes. Disaster preparedness activities are important as a precursor for a more effective humanitarian response and for reducing humanitarian caseloads during disasters. Experience shows that an effective humanitarian response at the onset of a crisis is heavily influenced by the level of preparedness planning of response agencies, as well as the capacities and resources available at all levels.

On account of its multi-layered vulnerability, Nepal has witnessed an increase in the frequency and intensity of disasters in the past. This inference is drawn only on the basis of disasters which have been reported. Losses from low-intensity, but more extensive disaster events such as landslides, soil erosion, thunderstorm, continue to affect housing, local infrastructure and large number of population. These disasters at the local level are so frequent that many communities accept them as an integral part of their existence and, with varying degrees of success, learn to live with them.

1.5 National Hazard Profile

Unstable steep slopes and fragile geological formation of a young mountain range with heavy monsoon rainfall leads to a wide range of geological and hydro-meteorological disasters across the country. The variation in geological characteristics, together with torrential rain during rainy season, result in landslides, debris flows, floods, etc. Apart from these, several other human-induced disasters are reported in the country.

Nepal is affected by many natural hazards and recent data shows that the frequency of natural disasters such as floods, landslides and fire have increased, especially during past three decades and could be attributed to uncontrolled development, environmental degradation or human interventions. A profile of the most important hazard-wise disaster events of 2012 has been presented in Chapter 3.

Evidence suggests that human interventions can increase the frequency or severity of certain types of hazards such as landslides, floods, drought, etc. or cause hazards that were not previously experienced. With the ever increasing growth of population, safe land is in scarce and there is a greater tendency for people to occupy marginal lands thereby increasing their susceptibility to hazards (*World Bank, 2012*).

In this context, managing disasters in the 21st century requires a concerted as well as an integrated national effort which needs to be coordinated at all levels. The Government of Nepal has been working to reduce risks through mainstreaming disaster management into sectoral development for preventing the occurrence of disasters, mitigating their impact and ensuring that there is adequate preparedness to ensure an effective response.

Box 1: Major natural disasters of the past

Historical records show that Nepal has been suffering from various types of disaster. The entire country is prone to earthquake. While the hilly areas, with rough topography and very young geology, are very prone to landslides, the lowland Terai is prone to floods. Avalanches, GLOFs and snowstorms are common in high hills of Nepal.

The biggest recorded disasters in Nepal are the earthquakes of 1934 and 1988 and the floods of 1993, 2008 and 2012 in addition to the Jajarkot diarrhea outbreak of 2009. The earthquake of 1934 put the country's

economy in shambles with 60% of the houses damaged in Kathmandu Valley alone. Similarly, the 1988 earthquake ruined the vital infrastructures in the eastern parts of Nepal. Again, the damage caused by floods and landslides of 1993 was about NRs 4 billion (equivalent to US\$ 55 million) in the 5 most affected districts amongst a total of 43 affected districts. This figure is equivalent to about 3% of the government's annual budget in that year. It was estimated that the floods of 1993 retracted the country's development performance by at least two decades (*ICIMOD, 2007*).

1.6 Disaster Resilience Profile

Disasters caused by natural hazards are currently occurring more frequently and with both increased human and financial costs (*EM-DAT 2012*). International activities for DRR received worldwide attention when the 1990s was declared the International Decade for Natural Disaster Reduction (IDNDR). In 1994, the 'Yokohama Strategy for a Safer World: Guidelines for Disaster Prevention and Mitigation' was adopted which agreed that disaster should be managed holistically from prevention and mitigation to rehabilitation and reconstruction (*UNISDR, 2012*).

Reducing disaster risk is about reducing the underlying causes of risks which are closely related to vulnerability. However, increasing resilience also means looking at what is available and accessible to individuals, households and communities and building on those existing capacities. For this reason, the concept of resilience has been examined and

implemented extensively in advancing understandings in the field of humanitarian aid and livelihood improvement (*Buckle et al. 2000; Paton and Johnston 2001; IFRC 2004*). The concept of resilience received worldwide attention in the DRR field through the adoption of the HFA in 2005.

In 2009, the Government of Nepal launched the Nepal Risk Reduction Consortium (NRRC), which is a unique arrangement that unites humanitarian, financial and development partners in line with the government priorities aimed at reducing Nepal's vulnerability to natural disasters, as stipulated in NSDRM 2009. The consortium has identified short-to medium-term DRR priorities that are both urgent and viable within the current institutional and policy arrangements in the country, termed Flagship Programmes. Based on the NSDRM and HFA, NRRC has identified 5 Flagship Priorities for sustainable disaster risk management (*see Box 3*).

Empowering communities to increase their resilience to disaster requires a sustained

effort. Nepal has over 3,950 Village Development Committees (VDCs) and 58 municipalities, each facing a range of risks to disasters, risks that are increasing due to climate change, improper land use and unplanned settlement and rapid population growth.

There is also a great diversity within each VDC/municipality and even within smaller communities, with multiple languages, ethnicities and religious groups represented. Such diversity in composition and capacity requires a customized strategy for DRR. With the adoption of the HFA, the Government of Nepal has committed to disaster risk reduction at the national and local levels. Based on this framework, the NSDRM 2009 acknowledges the role of the community in disaster risk management and focuses on local level participation and implementation.

In addition to the government mechanism, an important contribution is being made by a large number of Community Based Organizations (CBOs), UN agencies, development partners, I/NGOs, Nepal Red Cross and other agencies in enhancing community resilience. They work with the community on hazard assessment and disaster risk management planning. They apply different approaches with different target groups that make it difficult to track and to evaluate overall progress towards creating nationwide disaster-resilient communities, and reinforce the need for NRRC Flagship IV as a mechanism to build consensus and ensure good coordination. The Flagship IV has developed common tools for CBDRM projects in Nepal, including minimum characteristics (*Box 2*) of a disaster resilient community, targeting implementation of CBDRR activities in 1000 VDCs/municipalities within 5 years.

Box 2 : Minimum characteristics of a disaster resilient community

1. Organizational base at VDC/ward and community level;
2. Access to DRR information;
3. Multi-hazard risk and capacity assessments;
4. Community preparedness/response teams;
5. DRR/management plan at VDC/municipality level;
6. DRR funds;
7. Access to community managed DRR resources;
8. Local level risk/vulnerability reduction measures; and
9. Community based early warning systems

<http://www.flagship4.nrrc.org.np>



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1.7 Policy and Institutional Framework of... Disaster Management in Nepal

In 1996, efforts were initiated to adopt various measures towards addressing different types of disasters with the introduction of the National Action Plan on disaster management in Nepal. The Action Plan served as an initiative to establish disaster management foundation in Nepal. The Plan was prepared to devise necessary measures for all kinds of natural disasters, which deals with different stages of a disaster: pre, during, and post-disaster periods.

The Tenth Plan (2002—2007) has given special attention to disaster management while developing infrastructures and making construction and development projects sustainable. The Three Year Interim Plan (2007/08—2009/10) recognizes disaster as one of the major impediments of national development process and addresses DM tasks. The Plan recognizes the need to foster collaboration and coordination among key DM actors and institutions active in different sectors of the national economy.

Similarly, the Three Year Plan (2010/11-2012/13) provides greater responsiveness to DRR and stresses on the implementation of the commitments under the Hyogo Framework for Action. The plan commits resources to priority areas that support broad-based, inclusive and sustainable development and also stresses the need for integrated policies and programmes. One of the priorities is to minimize the impacts of climate change. Accordingly, the government has encouraged the concept of green development to minimize activities that contribute to climate change, and reduce the negative impacts on human well-being.

1.8 Existing Legal Frameworks

a. Natural Calamity (Relief) Act, 1982

The Natural Calamity (Relief) Act, 1982, is the first Act that recognizes earthquake, fire, storm, flood, landslide, heavy rainfall, drought, famine and epidemics as disasters. The Act defines natural calamities relief work as any relief work to be carried out in the area affected or likely to be affected by natural disaster in order to remove the grief and inconvenience caused to the people, to rehabilitate the victims of natural disaster, to protect lives and property, to control and prevent natural disasters and to make advance preparation thereof. Prior to 1982, relief and rescue works were carried out as social works only after the occurrence of a disaster. Since then, it has already been amended twice in 1989 and 1992.

The Act which envisaged two sub-committees related to health facilities and supply and rehabilitation, plays an instrumental role in imparting organized approach to disaster management in the country. It has helped in developing an organizational structure from central to local level to deal with response and relief works. Furthermore, the Act has provided basis for coordination among various agencies (government and non-government) in emergency response activities.

b. Local Self-Governance Act, 1999

The Local Self-Governance Act, 1999 has promoted the concept of local self-governance within the decentralization framework for managing environment-friendly development. The Act has given due emphasis to the inter-relationship between development process, environment and disaster. The Act encourages and empowers local government on overall local development process with ownership.

Some DDCs, municipalities and VDCs have started good initiatives such as the preparation of DRM plan that also addresses climatic hazards, training of professionals and staff and implementation of community-based disaster risk management programmes. However, due to the absence of elected local bodies, local government authorities have to perform their responsibilities with limited resources and capacities.

c. National Strategy for Disaster Risk Management in Nepal, 2009

The National Strategy for Disaster Risk Management (NSDRM), 2009, has provided a roadmap for all the sectors to prepare sector-specific programmes on disaster management and formulate necessary policy decisions in facilitating disaster mainstreaming into sectoral development planning process. It is a commitment of the Government of Nepal to

reflect the paradigm shift towards protection as part of the fulfillment of the basic rights of the people. Based on the identified gaps and issues for each of priorities for action that are in line with HFA priorities, the NSDRM has proposed and recommended strategies to be taken for disaster management in Nepal. The strategy has identified 29 cross-sectoral priority strategic actions and several sectoral activities for disaster management. The cross-sectoral strategies are based on the gaps and issues identified and are focused on addressing the identified gaps in particular sectors, incorporating all three stages of disaster management cycle, namely- pre, during and post disasters.

Out of 29 priority actions, the following key five priorities have been taken forward under the Nepal Flagship programme for immediate action (*Box 3*):

Box 3: Nepal Flagship Programmes

1. School and Hospital Safety – Structural and Non-structural Aspects of Making Schools and Hospitals Earthquake Resilient;
2. Emergency Preparedness and Response Capacity;
3. Flood Management in the Koshi River Basin;
4. Integrated Community Disaster Risk Management Programme; and
5. Policy/Institutional Support for Disaster Risk Management

<http://www.un.org.np/coordinationmechanism/nrrc>



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The NSDRM has proposed the formation of the National Commission for Disaster Risk Management (NCDRM), which will be chaired by the Prime Minister with high ranking government officials from different ministries and representatives from civil society organizations as its members.

d. Central Natural Disaster Relief Committee (CNDRC)

An apex level Central Natural Disaster Relief Committee (CNDRC) has been provisioned at the Ministry of Home Affairs. Chaired by Hon. Home Minister, the CNDRC, a 36-member committee, is mandated to recommend the Government of Nepal to declare emergency in the disaster affected areas. CNDRC is mandated to formulate and review national policy regarding relief and rehabilitation works, required programmes for preparedness, response and recovery.

The CNDRC is comprised of the Minister of Health and Population, Ministry of Physical Infrastructures and Transport, secretaries of relevant Ministries, Nepal Army, Nepal Police, Armed Police Force, relevant government departments, representatives of Social Welfare Council, Nepal Red Cross Society and Nepal Scout. The committee mobilizes the Central Disaster Relief Fund.

The CNDRC coordinates all the central level disaster relief and rehabilitation efforts and directs the district and local committees on all matters related to relief and rehabilitation works, supplies, etc. The committee may mobilize the Relief and Treatment Sub-Committee chaired by the Minister of Health and Population and Supplies, Shelter and Rehabilitation Sub-Committee chaired by the Minister of Physical Infrastructures and Transport with specific terms of reference for respective actions during disaster.

e. Local Disaster Risk Management Planning (LDRMP) Guideline, 2011

The Ministry of Federal Affairs and Local Development (MoFALD) formulated the Local Disaster Risk Management Planning Guideline (LDRMP), 2011, under the Local Self-Governance Act, 1998, in line with NSDRM, 2009. The main aim of the guideline is to mainstream disaster management into local level sectoral development areas by mobilizing local resources and ensuring local community participation following bottom-up approach. LDRMP was put in place to make disaster management participatory, transparent, accountable, inclusive and responsible by optimizing indigenous and local knowledge, resources and capabilities.

f. Disaster Preparedness and Response Plan (DPRP) in Districts, 2010

The Ministry of Home Affairs (MoHA) has formulated District Disaster Preparedness and Response Planning Guideline (DPRP) under the guidance of CNDRC aimed at formulating emergency preparedness for response at all districts. The DPRP piloting process was started in 2007 as a contingency plan for effective response under the chair of the Chief District Officer.

Under the leadership of the District Disaster Relief Committee, the DPRP process has been scaled up with the technical support of District Lead Support Agencies (DLSA), successfully covering 73 districts by 2012. The result of this initiative has tremendously contributed to integrated disaster response with pre-identified roles and responsibilities of state and non-state stakeholders with accumulative inventories for response.

g. National Disaster Response Framework (NDRF)

The National Disaster Response Framework (NDRF) has been prepared for effective coordination and implementation of disaster preparedness and response activities by developing a National Disaster Response Action Points that clarifies the roles and responsibilities of the government and non-government agencies. The main purpose of this framework is to develop a clear, concise and comprehensive national disaster response framework for Nepal that can guide a more effective and coordinated national response focusing on large scale disaster. The framework includes actions to be taken to save life and property; maintain law and order; care for sick, injured and vulnerable people; provide essential services (lifeline utilities, food, shelter, public information and media); and protect public property immediately after the onset of any disaster. The framework has also identified required actions for needful preparation from respective agencies.

h. National Adaptation Programme of Action (NAPA)

Nepal's Climate Change Policy, 2011, sets out the goal to improve people's livelihoods through climate change impact mitigation and adaptation activities. The policy emphasizes a climate resilient and low carbon development path supported through international commitments. The policy also calls for strengthening national capacity to monitor activities related to climate change. The emphasis of the policy, *inter alia*, includes (i) implementation of community-based local adaptation actions as mentioned in the National Adaptation Programme of Action (NAPA); (ii) promotion of climate adaptation and adoption of effective measures to address

the adverse impacts of climate change through technology development and transfer, public awareness, capacity building and access to financial resources; and, (iii) development of a reliable forecasting system to mitigate the adverse impacts of climate change on vulnerable areas, natural resources and people's livelihoods.

i. Local Adaptation Plans for Action (LAPA)

The National Framework on Local Adaptation Plans for Action (LAPA) aims to promote the preparation and implementation of LAPA and integrate adaptation options into local and national plans. LAPA Framework guides local to national level planning to identify the most climate vulnerable VDC, municipality, wards and communities and their adaptation challenges and opportunities, including possible activities, and prioritize adaptation actions in simple ways so that local communities decide on and prioritize their own needs. The integration of local level Climate and Energy Plans with the LAPA could facilitate some triple-wins and produce low carbon climate resilient development (LCCRD).

j. Nepal Risk Reduction Consortium (NRRC)

The Government of Nepal launched the NRRC in 2009 under the chair of Home Secretary to fulfill the institutional gap between obligation from HFA, mandate from NSDRM and proposed Disaster Management Act. The key role of NRRC is to support the government in identifying the programme areas on disaster management, resource mobilization and its implementation. The Ministry of Home Affairs leads the NRRC, which is composed of 23 member organizations, including government, donor communities, UN system, Red Cross

Movement and civil societies. It is a unique multi-stakeholder participatory arrangement that unites humanitarian and development partners in building a resilient Nepal.

k. National Building Code (NBC)

The Government of Nepal has formulated the Nepal National Building Code (NBC), 1993 targeting safer construction practices across the nation. The Municipal and VDC authorities are identified as key implementers of the code with technical support from the Department of Urban Development and Building Construction. Though developed in 1993, NBC went into force only in 2000 when the Building Construction System Improvement Committee (established by the Building Act, 1998) authorized the ministry to implement the code by gazetification. The Building Act and Regulations and the Building Code provide the legal framework for implementation by local government. However, especially in urban areas, it is essential that the full cycle of a legal building regulation process is implemented for new constructions.

1.9 Way Forward

Overall, there is a well developed policy and regulatory frameworks for disaster management in Nepal. Still the institutional structure for implementation needs strengthening at all levels. The challenge is to implement these measures in a period of the country's political transition and to move to a new system of implementation with full community participation to empower communities and create a sustainable approach to disaster management.

It calls for strengthening capacities of all actors: government, non-government and humanitarian agencies and civil society organizations. Interventions in this area will have to aim at developing and improving effective early warning systems, development of a comprehensive database, conduct comprehensive surveys and develop communication channels. The approval of NSDRM is a major achievement. With the approval of the strategy, various instruments need to be upgraded, harmonized and streamlined for consistency as they may have been originally developed through separate processes and mechanisms. This mainstreaming needs to take place at all levels with enhanced capacity and resourcing. Though five priority areas envisaged by the NSDRM are now in implementation, the remaining priority areas equally need to be implemented in achieving the goal of developing a resilient Nepal.

NRRC has helped create and retain a focus on disaster risk reduction and preparedness. As it matures, cross-Flagship work has been increasing. Flagship coordinating agencies need to allocate appropriate, adequate and dedicated capacity to proactively undertake the increased functions for Flagship coordination as originally envisaged (coordination, information management, technical support, resource mobilization, monitoring reporting and evaluation). Since Flagship V is related to institutional and policy support, rest of the Flagship areas should be coherent and directly linked with the area-V. The endorsement of the disaster management Act and formulation of designated agency are crucial in further institutionalizing DM in Nepal.

CHAPTER 2

Conceptual Issues on DRM



Introduction

Disaster Risk Management (DRM) is the concept and practice of reducing disaster risks through systematic efforts to analyze and reduce the causal factors of disasters. Reducing exposure to hazards, lessening vulnerability of people and property, wise management of land and environment, and improving preparedness and early warning for adverse events are all examples of disaster risk management. Nepal has felt the critical need to ensure that all development plans, policies and implementations mainstream disaster risk management to save lives and secure development gains.

Nepal is a country with high disaster risks, where investments in risk reduction both save lives and protects development goals. Thus, its importance has been realized to proactively integrate disaster management and climate risk management into key development sectors to lead to a self-sustained and long-term reduction in disaster risks. In fact, DRM is a comprehensive approach to reduce disaster risks which is set out in the Hyogo Framework for Action. Its expected outcome is the substantial reduction of disaster losses, in lives and the social, economic and environmental assets of communities and countries (UNISDR, 2009).

2.1 Risk and Vulnerability in Nepal

With such a diverse landscape, ranging from the massive Himalayan range to the fertile Terai region, the people of Nepal face a variety of life-threatening hazards. Classified as a global 'hotspot' (World Bank, 2005), Nepal is vulnerable to multiple natural disasters, suffering an average of 900 natural disasters each year resulting in the loss of lives and fragile livelihoods (MoHA, 2009). These disasters include earthquake, flood, landslide, windstorm,

hailstorms, fire, GLOFs and avalanches. In terms of relative vulnerability, Nepal has been ranked as the 11th most at-risk country in the world to earthquakes and 30th most at-risk to floods and landslides (UNDP, BCPR, 2004). This vulnerability to natural disasters result in preventable deaths and injuries and puts investments made in development at risk.

Disaster risk and vulnerability has increased due to security issues and decreased livelihood opportunities, migration, displacement, limited access to and weak flow of information to the population displaced internally due to more than a decade-long conflict in the country (NSDRM, 2009). However, the issue of displacement is being addressed under the ongoing government programme. Increasing vulnerability in both urban and rural areas in Nepal requires an integrated approach to disaster risk management. In common with many developing nations, Nepal is faced with rapid urbanization, with a 3% increase in urban population since 2001 (CBS, 2011), specifically in the Kathmandu Valley. Urbanization is occurring in a haphazard manner with little regard to averting risk and placing more lives in danger, specifically with regard to earthquake.

Kathmandu is the most at-risk city in the world to a major earthquake (Geo Hazards International, 2001). In the event of an earthquake, major bridges and critical infrastructures such as the only international airport would be severely affected posing significant challenges for an immediate and effective response. This vulnerability is largely due to poor building construction practices, including infrastructure that is constructed undermining seismic resilience. During the last 40 years, more than 300,000 buildings were destroyed or damaged by floods, fire or earthquakes (Des Inventar). These disasters have imposed a devastating burden on people and communities throughout Nepal. Disasters

occur consistently in a majority of the districts in Nepal with more than 90% of the population at high risk of casualties from two or more types of hazards (*MoHA, 2009*).

The Government of Nepal has undertaken a comprehensive study to assess urban growth trends and scenarios of multi-hazard risks in Kathmandu Valley to explore the scope of future land use pattern. This assessment is aimed at investigating and mapping the projected future land use, probability of multi-hazard scenarios and current land use and planning policies. Its purpose is to provide a clear picture of the current and future trends of urban expansion which could eventually support for policy formulation and implementation of effective land use and disaster risk management plans (*UNDP, 2012*)

In rural areas, the risk of floods and landslides is particularly high in Nepal where there is heavy reliance on weather dependent agriculture. Agriculture sector is poorly diversified and is largely dependent on monsoon rains, which have become less predictable due to climate change (*Department of Agriculture, 2010*). Annually, floods and landslides cause about 300 deaths also causing severe economic damages exceeding US \$10 million (*MoHA, 2009*). As a result, sustaining development gains becomes a challenge as disasters continue to impede them at both national and local levels. Progress in development that does not take disasters into account is unsustainable and faces severe risk of setback.

At a global level, there is now an emphasis that sustainable development, poverty reduction and good governance should require disaster risk management to be integrated into plans, policies and programmes (*HFA, 2005-2015*). The Government of Nepal recognizes the need to address and mainstream DRR through

development planning in Nepal in order to protect lives and development gains.

2.2 Disaster Risk Management in Nepal: A Paradigm Shift

In recent years, the Government of Nepal has taken steps to move from a relief and response paradigm towards putting greater emphasis on DRM by addressing all stages of disaster management cycle. Although the current institutional and financial frameworks remain predominantly response-based, efforts are being made to move towards a DRM approach that is mainstreamed across all development sectors and at all levels.

The Natural Calamity (Relief) Act, 1982, provides the main legal basis for DM in Nepal. Amended twice since its adoption, it has envisaged a response-focused approach to DRM. In part, the government has addressed this gap through the Local Self-Governance Act, 1999, which authorizes a number of risk reduction measures to be designed and implemented by local government authorities: District Development Committees, Municipalities and Village Development Committees. However, inadequate institutional structures, limited trained human resources, lack of integrated planning for cumulative financial resources, all remain limiting factors to the implementation of these risk reduction measures. Moreover, the absence of local elected representatives has also remained a stumbling block in its implementation.

The Government of Nepal, along with ongoing relief and response practices, has recognized the impact of disasters and the need to address this issue through comprehensive risk management approaches. As a result, development plans have included DRM as critical parts of sustainable development by highlighting the need for policy formulation and coordination with the creation of an

appropriate and high-powered institutional mechanism. The Three Year Interim Plan (2007–2010) has emphasized the importance of disaster risk management calling for changes in existing national policies to give greater attention to disaster preparedness and reconstruction in addition to relief activities. Similarly, the Three Year Plan (2010–2013) has also placed higher importance to resiliency and minimize human and economic loss from disaster by mainstreaming DRR into sectoral development planning process.

Box 4: Disaster preparedness and response planning initiatives

In 2012, the Ministry of Home Affairs, through Regional Administration Offices, organized disaster preparedness and response planning workshops in all five development regions. These workshops were aimed at orienting regional authorities on disaster preparedness and planning process, quality monitoring plans and reinforcing the roles and responsibilities of District Lead Support Agencies (DLSA). The Regional Disaster Relief Committee (RDRC) members, security forces from the region, district authorities from host districts, regional representatives of line agencies, Red Cross and heads of key I/NGOs and UN agencies are key stakeholders at the regional level coordinating disaster preparedness and planning initiatives. This initiative is rolled out at the district level to ensure local level preparedness.

The Government of Nepal became a signatory to the Hyogo Framework for Action (HFA) in 2005. In line with this, the government is currently in the process of approving the Disaster Management Act, which aims at including long-term planning, sustainable approaches to DRM and strengthen links between risk management and development. The proposed Act will clarify the understanding

of DRM and clearly outline the role of national, regional and local authorities by provisioning three sub-committees, namely, disaster risk reduction, disaster response and disaster recovery committees. In order to implement the National Strategy for Disaster Risk Management (NSDRM), the proposed Act has envisioned a separate institutional mechanism to coordinate overall disaster management affairs.

2.3 Examining Risk-Poverty Relationships

Quantitative and pragmatic evidence suggests that there is a direct relationship between disaster risk and poverty, which plays a key role in the accumulation of extensive risk over time and space. This role is intrinsically linked as undermining disaster risk management limits government's efforts for poverty reduction.

Recurrent and major disaster impacts seem to perpetuate poverty outcomes. The extent of vulnerability of communities to disaster risk differs in urban and rural areas. Although disasters impact social and economic landscape of a country tremendously, there is little evidence of systematic research to demonstrate the long-term impacts of disaster on the livelihoods of people in urban and rural areas.

Recent natural disasters in 2008 (Koshi floods) and 2012 (Seti floods) demonstrate the inter-relationships between poverty and vulnerability by aggravating the livelihood options as the poor people were highly affected by these disasters. Furthermore, the national poverty reduction agenda is facing numerous challenges due to emerging climate change, environmental degradation and the increasing number of natural disasters across the country.

3.1 Political Economy of Disaster Risk Management

Political economy of disaster risk management is relatively a new concept, which addresses the central question of what are the critical drivers that explain the uptake of disaster risk management policies and how national and international actors work to strengthen them. It is analyzed by examining the incentives, interests, institutions and power relations facing key stakeholders while reducing disaster vulnerability (*Global Assessment Report, 2011*).

Taking into account these factors in mind, the Government of Nepal has realized that effective policies for disaster risk reduction can greatly reduce the loss of lives and property caused by disasters. In order to achieve this, the government has adopted a multi-pronged approach in reducing disaster vulnerabilities. It has been realized that the implementation of DRR policies and plans are constrained by many factors such as differences in how various line ministries, their departments at the national and local levels, and local government authorities act towards the existing DRM policies, including financial constraints and organizational challenges.

It has been realized that weak governance, combined with political and economic factors, are main shortcomings for the poor implementation of DRR plans and policies. The government has felt the need to gain a better understanding of the political economy of disaster risk management. In the past, political dynamics has not taken disaster management into consideration, and in recent years, political ownership has been considered as a critical element in addressing disaster risk management. Moving forward, more emphasis is needed to work mainly on policy issues, technical aspects, capacity building and

strengthening institutions both at national and local levels.

From previous initiatives, good results have been achieved in many parts of the country but it has also become clear that many programmes have yet to deliver the expected benefits to its citizens due to response-focused political engagement, which is reflected in fragmented priority and insufficient resource allocation. The importance of these factors are now widely recognized by the government, but utmost attention needs to be given to respond to a question of how political interest arises, how to strengthen it and which will be the government's priority in the years to come.

The government has paid its attention in public policy, collective action and address issues related to political engagements by emphasizing on the following key areas:

- Implementation of disaster management plans and policies;
- Raising public awareness;
- Creating enabling environment for disaster-friendly public services;
- Ensuring residual risk transfer;
- Improving disaster management information system;
- Strengthening networking and coordination;
- Enforcing national building code and land use planning; and
- Mainstreaming disaster and climate risk management into development planning process.

2.3.2 Co-relation amongst Hazard, Poverty and Resiliency

Nepal is facing unprecedented disaster risks as people are being exposed to more frequent and severe hazards owing primarily to

unmanaged population growth, increasing level of poverty and marginalization, environmental degradation, poor planning and preparedness and the impacts of climate change.

Linking DRM to development can overcome this dichotomy as disasters put development at risk if development continues without considering future disaster risks. Hazards turn into disasters when there is a low level of physical and social development. For example, risks may happen because of the absence of necessary flood management or counter disaster infrastructure such as embankments and drainage channels. In some cases, poorly planned infrastructure development can itself be the cause of disaster such as the outburst of dams and collapse of mines.

Disasters, therefore, are inextricably linked to the human context. Nepal has a population of over 26.5 million (CBS, 2011). About 25% lives below poverty level and majority of the population are considered to be particularly at-risk to hazards because of location and/or socio-economic factors. Human activities are also a major contributor to the likelihood and extent of a disaster. Because of the rugged topography, people have to engage with natural environment on a daily basis which can aggravate the natural conditions in ways that lead to extreme events. Socio-economic activities are linked closely to the natural environment, disturbances in one region can easily lead to consequent effects in other areas—destructive practices like slash and burn agriculture in the upstream areas increases the risk of flood downstream. Understanding the process involved in a disaster event requires analyzing hazards at the locality, linking them to wider driving factors and assessing the human interaction.

Disasters are widely acknowledged to affect disproportionately the poorest in a community

as they have relatively higher sensitivity to disaster events compared with communities of higher development status. Recurrent events increase the vulnerability of the poor to disasters, increasing poverty levels so that many households are often unable to break out of the poverty cycle. Medium to longer term impacts of disasters at the national level also challenge development progress towards reducing poverty, possibly (re)creating conditions that place marginal urban and rural communities perpetually 'at risk' (UNISDR 2007). The exact relationship between disasters and poverty is context-specific and often poorly understood. The secretariat for the United Nations International Strategy for Disaster Reduction (UNISDR 2007a) noted there is little empirical evidence of the long-term impact of disasters on the lives and livelihoods of people and on national development prospects.

Lessons from community participation in disaster management reveal that it brings great benefits in terms of ownership and direct savings in losses from disasters. Although problems vary from one specific context to the other, top-down driven community-based approach has yet to address local needs, promote the potential of indigenous resources and capacities, in the absence of which people's vulnerabilities are likely to increase. Recognizing these limitations, the Community Based Disaster Management (CBDM) approach has been promoted as a bottom-up planning process. In order to create an enabling environment, additional attention has been given to assess community level hazards and vulnerabilities.

In the case of disasters, people at the community level have more to lose because they are the ones directly hit by disasters, whether major or minor. They are the first ones to become vulnerable to the effects of such hazardous events.

2.4 Current Practices and Coping Mechanism

Disasters damage natural and physical resources on which people's livelihoods depend. While different hazards have specific effects, the ultimate impact of each hazard on resource and poor people is mostly to disrupt or destroy their livelihoods. Small farmers, artisans and fishermen are affected both through the loss of assets and the loss of employment opportunities. Prevailing poverty, characterized by low level of awareness, limited resources, including access to skills and knowledge, limit livelihood options. These constraints limit opportunities to build resilience.

Environment conservation and disaster management are important in the livelihoods of indigenous people who often live in hazard-prone areas and have built up, through thousands of years of experience and intimate contacts with environment, inherent indigenous knowledge and local resources on disastrous events. This knowledge is a precious resource that continues to contribute to environment conservation and disaster management in Nepal. With the disruption of traditional lifestyles and settlements in permanent communities, it is a challenge to maintain the continuity of traditional knowledge through its transmission from one generation to the other.

Disasters have affected poor countries and poor people have been hit the most. According to UNDP, 24 out of 49 least developed countries face high levels of disaster risks. Nepal is no exception to this. Not only are the people

affected by disasters, they also lack the capacity to deal with the consequences of a disastrous event. This exacerbates the situation which is often characterized by food shortages, civil unrest and furthermore creates dependency (*Practical Action, 2010*).

2.4.1 Harnessing Synergies: Mainstreaming DRM and Climate Change Adaptation into Development Planning and Process

The Ministry of Home Affairs and the Ministry of Science, Technology and Environment, focal ministries for disaster management and climate change adaptation respectively, have initiated effective linkages, coordination and synergy in ensuring that the poorest and most vulnerable communities in Nepal are able to adapt to the negative effects of climate change. According to the United Nations, although Nepal's per capita green house gas emissions are negligible, it is affected by the negative consequences of climate change such as rising average maximum temperature which leads to the subsequent retreat of glaciers (*UNDP, 2010*).

Climate models predict irregular precipitation thus leading to an increased chance of flash floods and intermittent rainfall resulting in food insecurity and livelihoods setback. Similarly, as glaciers begin retreating due to climate change, there is also an increased chance of GLOF. According to International Centre for Integrated Mountain Development (ICIMOD), warming in Nepal is an average of 0.6 degree per decade which is higher than the global average of 0.4 degree (*Country Disaster Response Handbook, 2012*).

Climate change is raising the frequency and scale of disasters in Nepal. This is having an enormous impact made vulnerable by its extreme climatic zones, geographical terrain and river systems, which have led to large scale temporary population migration, loss of major infrastructures, exacerbated existing gaps in educational and health services thus impacting livelihood patterns.

Table 2.1: Land cover exposed to GLOF risks in Nepal

Land cover type	Area (ha)
Agricultural land	234.8
Forest	161.3
Grass	60.2
Bush	123.4
River course	364.4
Cutting cliffs	0.2
Total	944.3

Source: ICIMOD GLOF Modelling, 2010)

A growing body of evidence indicates that the frequency and intensity of flash floods are increasing in Nepal. On 5 May 2012, a flash flood in Kaski district, claimed 72 lives. The frequent occurrence of flash floods in the Hindu Kush Himalayan region poses a severe threat to lives, livelihoods and infrastructure, both in the mountains and downstream. Vulnerable groups such as the poor, women, children, the elderly, and people with disabilities are often hit hardest (ICIMOD, 2012).

Disaster risk is further increased because climate change amplifies the effects of damaging human practices. Where the natural environment is already depleted through the use of unsustainable practices, ecosystems will be less able to withstand the variances in water level or temperature rise. In turn, damaged ecosystems provide weaker protection against physical threats and, therefore, the likelihood of an associated disaster event increases. This

is the case in the Siwaliks range, where settlements and agricultural practices have degraded the landscape and weakened the natural defense system.

2.4.2 Building Resilience

Climate change has undermined the capacity to deal with hazards. By putting pressure on natural resources such as water, forests and land, productivity, profitability and even viability of subsistence livelihoods is challenged. With less financial capital, people have little spare funds to prepare for a disaster, protect their property and other assets, and recover afterwards.

In all, climate change has increased the vulnerability of those that are already susceptible to disasters and poverty by:

- Increasing the disaster risk in places where the poorest people live;
- Adding strain on the natural protection against hazards; and
- Undermining livelihoods that provide resilience against disaster

In light of these threats, disaster risk management is central to meet development objectives and to adapt to climate change. Even gradual, mean changes in climate can increase vulnerability of the poor and make the work of disaster risk managers more difficult.

That is why, for the majority of policy makers and practitioners, the rationale behind calls for greater mainstreaming of Climate Change Adaptation (CCA) into DRM, and their mainstreaming into development more broadly is self-evident. Exploiting the overlap between CCA and DRM is one way to ensure disaster risk managers can continue to have a positive impact on reducing vulnerability.

Box 5: Integrated watershed management: An option to CCA and DRM

Landslide and flood is one of the major disaster risks in Jugedi Khola watershed of Chitwan district, Nepal. Both socio-economic practices (such as deforestation, cultivating unsuitable hill slopes, uncontrolled grazing and lack of skills for alternate livelihood options) and erratic pattern of rainfall enhanced floods during summer and drought and forest fire risks during winter.

Between 2004 and 2012, a range of activities in improving livelihood capacities and improving watershed condition were implemented. Communities have learned to grow vegetables during winter as additional income source, improved livestock rearing, conserved soil and forests and utilized water resources to irrigate crops by improving existing irrigation channels.

Some farmers have chosen to cultivate bananas instead of rice which would bring more income in limited water availability situation. Soil erosion was managed by controlling gully in the micro catchments and applying appropriate sloping agricultural land technology and by

conserving forests through community forestry. Although rainfall is becoming more erratic and the potentiality of hazards still exists, natural ecosystem has been improved providing better defense and minimizing disaster risks. Alternative options on growing crops and improved irrigation facilities have enhanced production and income.

Stabilization of steep land through terracing and tree planting, improving water management and construction of flood barriers have helped prevent small scale disasters; introduction of intensive vegetable gardening and improved livestock breeds have strengthened livelihoods, as increased agricultural biodiversity is a key livelihood strategy to cope with changing and more challenging environmental conditions. Sustainability of livelihood initiatives are ensured by establishing an institutional set up of community-based organizations and linking them to service providers and markets to carry out the activities in future.

2.5 Way Forward

In addressing disaster risks, a number of emerging concerns warrant attention. These include the integration of climate change issues within the HFA and governance for DM at the local level. DRM in Nepal has traditionally been relief and response-oriented. There is significant recognition that a strong, implementable, results-based disaster risk management system in Nepal will contribute to community and national resiliency towards risks, sustainability of development gains, poverty reduction, and ultimately continued economic growth. Disaster management is possible only through integrated, participatory and collaborative involvement of all partners. As such, due importance needs to be given to more effective integration of disaster risk considerations into sustainable development policies, planning and programming at all levels, with a special emphasis on disaster prevention, mitigation, preparedness and vulnerability reduction.

Overall, there is a well developed policy

framework for DRM, but the institutional structure for implementation needs strengthening at all levels. Legislation of the proposed new Disaster Management Act with a new dedicated institution is clearly the first priority. For this, the national Disaster Management Policy must be brought forward ensuring integrated planning with community level collective ownership. Again, development and strengthening of institutions, mechanisms and capacities at all levels, political ownership and urban-focused earthquake preparedness and mitigation measures with strong stewardship from all the nodal ministries is a pre-requisite to building resilience to hazards.

Furthermore, it is very important to consider climate change issues within DRM. Development plans and policies need to integrate disaster management, climate change adaptation and environment management comprehensively in development strategies. This holistic approach should also be reflected at the grassroots level implementation to address livelihoods of local communities.



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CHAPTER 3

Disaster Scenario, 2012



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Introduction

This chapter presents major disaster events and their effects on human casualties and economic losses in the country in 2012. In doing so, it places the disaster events of 2012 in the context of disaster trends in the country. The disaster events are analyzed in terms of their regional and district-wise distribution and seasonality. These analyses are largely based on the records of the Ministry of Home Affairs, Ministry of Agriculture Development and DesInventar.

3.1 General Disaster Types

Common types of disasters in Nepal are landslide, flood, thunderstorm, fire, epidemics, earthquake and cold wave, among others. The

occurrence and impact of different types of disasters varies over the years and seasons. For example, landslides and flood occurs every year in monsoon season whereas earthquake does not have any pattern of season or year of occurrence. A kaleidoscopic review of the impact of various disasters since 1971 shows that epidemics has caused the highest number of fatalities, but in terms of impacted families, flood has affected the largest number. Other major disaster types, in terms of the number of human deaths caused are landslide, flood, fire and thunderstorm. The impact of different types of disasters since 1971 is shown in *Table 3.1*. Category 'others' includes disasters such as avalanche, drought, famine, forest fire, frost, heat wave, pollution, snow storm, sedimentation, etc.

Table 3.1: Most lethal disaster types and their impacts in Nepal (1971-2012)

SN	Disaster Types	Number of events/records	Number of Deaths	Number of injuries	Affected family	Destroyed houses	Damaged houses
1.	Epidemic	3446	16,563	43,076	512,969	0	0
2.	Landslide	2942	4511	1566	555,705	18,414	13,773
3.	Flood	3685	4079	488	3,665,608	94,700	87,261
4.	Fire	6999	1416	1347	255,172	75,581	2282
5.	Thunderbolt	1403	1200	2257	6729	379	427
6.	Accident	1000	969	359	2137	5	415
7.	Earthquake	105	880	6840	4539	33,708	55,318
8.	Cold wave	390	515	83	2393	0	0
9.	Structural collapse	389	404	596	2016	1170	623
10.	Boat capsize	140	279	140	410	0	0
11.	Others	2892	1092	1458	928,492	5210	9998
	Grand Total	23,391	31,908	58,210	5,936,170	229,167	170,097

Source: DesInventar 2011, MoHA 2011 and 2012

A trend analysis of human deaths caused by different disaster types (Fig. 3.1) since 2000 shows that the number of deaths by particular disaster type has been fluctuating over the years. Since the casualty data caused by landslide and flood has been recorded as one category until 2010, the trend of casualties has been analyzed by considering these two disasters as one category. It indicates that with

an exception of 2009, flood and landslide has caused highest number of human deaths since 2000. In 2009, epidemic was the major disaster causing the highest number of deaths. In the last three years, the number of deaths caused by thunderbolt has been increasing. Similarly, the number of deaths caused by fire has also been increasing since 2009.

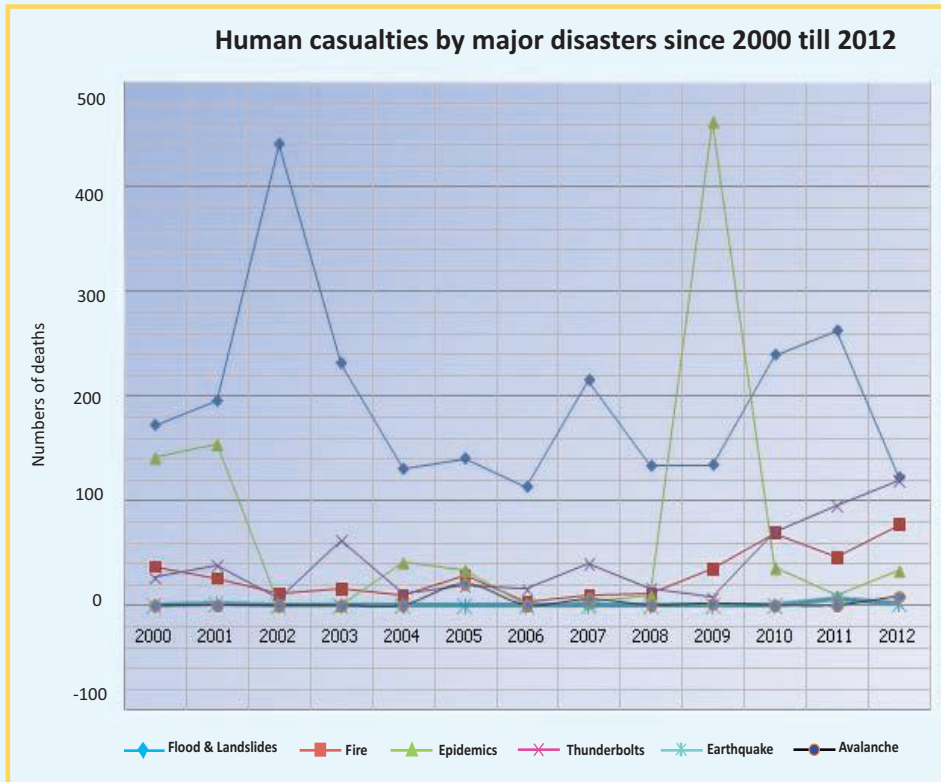


Fig. 3.1: Human casualties by major disasters since 2000 till 2012

3.2 Disasters in 2012

Major types of disasters recorded in 2012 are thunderbolt, fire, landslide, flood, epidemic, avalanche, extreme rainfall and windstorm. Although air crash caused 34 fatalities, the current norm of the Ministry of Home Affairs does not consider it as disaster as the government does not pay relief package to victims. Casualties and the number of affected families are shown in Table 3.2. Although cold

wave has largely affected people during winter months, the data includes only deaths medically certified as cold wave and not deaths occurring during the events of cold wave. Table 3.2 shows that the total number of deaths and people injured are 419 and 490 respectively in 2012. The number of casualties is less than 2011 (Fig. 3.2). The impact of various disaster types in terms of human and property losses is given in Annex 2.

Table 3.2: Number of casualties and affected families in 2012

SN	Disaster	No. of deaths	No. of missing	No. of injuries	Affected family
1.	Thunderbolt	119	0	267	35
2.	Fire	77	0	134	2436
3.	Landslide	60	8	33	66
4.	Flood	52	39	8	104
5.	Air crash	34	0	6	0
6.	Epidemic	33	0	0	0
7.	Windstorm	18	0	20	102
8.	Extreme rainfall	11	0	9	0
9.	Avalanche	9	3	13	0
10.	Boat capsize	4	0	0	0
11.	Cold wave	1	0	0	0
12.	Earthquake	1	0	0	0
	Total	419	50	490	2743

Source: MoHA, 2012

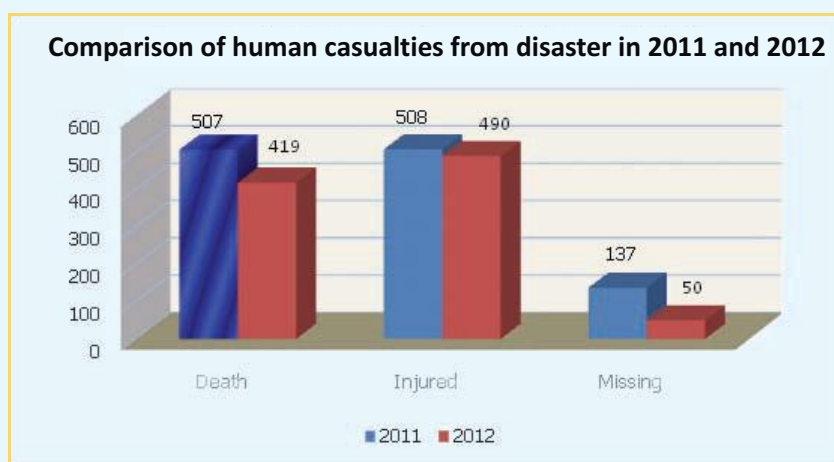


Fig. 3.2: Comparison of human casualties from disaster in 2011 and 2012

The severity of disaster type varies in terms of fatalities, injuries and property damage. In terms of fatalities, thunderbolt caused the largest number of deaths (119) and accounted for 29% of the total death (*Table 3.2*) in 2012. Fire, landslide, floods and epidemics are other major disaster types. These disaster types together accounted for 82% deaths. However, in terms of affected families, fire has affected the largest number of families.

In 2012, a total of 1,699 disaster events were recorded. Major disaster events, including deaths, missing and affected families that occurred in 2012 have been presented in chronological order in *Table 3.3*. Among the disaster types, major events recorded were flood in the Seti river in Kaski district, fire in Siraha district and avalanche in Gorkha district in addition to two air crashes in terms of human casualties and affected families.

Table 3.3: Chronology of major disasters in 2012

S.N.	Date	District	VDC/ municipality & ward No.	Types of disaster	Deaths	Missing	Injured	Affected family
1.	18 January	Dhankuta	Rajarani 6	Fire	5			3
2.	3 May	Dhading	Mahadevsthan 1	Thunderbolt	2			5
3.	5 May	Kaski	Sardikhola 7	Flood	40	32	5	31
4.	14 May	Mustang	Jomsom	Air crash	15		6	
5.	15 May	Siraha	Aaurahi 3, 4, 5, 6, 7	Fire	1		4	477
6.	23 May	Banke	Holiya 9	Fire	1			45
7.	31 May	Bajura	Badhu 9	Storm	5		3	35
8.	29 June	Baglung	Hatiya 3	Landslide	3			22
9.	3 August	Gorkha	Prok 4, 5	Epidemic	4			
10.	23 Sept.	Gorkha	Samagaun 4	Avalanche	9	3	13	
11.	28 Sept.	Bhaktapur	Thimi 16	Air Crash	19			
12.	30 Sept.	Ilam	Kolbung 1, 2	Landslide	10			
13.	2 October	Sankhuwasabha	Dhup 8	Landslide	5			

Source: MoHA, 2012

3.3 Spatial Pattern of Human Casualties

Occurrence and impact of disasters vary in different regions. Some disasters exhibit specific spatial patterns whereas others do not follow the same. For instance, landslides occur almost exclusively in hills and mountains whereas fire has broader occurrences. Analysis of the spatial pattern of disaster helps in designing appropriate response measures.

3.3.1 Ecological/Development Regions

Regionality of the disaster impact has been organized by grouping districts of each development region into three ecological

regions: mountain, hill and Terai. *Figure 3.3* presents the regions thus grouped. Since the number of districts and population vary in each region, analysis of the impact of disaster should take into consideration these variations. Generally, since the hills and Terai have high population, more people are exposed to disasters and thus exhibit more casualties. According to 2011 census, population of three ecological regions, viz., mountain, hill and Terai is 1,795,354; 11,475,001 and 13,350,454 respectively. Population of specific region for 2012 has been projected based on the population growth rate of the respective regions to calculate the proportion of casualties. Spatial pattern of human deaths and injuries caused by major disaster types is analysed by development/ecological regions

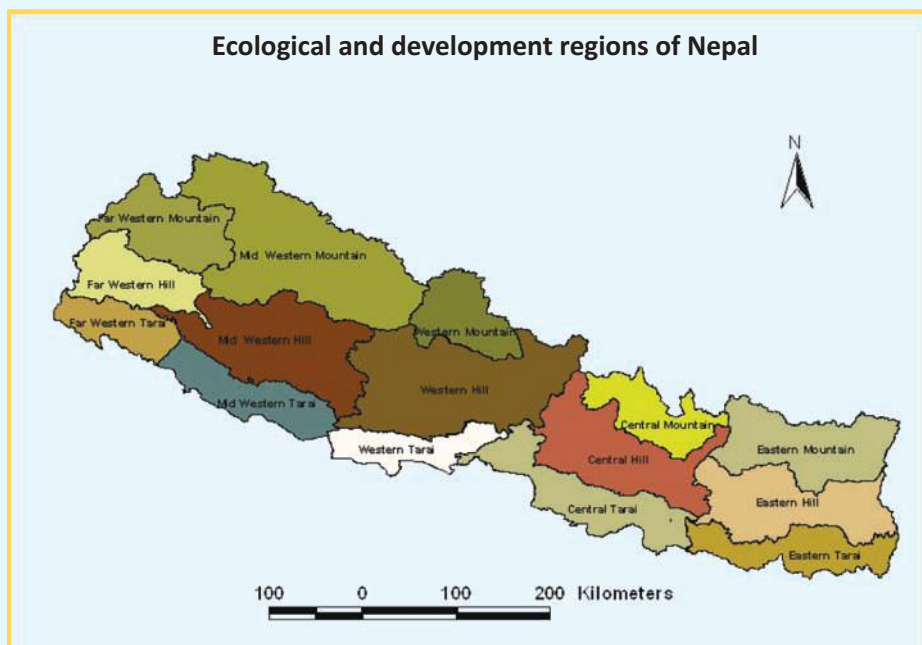


Fig. 3.3: Ecological and Development Regions of Nepal

Tables 3.4 and 3.5 represent the proportion of human deaths caused by disasters in different ecological and development regions respectively. Among the ecological regions, hill accounted for 258 deaths (61.57%), Terai accounted for 88 (21%) and mountain 73

(17.42%) deaths. In terms of population, mountain has the highest casualties with 4.040 deaths per 100,000 people followed by hills with 2.248 deaths and the Terai with 0.647 deaths per 100,000 people .

Table 3.4: Human deaths distribution by ecological regions in 2012

Ecological Regions	Projected population		Total human death		Number of death per 100,000 people
	Number	%	Number	%	
Mountain	1,806,788	6.68	73	17.42	4.040
Hill	11,612,002	42.97	258	61.57	2.248
Terai	13,605,022	50.34	88	21.01	0.647

Source: MoHA, 2012

Among the development regions, Central Development Region recorded the highest number of human deaths of 146 (34.84%) closely followed by Western Development Region with 123 (29.35%) deaths (Table 3.5). Similarly, Eastern and Far Western

Development Regions each have accounted for 12.41% human deaths. However, in terms of the population size, Western Development Region has recorded the highest death (2.467) per 100,000 people with the lowest in Eastern Development Region (0.883).

Table 3.5: Human death distribution by development regions in 2012

Development Regions	Projected population		Total human deaths		Number of deaths per 100,000 people
	Number	%	Number	%	
Eastern	5,887,640	21.78	52	12.41	0.883
Central	9,917,137	36.69	146	34.84	1.472
Western	4,985,671	18.45	123	29.35	2.467
Mid Western	3,652,364	13.51	46	10.98	1.259
Far Western	2,584,206	9.56	52	12.41	2.012

Source: MoHA, 2012

Total human deaths caused by disasters in different regions are shown in *Fig. 3.4*, which depicts that the highest number of deaths was recorded from the Western hills (96) and the lowest in Western Terai (26). Highest death in Western hill is

manifested by the occurrence of the Seti flood in Kaski district. Human deaths caused by individual disaster types in each development region and ecological region are given in *Annex 2*.

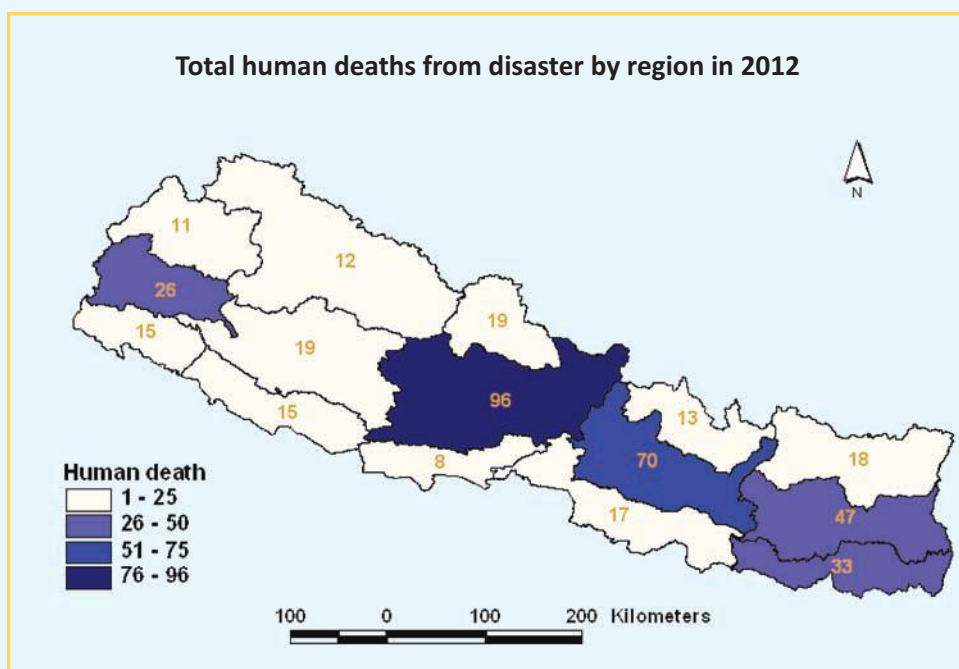


Fig. 3.4: Total human deaths from disaster by region in 2012

District-wise review of the distribution of human casualties from different disaster type indicates that 8 districts have not recorded any human death. This has not changed from

2011 although particular districts without human deaths have changed. The highest number of deaths was recorded from Kaski district (*Table 3.3*).

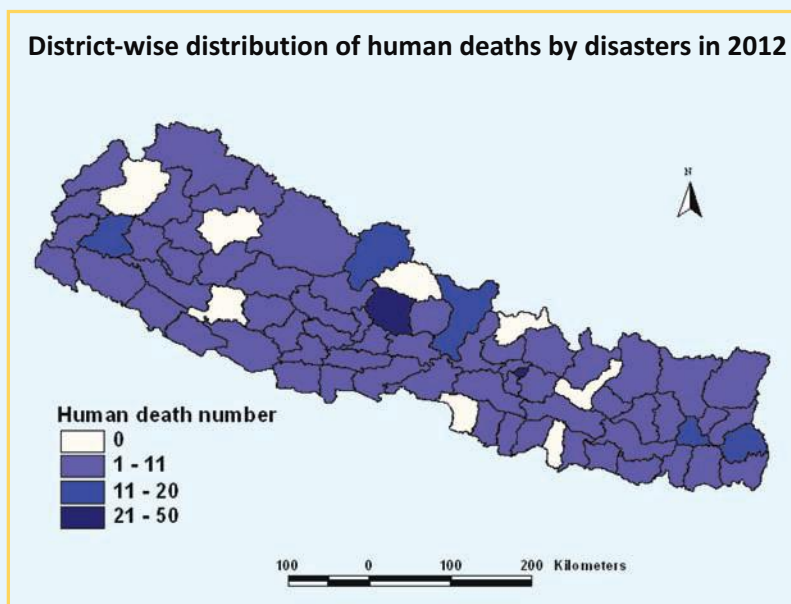


Fig. 3.5: District-wise distribution of human deaths by disasters in 2012

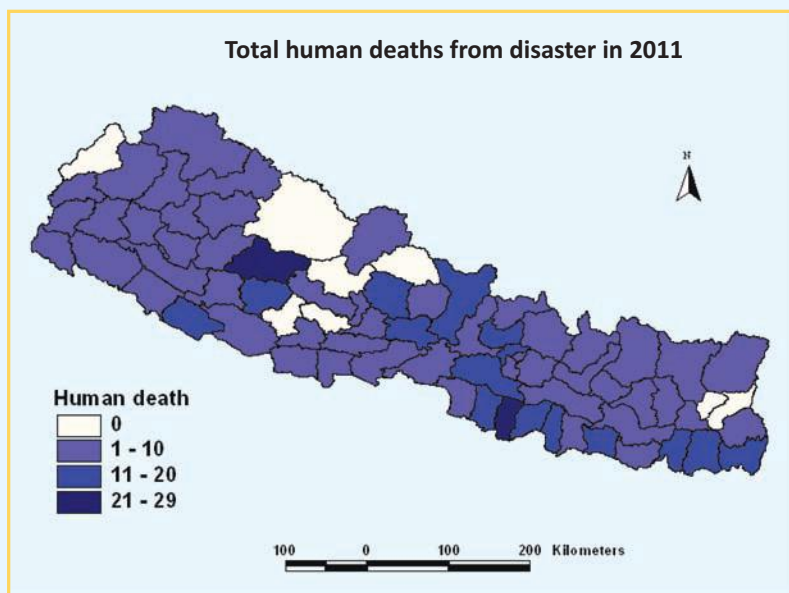


Fig. 3.6: Total human deaths from disaster in 2011

3.3.2 Human Injuries

A total of 490 human injuries were caused by disasters in 2012 (*Table 3.2*). Out of all the disaster types, largest number of injuries was caused by thunderbolt (267), followed by fire (134), landslide (33) and avalanche (13). These four disasters accounted for 91% of total injuries caused by disasters. A total of 9 districts did not report human injuries from any type of

disasters. With regard to distribution, thunderbolt caused human injuries in 45 districts of all the development and ecological regions whereas fire injuries have been reported from 37 districts. In terms of human injury, thunderbolt, fire and landslide have caused maximum number of injuries. Largest number of injuries occurred in April (136) largely contributed by thunderbolt.

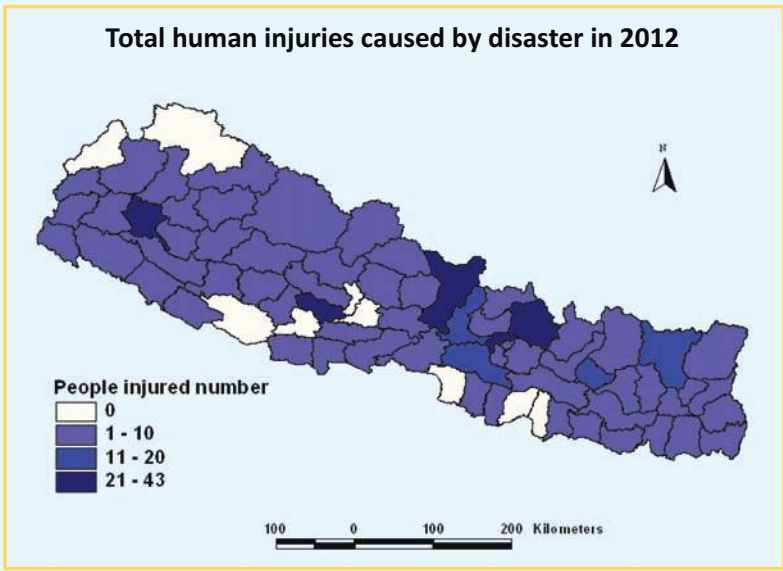


Fig. 3.7: Total human injuries caused by disaster in 2012

3.3.3 Human Casualties by Major Disaster Types

Thunderbolt

Among different disaster types, thunderbolt claimed the largest number of human lives (119) accounting for 29% of total death from disaster (Table 3.2). Again, with regard to injuries, thunderbolt accounted for highest (267) resulting in 54.49% of the total 490

injuries. Number of deaths caused by thunderbolt has been increasing since 2009. An analysis of distribution of human deaths in different districts shows that amongst various disaster types, thunderbolt has caused human deaths in largest number of districts (44). Although districts of all the development and ecological regions have been affected by thunderbolt, casualty is more predominant in the Central and Eastern hills and Eastern Terai

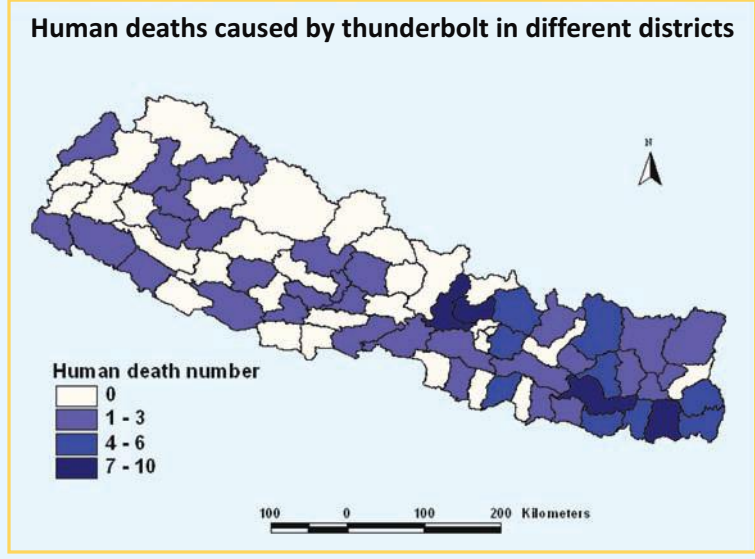


Fig. 3.8: Human deaths caused by thunderbolt in different districts

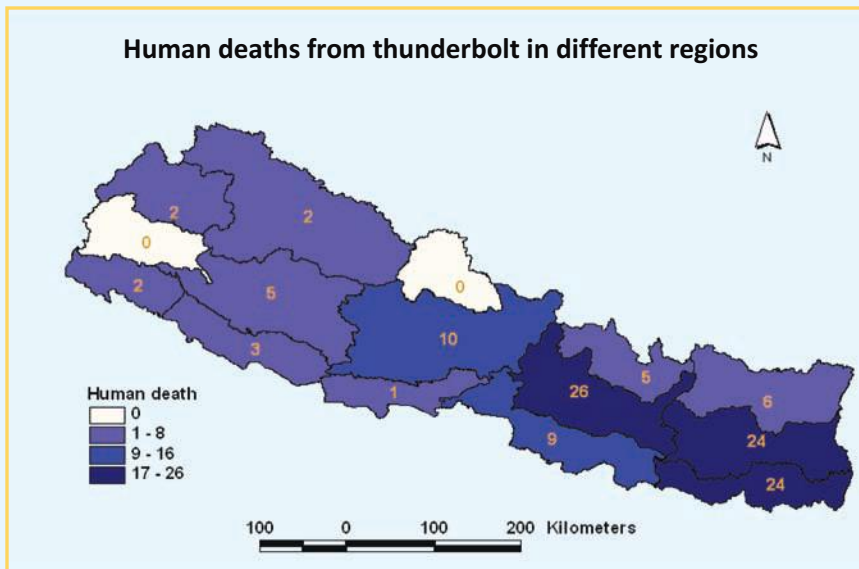


Fig. 3.9: Human deaths from thunderbolt in 2012

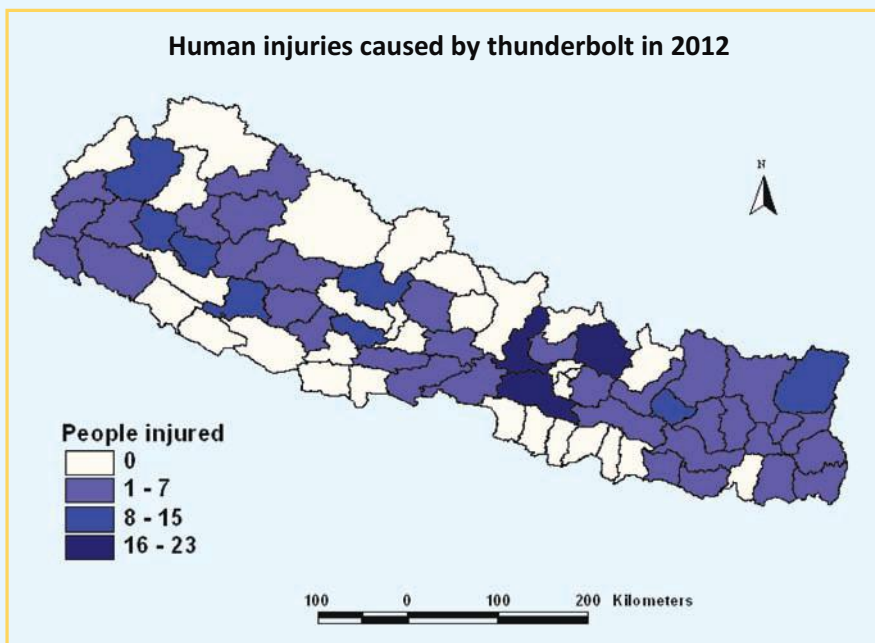


Fig. 3.10: Human injuries caused by thunderbolt in 2012

Fire

Next to thunderbolt, fire is the second largest life claiming disaster in 2012 causing 77 deaths (18%). A total of 134 people (27.35%) were injured by fire (*Table 3.2*). Similarly, the number of casualties by fire has been increasing since 2009. *Figs. 3.9* and *3.10* indicate the distribution

of human deaths by fire in various districts and regions. Interestingly, Far Western mountain and Western mountain did not cause any human deaths due to fire in 2012. Central hills followed by Western and Eastern hills accounted for the highest human deaths by fire.

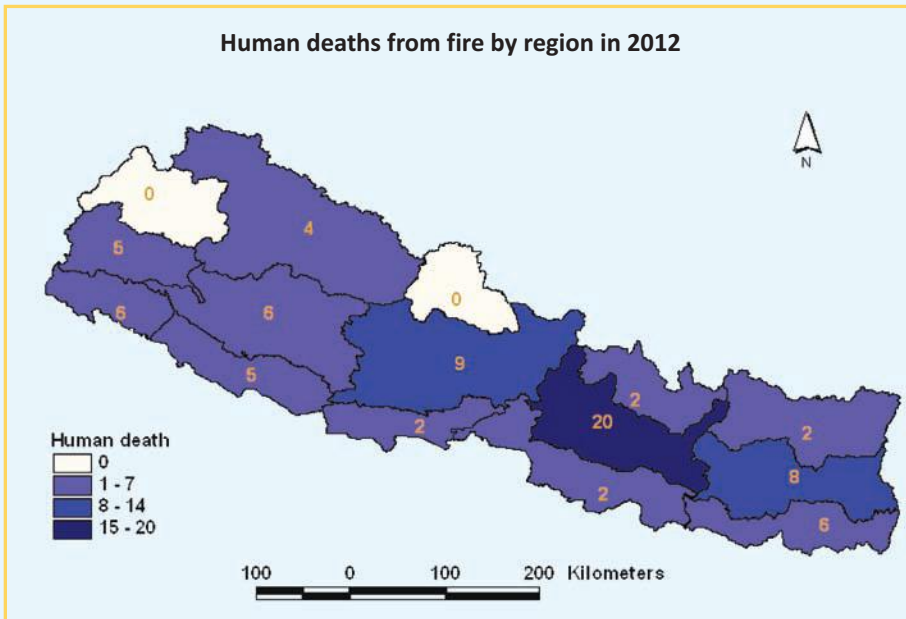


Fig. 3.11: Human deaths from fire by regions in 2012

Human death has been reported from 37 districts with highest number from Kathmandu district. Generally, fire caused deaths more in Terai districts and Mid-western hills.

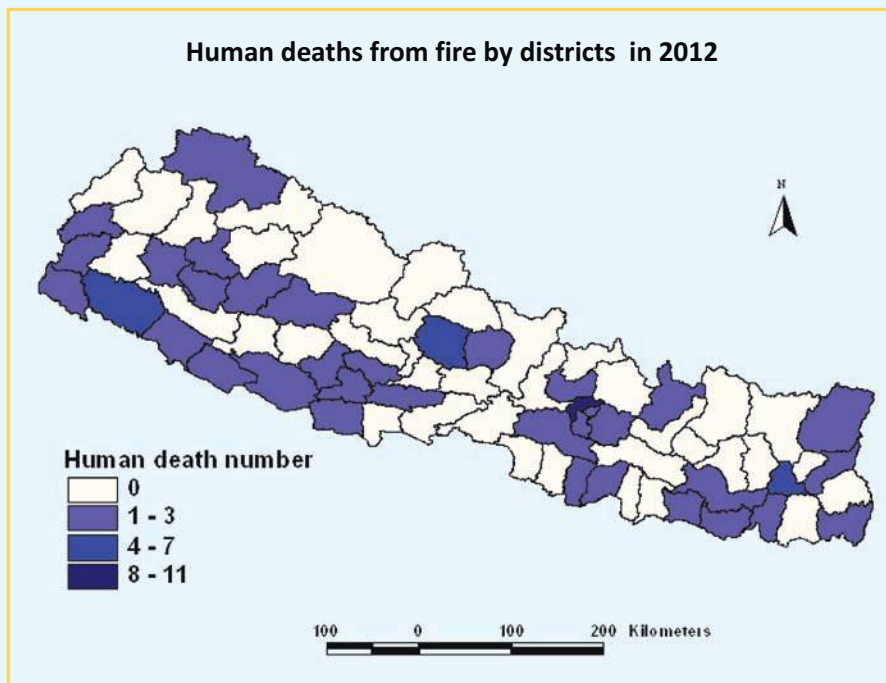


Fig. 3.12: Human deaths from fire by districts in 2012

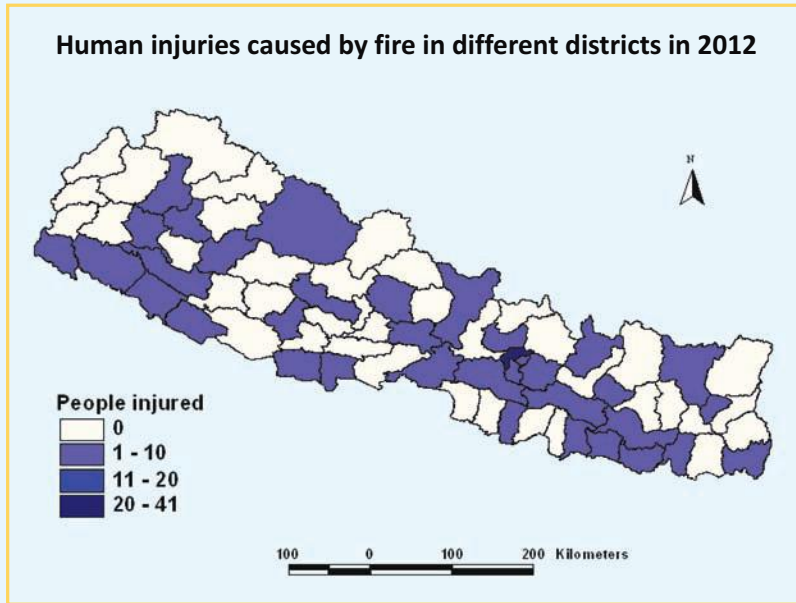


Fig. 3.13: Human injuries caused by fire in different districts in 2012

Landslide

In 2012, landslides ranked third both in terms of human deaths and injuries. A total of 60 deaths (18%) and 33 injuries (6.7%) were recorded in 2012 (Table 3.2). Deaths due to

landslide were more prevalent mainly in hills and mountains only, the highest being in Western and Eastern hills. Combined with flood, landslide has remained the most lethal disaster in Nepal since 2000. Human injuries by landslide were reported from 14 districts of hills and mountains.

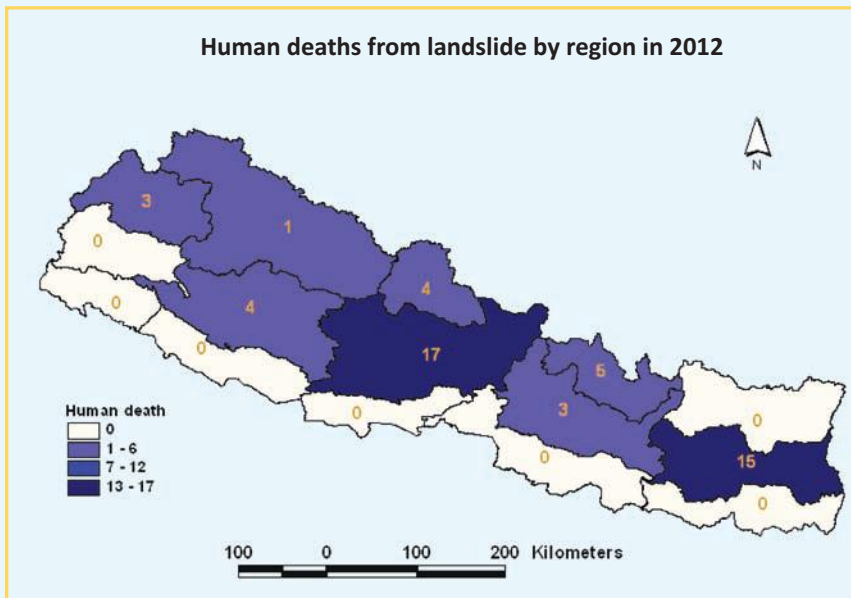


Fig. 3.14: Human deaths from landslide by region in 2012

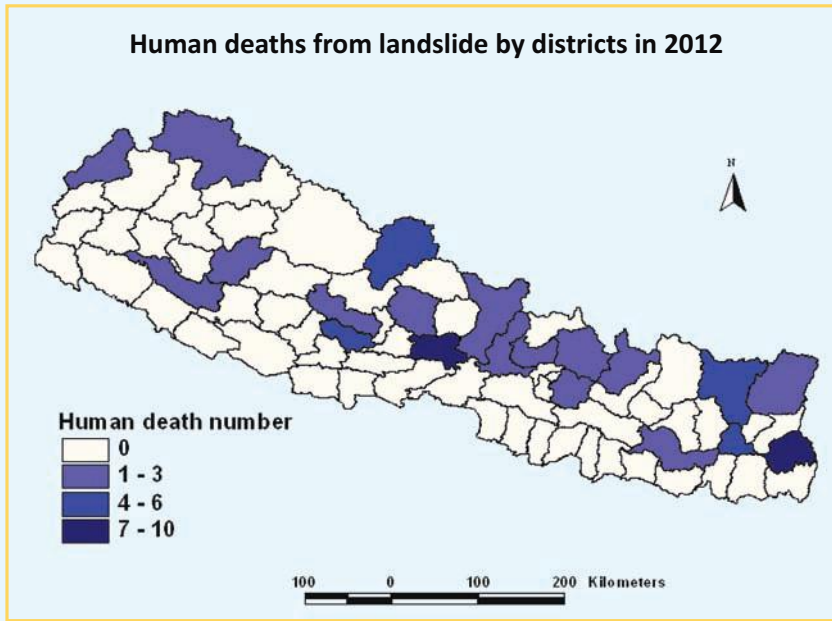


Fig. 3.15: Human deaths from landslide by districts in 2012

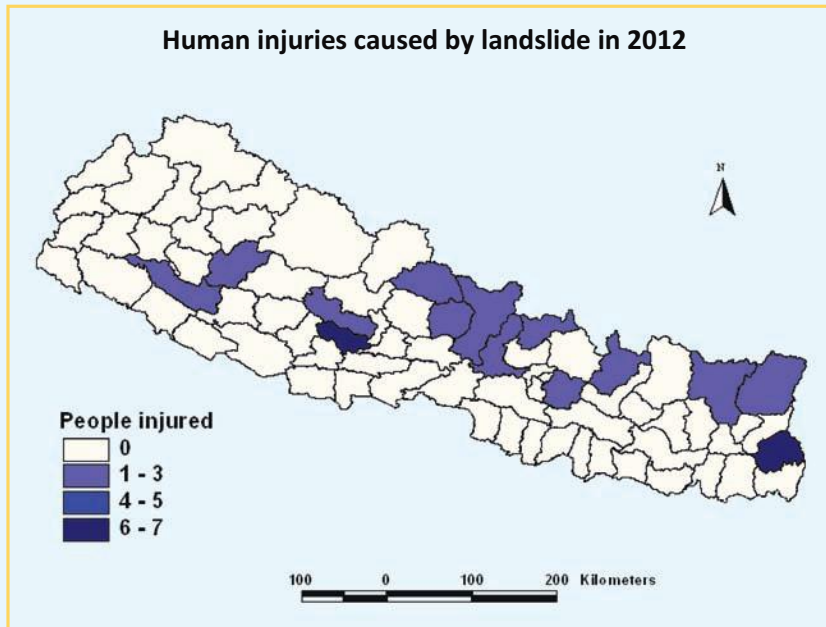


Fig. 3.16: Human injuries caused by landslide in 2012

Floods

Floods caused 52 deaths and 8 injuries in 2012. The largest number of missing (52) was attributed to flood in the same year. The Seti river (Kaski district) flood in May 2012 alone claimed 41 lives. Flood deaths were recorded

from Far Western Terai, Mid Western hill, Mid Western Terai and Western hills (Fig. 3.17). Human deaths due to flood were recorded from only six districts (Fig. 3.18). Floods and landslides together have been the major cause of the largest number of deaths since 2000 except in 2009.

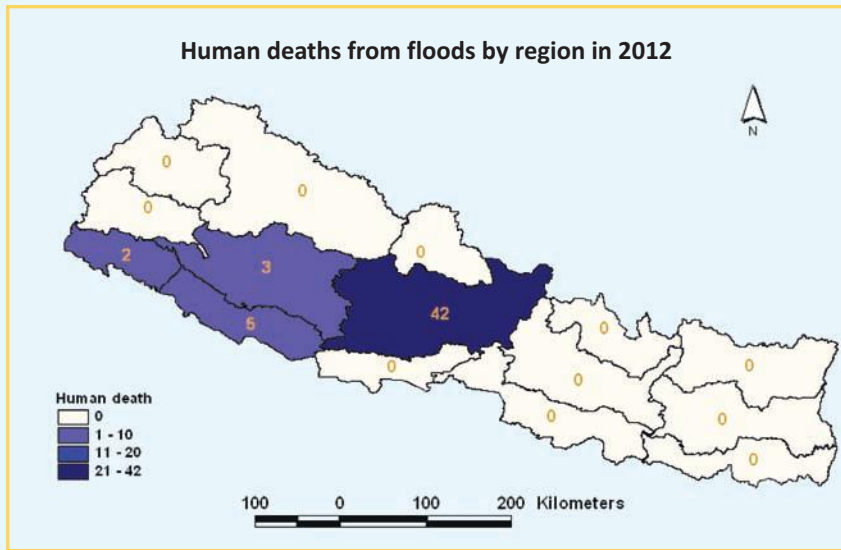


Fig. 3.17: Human deaths from floods by region in 2012

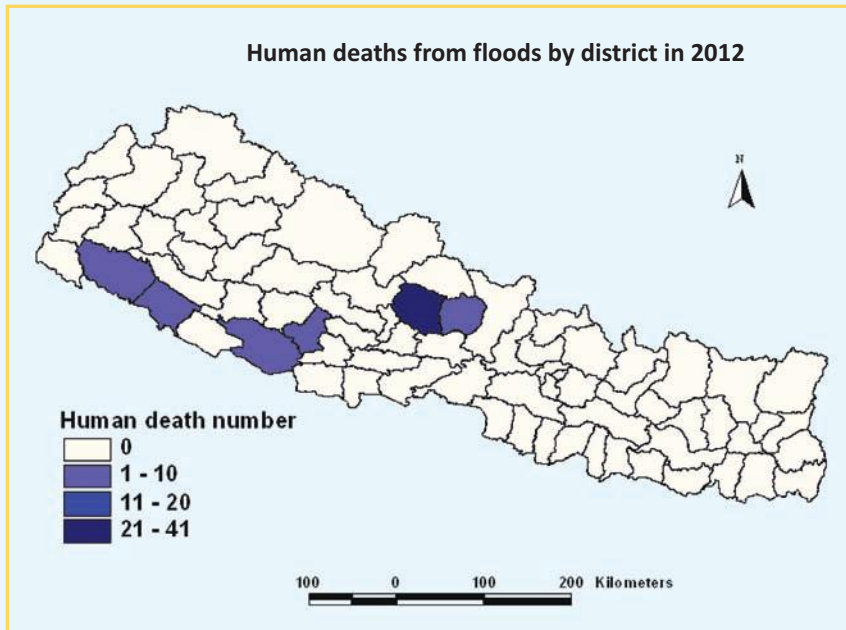


Fig. 3.18: Human deaths from floods by district in 2012

Epidemics

Although epidemics accounted for the largest number of deaths among various disasters in the past 40 years, it accounted for only 33 (8%) deaths in 2012 (*Table 3.2*). No epidemics

related deaths were reported in the Central and Eastern Development Regions (*Fig. 3.19*). This also reflects poor public health scenario in the affected regions. In comparison with other regions, the highest number of deaths was reported in Western hills.

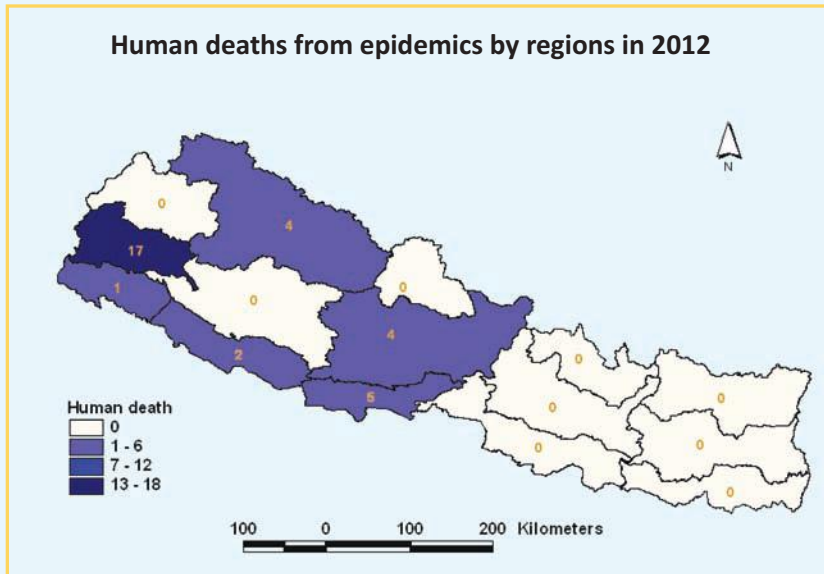


Fig. 3.19: Human deaths from epidemics by region in 2012

Epidemics caused human deaths in 9 districts of Western, Mid-Western and Far-Western Development Regions, the highest being in Doti district.

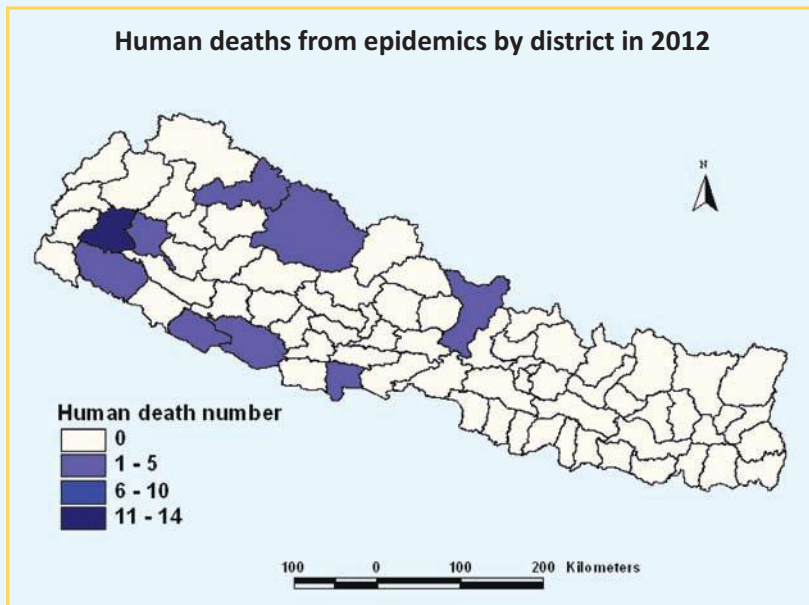


Fig. 3.20: Human deaths from epidemics by districts in 2012

3.3.4 Other Disaster Types

In addition to these disasters, which collectively accounted for 81.38% of deaths by disasters in 2012, other disasters such as avalanche, air crash, cold wave, wind storm, extreme rainfall, hailstone, etc. have also

caused damages. The total number of deaths caused by these disasters is 78 and the number of injury caused is 48. Amongst these disasters, air crash caused 34 deaths and 6 injuries and avalanche caused 9 deaths and 13 injuries. *Table 3.2* shows the details of damages caused by these disasters.

Missing people

The number of missing people due to disaster in 2012 was recorded at 50. Out of the total missing, flood accounted for 39, landslide caused 8 and 3 were reported missing due to avalanche. The Seti flood in Kaski district claimed the highest number of missing people.

Affected families

The 'affected families' as recorded by the MoHA are those families which have been temporarily displaced in the midst of disaster events and which have returned to their houses later. However, it does not reflect, as generally assumed, the number of families which were affected by the disaster. In 2012, altogether 2,743 families were recorded as 'affected families'. Fire affected the largest number of families (2,436) followed by flood (104) and windstorm (102). Among the ecological/development regions, largest number of affected families were recorded from Eastern Terai (1,478) followed by Mid Western Terai (359).

3.4 Economic Losses

Disasters cause economic losses of various types in addition to human deaths and injuries. These economic damages include losses of houses, livestock, crops, damage to public properties, etc. MoHA coordinates with other agencies and maintains the record of losses from disasters. Problem in assessment of economic losses was reported as there would be variation in different districts in assessment and in many cases there is a tendency to over-estimate economic losses. *Table 3.6* summarizes the damages caused by various disasters in 2012 by ecological and development regions. The summary of damage by disasters in 2011 has also been presented for comparison in *Tables 3.6 and 3.7*.

House damage

In 2012, a total of 2,743 houses were totally damaged and 816 were partially damaged (*Table*

3.6). Basically, more houses were damaged in Terai with the highest in Central Terai (2,350). In 2011, 2,558 houses were totally damaged and 769 were partially damaged (*Table 3.7*). Thus, there is an increase of 66 % in totally damaged houses and 6% in partially damaged houses in 2012.

Livestock loss

A total of 1,181 livestock were lost due to disaster with the highest reported from Mid Western hill (281) in 2012 (*Table 3.6*). In 2011, 745 livestock were lost. Thus, there is an increase of 58% in animal loss in 2012 (*Table 3.7*).

Crop damage

The Ministry of Agriculture Development (MoAD) maintains the records of crop damages caused by disasters. Major disaster type causing crop damage in 2012 is drought. Less rainfall was received in the main cropping season throughout the country (*MoAD 2012*). Although drought condition generally prevailed throughout the country, it was more pronounced in some of the major paddy producing districts like Saptari, Siraha, Dhanusa and Mahottari. Since about 46% of the land is rain-fed, drought situation affects agriculture seriously. In 2011, which witnessed good rainfall, paddy production reached a peak of about 5 million metric tons. On the other hand, in 2012, the occurrence of drought resulted in leaving about 140,000 hectare land barren thereby reducing agriculture production by about 420,000 metric tons. There was 18% less production of paddy compared to 2011 because of drought (*MOAD, 2012*).

Economic losses

The total value of economic losses has been reported to be NRs 1,293,956,997 in 2012 with the highest economic losses reported from Eastern Terai (*Table 3.6*). Similarly, in 2011, the total economic loss was reported at NRs. 1,451,619,007 (*Table 3.7*).

Table 3.6: Impact of disasters by different ecological/development regions in 2012

Ecological Region	Death	Injured	Missing	Affected family	Houses damaged		Livestock loss	Estimated loss (in Rs.)
					Completely	Partially		
Central								
Hill	116	163	4	201	294	174	189	294,197,900
Mountain	13	31		48	12	1	9	5,575,000
Terai	17	7	1	148	199	27	67	97,511,500
Eastern								
Hill	1	5		28	54		1	100,257,200
Mountain	18	27	5	71	105	80	15	21,958,700
Terai	33	24		1478	2350	30	150	467,433,000
Far Western								
Hill	26	38		6	8	43	32	4,131,500
Mountain	11	13	2	35	38	53	13	14,480,000
Terai	15	11	1	20	140	280	23	21,787,000
Mid Western								
Hill	19	47		83	101	15	281	25,990,619
Mountain	12	19		7	50	83	87	19,500,778
Terai	15	10	2	359	605	6	26	142,984,000
Western								
Hill	96	77	35	66	70	8	260	52,220,000
Mountain	19	7		0	3	6		2,015,000
Terai	8	11		193	218	10	28	23,914,800
Grand Total	419	490	50	2743	4247	816	1181	1,293,956,997

Source: MoHA, 2012

Table 3.7: Impact of disasters by different ecological/development regions in 2011

Ecological Region	Death	Missing	Injured	Affected family	Livestock loss	Houses damaged		Estimated Losses (in Rs.)
						Completely	Partially	
Central	172	20	180	562	173	860	472	779,484,640
Hill	70	11	113	39	74	71	52	212,854,540
Mountain	13	4	11	1	5	15		2,727,000
Terai	89	5	56	522	94	774	420	563,903,100
Eastern	115	26	119	310	303	1153	118	500,821,717
Hill	37	10	61	52	47	108	5	143,264,850
Mountain	14	3	18	22	63	59	5	179,413,900
Terai	64	13	40	236	193	986	108	178,142,967
Far Western	36	15	29	18	36	23	14	38,160,500
Hill	14	6	9	1	6	3	6	880,000
Mountain	7	3	10	3	16	2	2	65,000
Terai	15	6	10	14	14	18	6	37,215,500
Mid Western	98	47	70	98	100	155	17	59,161,250
Hill	69	36	51	24	58	87	7	30,361,350
Mountain	4	5	8	23	3	16	4	16,196,900
Terai	25	6	11	51	39	52	6	12,603,000
Western	86	29	108	193	133	367	148	73,990,900
Hill	63	16	92	81	74	83	93	55,450,900
Mountain	2		2				1	1,019,000
Terai	21	13	14	112	59	284	54	17,521,000
Grand Total	507	137	506	1181	745	2558	769	1,451,619,007

Source: MoHA, 2011

3.5 Seasonality of Disaster

Generally, occurrence of disaster exhibits seasonal pattern. For example, floods and landslides occur in monsoon season, whereas some disasters like earthquake and epidemics may occur in different seasons. The number of death occurring from various disaster types in different months is given in Annex 2. With regard to the total number of deaths, maximum deaths (113) were recorded in May. But the occurrence of flood in the Seti river (Kaski district), an unusual season for the occurrence of flood, contributed to the large number of

human deaths in this month. Thunderbolt has caused more deaths from April to September with maximum number of deaths occurring in May. Similarly, a distinct pattern can be seen in the case of fire, landslides and floods. Human death from fire was high from January to March. Death from landslide was also recorded high in the rainy season from May to October. Epidemic caused deaths from May to September, 2012. Total number of deaths, injuries and missing by months is shown in Table 3.8. Figure 3.21 shows the casualties caused by different disaster types by months in 2012.

Table 3.8: Major disaster impacts by month in 2012

Month	Deaths	Injuries	Missing
January	18	22	
February	12	49	
March	27	30	
April	25	136	
May	113	73	32
June	56	52	5
July	33	23	2
August	50	32	2
September	61	40	9

Source: MoHA, 2012

Distribution of total deaths, injuries and missing by months, 2012



Fig. 3.21: Total deaths, injuries and missing by months in 2012

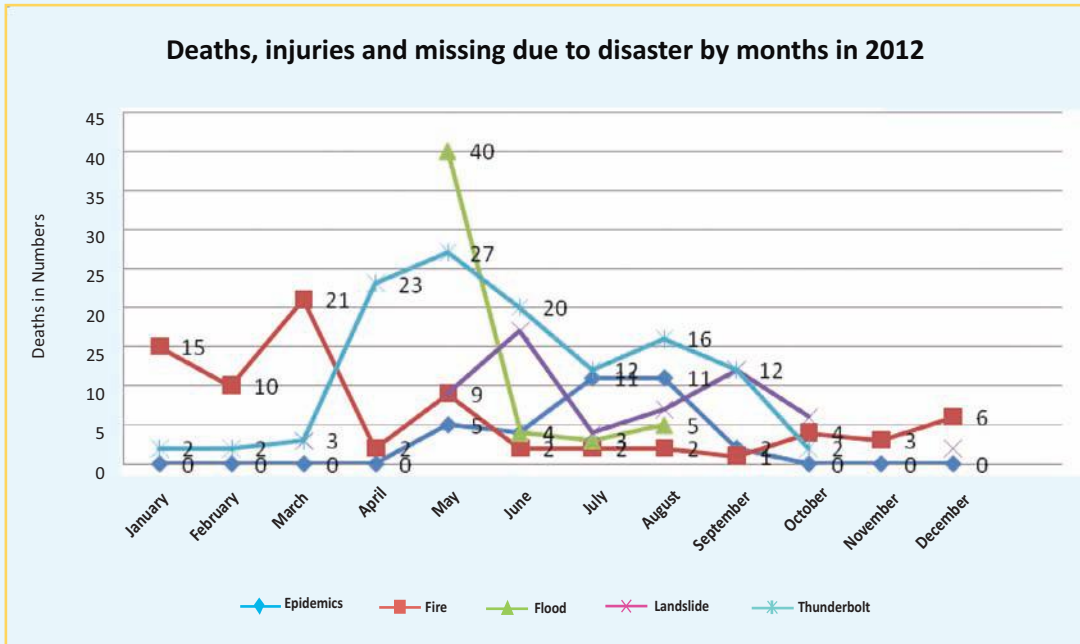


Fig. 3.22: Deaths, injuries and missing due to disaster by months in 2012

A comparison number of deaths caused by disaster in different months in 2011 and 2012 shows the period lasting from April to October is most vulnerable in Nepal.

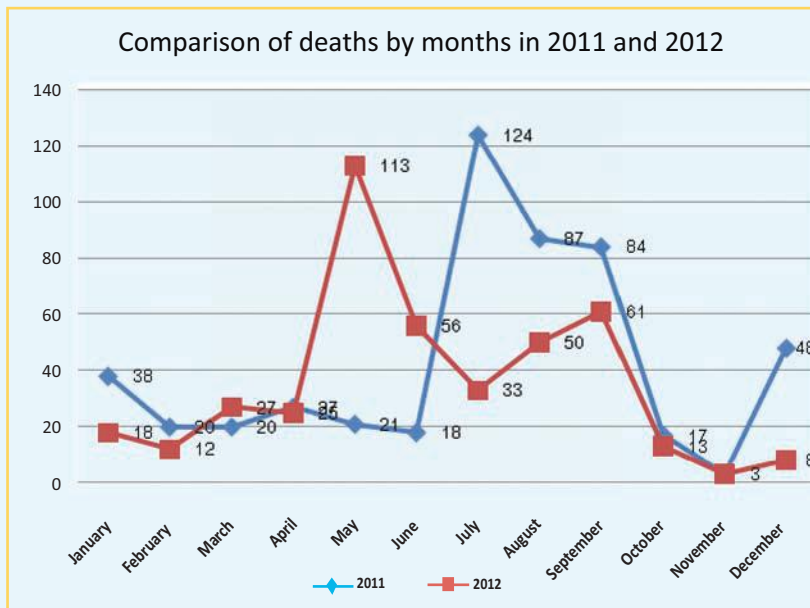


Fig. 3.23: Comparison of deaths by months in 2011 and 2012

3.6 Data Insufficiency

Data analysis is largely based on the database maintained by the Ministry of Home Affairs complemented by the database from DisInventar, Ministry of Agriculture Development and information provided by other agencies. The database of MoHA records the number of deaths, injuries, missing, affected families and losses by disaster types and the places of occurrence.

Database does not segregate the data along the axis of age groups, gender, disability, ethnicity, etc. This has led to the lack of assessment as to who are the most affected people in the event of a disaster. Similarly, data on economic losses are not complete for some of the districts. Assessment of economic losses also varies between districts. Some of these databases contain data gaps and not all have quality control procedures or documented applications. Nevertheless, they provide good examples for further examination.

Data discrepancies from various databases maintained in Nepal are mainly due to the differences in coverage and extent of disasters, standards used in data collection system, definition of disaster events and criteria used, and most importantly the purpose of data collected. Majority of data comes from relief and rescue operations provided by the government and other humanitarian organisations. Data for the use for reconstruction and rehabilitation purposes are least collected. For example, data collected in districts by DDRC and NRCS mechanism are focused on humanitarian and relief purposes whereas DWIDP data is more oriented towards reconstruction and mitigation purposes.

On the other hand, criteria and standards used by data collectors are also the major

contributors of these discrepancies. There is a sheer lack of common standards for disaster data collection in terms of its format as well as with stated objective of the collection mechanism. The same dataset is considered to be good for relief as well as for reconstruction and rehabilitation but not very relevant for other purposes.

These discrepancies can be minimized for much wider use by all stakeholders by using standardized and comprehensive database management system in disaster data collection. The incompatibility among disaster database can also be minimized and the data can be made more purposeful.

The DesInventar database has been serving as a significant source of information on disasters in Nepal from 1971 onwards. This gives an important and comprehensive information for historical events occurred in Nepal as reported in different media sources. Primarily, the present report has evaluated the disaster scenarios and losses from MoHA database.

3.7 Key Features

The disaster data analysis for 2012 reveals the following key features:

- A total of 31,908 people have lost lives to different types of disasters since 1971. During the period, a total of 5,936,170 families were affected from the disaster.
- During this period, starting from 1971, epidemics claimed the largest number of lives (16,563) accounting for 53.88% of total human loss from disaster.
- By and large, flood and landslides, when put together, have been the major disaster type in terms of human casualties. Since 2009, deaths due to thunderbolt have been increasing steadily.

- In 2012, a total of 419 lost their lives, 490 were injured and 50 were missing
- Among different disaster types, thunderbolt caused the largest number of human deaths (119) accounting for 29%. Other major disasters in terms of human deaths are fire (18%), landslide (14%), flood (13%) and epidemic (8%).
- Thunderbolt has caused death in largest number of districts (44), with more damages done in Eastern and Central Development Regions. Fire and landslides are other commonly occurring disasters.
- Among the ecological regions, largest number of death was recorded in hills (258) accounting for 61.57%. Among the Development Region, Central Development Region lost largest number of people (146) followed by Western Region (123).
- In 2012, 8 districts did not record any death from disasters.
- Largest number of deaths (113) was recorded in the month of May.
- Thunderbolt has caused more deaths from April to September with maximum number of deaths occurring in May. Human deaths from fire was high from January to March.
- A review of deaths caused by disasters in different months in 2011 and 2012 shows the period lasting from April to October is most vulnerable in Nepal.
- Because of the drought situation in 2012, about 140,000 hectares of land was left barren reducing the paddy production by about 420,000 metric tons.
- Altogether, 4,247 houses were totally damaged and 816 were partially damaged in 2012.
- A total of 1,181 livestock were lost due to disaster with the highest reported from Mid Western hill (281).
- The total value of economic losses has been reported to be NRs 1,293,956,997 in 2012 with highest economic losses reported from the Eastern Terai.

Box 6: Seti flood: A missed opportunity

In May 2012, a massive flash flood just north of Pokhara, the district headquarters of Kaski District and the main tourist hub in the Western Region of Nepal, caused immense destruction. A powerful wall of water swept away several settlements along the Seti river, breaching river banks downstream and damaging the water supply of Pokhara, a city with a quarter million inhabitants. Reportedly, 28 people lost their lives and many more were injured.

In July and August 2012, Dang district in the Mid Western Terai region, was affected by the floods of two separate rivers in a period of less than two weeks. The floods, which in certain areas reached up to one and half meters (five feet) above the normal water level, damaged over 2000 houses and shelters—completely destroying around 165—mostly those of poor families. It left the area cut-off for several days and many households lost cattle, stored grains or crops in the fields. Two

people reportedly lost their lives and many more were affected.

The most recent flooding in Nepal during late June 2013, resulting from incessant monsoon rainfall, has reportedly cost the lives of nearly 60 people and affected hundreds of households in the Far and Mid Western Development Regions and continues to affect the daily lives of people in the Eastern, Central and Far Western part of the country. These natural disasters reflect some of the more obvious lessons:

- The need to conduct joint inter-agency damage assessments is imperative in order to obtain a comprehensive picture of the extent of damage. Having valid and up-to-date information is vital in the evidence based decision-making process and contributes to be a more efficient use of resources while responding to disasters. In

Kaski district, the DDRC had formed a task force comprising both government and non-government actors to carry out a joint assessment in the affected areas. The task force conducted observations and interviews in the affected areas and carried out a multi-sectoral analysis to respond in the most effective and efficient manner to the needs of the affected people.

- ii. The presence of an adequate response capacity at the local level is critical in order provide immediate relief support to affected people during small scale disasters. The government introduced a provision for a disaster relief fund of NRs. 300,000 for the DDRC and NRs. 700,000 for the RDRC, respectively. In addition, a team of 25 police personnel was on standby for search and rescue operations in each district. In 2011, the Armed Police Force (APF) established a disaster risk management centre in Chitwan district.
- iii. There is a need for active early warning systems as the number of unusual floods and landslides with greater damage and loss of property has increased in recent years. Climate change and infrastructure development have increased vulnerability, particularly in the hills and mountains. The Kaski CDO shared that “The Seti flood was unexpected as it occurred during the spring season. People were not prepared, which perhaps contributed to a higher number of casualties”. Based on this experience, the Kaski DDRC established a community-based early warning system in 2013, which links the communities living up and downstream of the Seti river.

The lessons thus drawn have brought about some challenges too. There is a need for enhanced coordination and collaboration, though both government officials and humanitarian actors commended improved coordination and collaboration between government and non-government humanitarian organizations in the past few years. However, more can be done in this respect and all actors involved are encouraged to

continue their good efforts to bolster disaster preparedness and response capacity at the district, regional and national levels.

Furthermore, both private sector and civil society are emerging actors in the humanitarian field. Potentially one of the first responders during natural disasters, the efforts of local private sector or civil society members could contribute significantly to life saving efforts. However, administrative and bureaucratic hurdles remain. For instance, transfer of private sector resources to the government is a complex process, which calls for a coherent strategy in terms of mobilizing funds from private sector, local charities or other donors.

Again, timely and reliable dissemination of information is imperative in saving lives during disasters as it provides people living in areas at risk the ability to find shelter on time. In addition, responders and relief organizations need timely and reliable information in order to effectively and efficiently plan their response. However, during the respective disasters, rumors and contradictory information created confusion and consequently delayed response activities.

Conclusion

Much has been achieved in the field of disaster risk reduction in Nepal in recent years. Disaster preparedness and response has been getting increased attention at all levels which has contributed to a reduction in human casualties and loss of property during the onset and direct aftermath of natural disasters. The government’s capacity to respond to natural disasters has improved considerably with the introduction of the DPR Plan in 2011.

Government and non-government humanitarian actors in both districts have acknowledged that the implementation of the DPR Plan has added significant value to the overall preparedness and response initiatives. Coordination and collaboration between government and non-governmental humanitarian actors has also improved, particularly in the areas of joint planning, response and the strengthening of district level clusters.

As was underlined by the government, the DPR Plan is a living document and needs regular monitoring and review. Disaster risk reduction activities should continue to focus on building capacity of people living in vulnerable areas and support the implementation of community managed early warning systems. Humanitarian actors stressed that the culture of relief should shift to a culture of preparedness. Also, DRR should be mainstreamed into district development

planning to secure adequate resource allocation. The role of local media and civil society organizations with respect to disaster risk reduction has been increasingly recognized and should be further bolstered. Finally, the experiences from the response to the 2012 disasters in Dang and Kaski districts provide valuable lessons learned to further enhance the overall level of preparedness and response to disasters, and hopefully will contribute to a reduced human suffering and loss of life in the event of future disasters.

Box 7: Siraha fire

An accidental fire broke out in Aurahi Village Development Committee (VDC) of Siraha district on 15 May 2012. According to the District Disaster Relief Committee (DDRC) Siraha, a total 2063 people from 347 families were affected due to the incident. A total of seven people with disability were identified in the affected community. The DDRC provided NRs. 6,000 (NRs 1,000 from District Development Committee and NRs. 5,000 from the local relief fund) to each of the affected families. On 16 May, the Prime Minister visited the affected area and announced to provide NRs. 25,000 to each affected family and requested all humanitarian organizations and individuals to

support the livelihood of affected families.

A total 1080 huts belonging to 347 families were engulfed by fire in which one person died and four were critically injured. Security forces (Nepal Army, Nepal Police and Armed Police Force), NRCS volunteers and local communities were mobilized to control fire. Humanitarian and development organisations such as WFP, UNICEF, Save the Children, Habitat for Humanity, Rural Reconstruction Nepal, etc. provided food, shelter, water, sanitation, hygiene and education support to the affected families.

Box 8: 2013 flood fury

Floods and landslides caused by heavy rains since the last week of May 2013 hit 29 districts of Nepal. Until July 20, a total of 59 people were killed, 29 people injured and 2,079 families (approximately 12,474 people) were displaced due to the disaster. Again, the intense rain from July 9-11, 2013, caused heavy flooding in ten districts in the southern plains of Nepal, amongst which Jhapa, Morang, Sunsari, Saptari and Rautahat were highly affected. Ten people were killed while over 719 families (over 4,314 people) were displaced due to the floods in eastern Nepal. Floods affected 14 VDCs and two municipalities of Jhapa district.

Similarly, the water level in Koshi river exceeded

by 0.09 metres than the warning level (5.60 metres). Likewise, floods from Triyuga river caused inundation in several VDCs and municipality areas in Udayapur district and breach on the embankment of Lalbakaia river caused heavy inundation in Gaur municipality of Rautahat district. Security forces were immediately mobilized in protecting further damages in the embankment which was later brought under control.

The Central Natural Disaster Relief Committee (CNDRC) meeting held on 16 June 2013 decided to provide NRs 5,000,000 to each of Darchula and Kanchapur districts for response, relief and rescue operations.



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CHAPTER 4

Participation and Inclusion: Making DRR Work for All



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Introduction

Disaster loss and damage is increasing in Nepal with grave consequences for the survival, dignity and livelihood of the people, particularly poor and marginalized communities. Addressing the role disasters play in perpetuating the cycle of poverty and in undermining development is increasingly being recognized as a major challenge that demands urgent attention. There are many aspects of vulnerability arising from various physical, social, economic and environmental factors. Examples include poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness and disregard for wise environmental management. Vulnerability can also arise when people are isolated and insecure in the face of risk, shock or stress. People differ in their exposure to risk as a result of their social group, gender, ethnic or other identity, age and other factors.

Mainstreaming people's participation and social inclusion into all stages of DRM, including disaster preparedness, risk reduction and mitigation, response and recovery, have gained

momentum in Nepal. The community-based disaster risk management (CBDRM) approach is valuable for many reasons, especially for participation and social inclusion. Although there has been limited study of community-based mitigation and preparedness, there is a growing body of case study evidence illustrating successful initiatives of many kinds. Indeed, the value of community-based initiatives has led many disaster mitigation and preparedness programmes to abandon technical, top-down methods in favour of more participatory approaches.

The Government of Nepal is a party to numerous international conventions and has adopted many progressive laws in response to international commitments. A number of national institutions have mandates that promote gender equality and social inclusion along with the Interim Constitution of Nepal (2007). Inclusive development is one of the government's priorities, which have been laid down in the Three Year Interim Plan and is aimed at building a just society by ensuring rightful sharing of power and resources for active people's participation.

Box 9: Some relevant legal instruments of participation and social inclusion related to DRM in Nepal:

- The Interim Constitution of Nepal, 2007, has highly prioritized people's participation and social inclusion by provisioning specific rights of freedom and equality, rights against untouchability and racial discrimination, right to education, right of women, and right to social justice.
- The Natural Calamity (Relief) Act, 1982, has the provision of formulating policies and facilitating implementation of disaster management.
- The Local Self-Governance Act, 1999, authorizes to undertake certain functions with respect to DRM by local bodies through legally prescribed participatory bottom-up planning process at all levels.
- The NSDRM, 2009, provides strategic guidance on cross-cutting issues such as human rights and protection, gender and social inclusion, decentralization and local self-governance, humanitarian security, and recommends implementation of disaster management by mainstreaming these in each sectoral plans and programmes.
- The LDRMP and DDMP guidelines, which were developed and approved considering the main spirit and thrust of NSDRM, also ensure participation and social inclusion which were approved under the existing power granted by the LSGA.

The Ministry of Home Affairs, in conjunction with supporting agencies, has been regularly conducting a series of simulation exercises, mass casualty management training programmes and search and rescue operations for targeted beneficiaries and first responder institutions in Kathmandu and other urban areas of Nepal. These training programmes include a full-scale mock drill simulating a major earthquake or large road traffic accident to improve the capacity of hospitals for emergency preparedness and disaster response. The mock drills are carried out in collaboration with humanitarian and development partners that have a major role to play in terms of disaster management. These training programmes and mock drill exercises have provided substantial experience in testing the practical application and proved to be the best way to put theory into action and to test hospital emergency preparedness.

4.1 Axis of Socio-economic Differentials

Gender Equality and Social Inclusion

Women and excluded groups are disproportionately vulnerable to the impacts of disaster. In most cases, the needs and responsibilities of women and socially excluded groups are not adequately considered in the design, planning, preparedness, recovery and reconstruction, thus making it critical to recognize the role of gender equality and social inclusion in crisis situations.

Women and socially excluded groups are supported to establish disaster management linkages with livelihood activities through micro level development interventions. This includes piloting saving and credit cooperatives among vulnerable communities in many parts of the

country which will help in institutionalizing DM initiatives in the long-run. This initiative has encouraged local communities to support social inclusion and women's participation by integrating livelihood improvement activities into DM. However, the understanding of gender in DM linkages at the policy and practice levels needs to be strengthened and institutional coordination and collaboration mechanism consolidated.

4.2 Role and Participation of Civil Society in DRM

Several government and non-government agencies have been focusing on DM in Nepal since the 1988 earthquake in Eastern Nepal and water-induced disasters in Central Nepal in 1993. However, there exists inadequate primary information at the central level that elucidates which agencies are involved in disaster management in Nepal, where are they working, what are they doing, how much resources have been spent, etc. Therefore, in many instances, DM activities are isolated from mainstream development initiatives with duplication of project activities and lack of cross learning.

In this context, under the aegis of the Ministry of Home Affairs, a National Platform for Disaster Risk Management (NPDRM) has been envisaged to facilitate coordination process at national and local levels. A committee comprised of DM related agencies (government, donors, UN agencies, INGOs/NGOs, academia, media, private sector and local government) has been established under this platform. In addition, many multi/bi-lateral agencies are working on promoting inclusive DM in Nepal .

4.2.1 Corporate Sector

Business sector has always been a very important stakeholder in DM as it has been playing a critical role in reducing socio-economic vulnerability and exposure to disasters and in ensuring more resilient economic growth at the national level. Building their capacity and strengthening business resilience further reduces dependency on government for post-disaster recovery and increases private sector capacity to pursue corporate social responsibility, national and sectoral development goals.

The Federation of Nepalese Chambers of Commerce and Industry (FNCCI), an umbrella organisation of the Nepalese private sector, along with the Confederation of Nepalese Industries (CNI) have played a major role in providing relief materials to disaster-affected communities. The private sector, on many occasions, has made contributions by raising funds for relief and rescue operations through their associations. However, Nepalese business houses are awakening to the call and have a long way to go before they are more responsive to their communities and society at large (*DFID, 2012*).

As corporate social responsibility is emerging, companies need to focus more on risk reduction and mitigation. Of late, insurance companies have teamed up with the DRR community on earthquake preparedness, livestock, land and crop compensation primarily aimed at gaining credibility to market its products and services.

4.2.2 Academic and Research Institutions

Academia and research institutions of Nepal

have started promoting, prioritizing and advancing research on natural, social, engineering and technology aspects of disaster risks in an integrated environment. Additionally, these research institutions have encouraged promoting the adoption of hazard, vulnerability and risk profiles into disaster-resilient development and sectoral planning.

Academic institutions such as Tribhuvan University, Kathmandu University, Pokhara University, Institute of Forestry, Institute of Engineering, ICIMOD, etc. have long been associated in undertaking research activities, initiating and supporting higher education on disaster management and promoting linkages and collaboration with I/NGOs working on disaster management.

4.2.3 Media

National and local media have played fundamental roles in promoting DM policies, holding the government and local bodies accountable and in advancing DM agenda at national and local levels. Increasing electronic and print media have an active role to play in the early warning chain and are essential partners to help educate communities, highlight particular needs of vulnerable groups and channel DM messages to different audiences in various local and ethnic languages.

Mainstream media such as daily newspapers, television, radio and community FM radio stations have recognized the increasing importance of DM issues in current affairs and are providing clear and accurate information to the public at times of pre, during and post-disaster periods. Similarly, Nepal's media have been emerging as a responsible humanitarian

and lifeline communicator as they are informing and educating people with customized messaging, including the most vulnerable groups of society, about the disaster risks they are facing and are willing to work closer with national and local institutions.

In addition to emergency broadcasts, Nepalese media has been relaying accounts of what happened, where it happened, who or what

4.2.4 Civil Society Organizations

Nepal's Civil Society Organizations (CSOs) have always raised concerns, expectations and voices within the community, particularly in the disaster-hit districts. Social cohesion and solidarity are at the heart of community resilience and CSOs play an important role in strengthening it. They have continued to play a critical role in upholding democratic values, serving as custodians of people-based development and building community resilience. Successful partnerships with CSOs have substantially contributed to innovations, increased reach and investment and promoted inclusion of marginalized communities with regard to DM and CCA at local level. Civil society and community-based disaster risk management committees and their networks have, therefore, proved to be important stakeholders in promoting accountability towards commitments made by the government.

4.2.5 Children, Youth, Old Age and Persons with Disabilities

Children are among the most vulnerable groups in times of disaster. Factors such as age, knowledge and physical strength affect their ability to cope and survive in a disaster

was affected, what is being done and where it is safe to go. This is amply demonstrated by the fact that media have disseminated accurate information on natural hazards and DM and dedicated more time and space to report on the causes of disasters and what can be done to prevent it.

Box 10: National Network of Community Disaster Management Committee (NCDMC)

Founded in 2008, the National Network of Community Based Disaster Management Committee (NCDMC) is a national level network of disaster affected communities, including representatives from district level CBDRM committees that has been expanded to 28 out of 75 districts, which is the first of its kind in the country.

Representatives from poor, marginalized and socially excluded groups and communities (such as women, children, persons with disabilities, senior citizens, etc. and/or disaster affected communities) have joined this network for increased solidarity. The committee discusses community level issues which are consolidated from the experiences of people living in disaster-prone areas and those issues are linked from community to VDC, district and national levels, aimed at creating mass awareness and pursuing government, humanitarian and DRR actors to take appropriate measures to stop underlying causes of disaster vulnerabilities and minimize disaster impacts in future.

context. Children have particular needs that must be met for their healthy growth and development, and these needs can be compromised by acute disasters. Today's children and youth are the generation who will inherit the legacy of our actions and so their involvement is a first crucial step to

ensure that actions to reduce risks are not only effective but sustainable for years to come.

Ongoing initiatives include enhancing knowledge, capacity and awareness of DM education for children, parents and teachers; design and promote "safe school"⁵ standards by training and mobilizing them to champion school-based DRM; developing a child-centred DRM model and advocating for the integration of "safe school" standards and DM curriculum into education policies. This apart, various programmes are being implemented to protect children by means of ensuring health, education and other essential services which are capable of addressing the needs of children when disasters strike.

School safety programmes have been implemented aimed at (i) physical, seismic retrofitting of school buildings; (ii) operational strengthening through training and workshops for students and teachers; and (iii) awareness raising.

Persons with disabilities have remained excluded from mainstream social activities such as livelihoods and participation in community level DM. Factors contributing to exclusion include barriers relating to physical accessibility, access to information and existing social and cultural attitudes. Inclusive DM considers the whole community, but pays specific attention to persons with disabilities and caregivers since their vulnerability reduces the entire community's resilience towards disasters.

In recent years, various organizations working on DM have been supporting children, youth, old age and persons with disabilities into mainstream development process. In order to meet the specific needs of persons with disabilities before, during and after disasters, efforts to strengthen the implementation of social safety net mechanisms are underway to assist the poor, the elderly and the disabled, and other population affected by disasters.

Similarly, enhancing recovery schemes, including psycho-social training programmes in order to mitigate the psychological damage of vulnerable population, particularly children, in the aftermath of disasters have also taken roots into disaster management.

Box 11: Children's Charter on DRR

1. Child protection must be a priority before, during and after a disaster;
2. Children have the right to participate and to access the information they need;
3. Community infrastructure must be safe, and relief and reconstruction must help reduce future risks; and
4. DRR must reach the most vulnerable

Experiences also show that persons with disabilities can effectively contribute to CBDRM initiatives by identifying possible solutions based on their needs and experience, which in turn, increases the overall resilience of the community. In order to foster maximum effectiveness of collective efforts for risk reduction, it is, therefore, important to work inclusively across all communities.

⁵Safe School standard not only focuses on mere preparedness, but also strives to develop knowledge to institutionalize the culture of safety and resilience of all school communities to disaster. It focuses on inculcating a safe learning environment and preparedness for a resilient school communities by training and mobilizing parents, students and teachers to champion school-based disaster risk reduction.

In recent years, the Government of Nepal has been promoting child-centred, gender-specific and disability-sensitive interventions to be mainstreamed into all CBDRM and into national and local level development approaches. However, the central question is how the poor and the weak can benefit from institutional processes in the first place and sustain those benefits in the long run. Nepal needs to compile and document good practices and lessons learnt of disability-inclusive disaster management in order to promote an achievable vision of disability inclusive disaster management. Building grassroots capacity, strengthening community institutions, networking and advocacy in response to and cope with future disasters go a long way in addressing disaster risks in Nepal.

4.2.6 Role of Nepal Army, Nepal Police and Armed Police Force

At the time of disasters, Nepal Army, Nepal Police and Armed Police Force play significant roles, especially in carrying out rescue and relief operations.

Nepal Army, through its Disaster Management Directorate, has been playing instrumental roles in providing emergency assistance for rescue operations to needy people—a role that has become even more important in the present context. Primary roles of the Nepal Army include search and rescue, medical assistance, evacuation and air rescue, mass evacuation, etc. Its first and foremost task is to carry out rescue and relief operations by reacting quickly and mobilizing capabilities due to its presence throughout the country and along with aviation service.

During pre-disaster, the Nepal Army sets up institutions, governance and functioning mechanisms. At the aftermath of disaster, it works on rescue operations through land and air, and logistics support for carrying out humanitarian relief items, along with supporting

reconstruction of physical infrastructures like schools, bridges, culverts, irrigation channels and roads.

In the event of a large scale disaster, the Nepal Police plays a crucial role in the established command posts to facilitate rescue operations. Since the police have a wider institutional network, they are the primary responders and first hand information providers to disasters. Thus, Nepal Police is the primary source of disaster data and information. The Nepal Police has also established a Disaster Management Division to coordinate the overall disaster response.

Box 12: Nepal's participation in 5th Asian Ministerial Conference on DRR

Former Deputy Prime Minister and Minister for Home Affairs Bijay Kumar Gachhadar participated in the 5th Asian Ministerial Conference on Disaster Risk Reduction from October 22-25, 2012, organized by UNISDR in collaboration with the Government of Indonesia.

Speaking at the conference, Hon. Gachhadar apprised the Parties of the efforts being made by Nepal at the local and national levels to reduce the disaster risk, challenges and problems being faced by the country to that end and raised issues related to the development of organizational mechanism to minimize problems related to landslides, floods and global climate change. He pledged to make maximum efforts for the allocation of 5% of total national budget for reducing disaster risks in Nepal.

As part of the Declaration, Nepal expressed its commitment to integrate local level DRR and climate change adaptation into national development planning process, strengthen local risk assessment and fund mobilisation, governance, accountability, build local community resilience, and identify accountability measures for more effective implementation of a post-2015 DRR.

Similarly, the Armed Police Force (APF) has established Disaster Management Division to coordinate all DM activities. Likewise, a Disaster Management Training Centre (DMTC) has been established in 2011 at Kurintar, Chitwan district, which is dedicated to enhance the capacity of its personnel needed for prevention, mitigation and response in line with APF's 5-year Disaster Management Plan.

Again, the APF has deployed Regional Disaster Management Team in every region with available tools and equipment which is mobilized in rescue and relief operations in times of disaster situation that might occur in respective regions. The APF's Immediate Reaction Team (IRT) is involved in DM and rescue operations.

Box 13: INSARAG Meeting

About 35 experts and participants from 17 countries in the Asia Pacific region shared their crisis response strategies, progress and the shortcomings to cope with disasters, during the 2-day International Search and Rescue Advisory Group (INSARAG) Asia Pacific Regional Meeting held in Kathmandu in 2012.

Hosted by the Government of Nepal in the

capacity of Vice Chair of INSARAG, for the second time in Kathmandu after April 2009, the meeting emphasized on ways to build national and international search and rescue capacity to deal with any likely major disasters in future. It also concentrated on strengthening search and rescue capacity; establish search and rescue operation team within the security forces for disaster response, and commitment of the international agencies for managing disasters in Nepal.

4.3 Addressing Rural and Urban Vulnerabilities

Agriculture sector and with it, the agri-business industry, has particularly high level of disaster risks. Disasters in this sector are not only disasters for businesses, large or small, but also significantly affect rural societies, urban households, national and global commodity markets and food security (*UNISDR, 2013*).

Nepal is passing through an unprecedented phase of urbanization where the urban population is projected to almost double during the course of a few decades. This has put enormous pressure on physical infrastructure, socio-cultural fabric, natural environment and institutional systems in towns and cities. While planned urban development has not been able to keep pace with the rising demands, ad-hoc growth has resulted in people living in high-

risk zones and increased the level of risks in cities as a whole.

The level of risk has increased further in cities due to high urban growth rates and consequent high physical exposure and inadequate preparedness. Urban vulnerability is largely a consequence of improper urban management, inadequate land use planning, unregulated population density, poor construction practices, ecological imbalance, infrastructure dependency, and inadequate provision for open spaces.

Climate change has added a new dimension to urban risks. It threatens towns and cities directly through physical impacts of stresses and catastrophic events, and indirectly through distress migration. The concept of climate resilience is very new to our developmental and management paradigms, and requires

innovative approaches and interventions. Resilience to climate related disasters in urban areas tries to identify the capacity of urban infrastructure and services to withstand disasters on the one hand and how communities and institutions are expected to deal with such an event on the other. The question is basically how resilient is our towns and cities today? Or how is a community going to absorb, maintain and recover from a disaster? (SEEDS, 2010).

There is a definite link between urban disaster and climate risks. In the context of urban risk reduction, both of these need to be viewed through a developmental lens, and mainstreaming of disaster management has to be one of the most prominent agendas of action. Under the approach of integrating urban risk reduction with climate change adaptation, linkages with challenging processes of risk assessment, risk communication, risk mitigation and preparedness at the local level needs to be re-examined. The Government of Nepal has reiterated that building resilience can be achieved only through multi-sectoral and multi-stakeholder approaches through appropriate policy and planning interventions.

Initially there used to be concerns mainly around metropolitan cities such as Kathmandu and Lalitpur districts, the emergence of second and third tier towns such as Birgunj, Hetauda, Narayangadh, Nepalgunj, Dhangadhi, etc. as major engines of economic growth have brought about a much wider landscape of urban concerns that cuts across other emerging towns in different geo-climatic settings within the country.

Now, CBDRM approach has also been gradually concentrated in urban areas through various initiatives related to emergency preparedness and response in community level as well as to

enhance emergency response of key institutions and stakeholders. Some of the highlights are stockpiling of LSAR, hygiene kit and WASH items as well as establishment of emergency water supply at identified open spaces such as Tribhuvan University, Kirtipur and NARC-Khumaltar, action plan of the Kathmandu Upatyaka Khanepani Limited (KUKL) and private tanker association for emergency water supply in emergencies.

In line with the government's flagship programme on hospital safety, an independent secure water supply system with emergency water supply response plan was developed in Tribhuvan University Teaching Hospital, Kathmandu, which is equipped with a deep tube well, earthquake resistant generator house with generator, 1500 liters fuel stock and other water supply materials to deliver water supply in seven critical hospital units through trained hospital maintenance and housekeeping staff.

In recent years, the focus on urban Nepal has grown steadily due to large population migration from rural areas to urban centres and more frequent and intense natural hazards leading to disasters. The urbanization pressure—in combination with more frequent and severe natural hazards that have been projected—are likely to significantly change urban infrastructure and services of towns and cities in the coming years. Especially, if natural hazards turn into disasters, the potential loss of lives and infrastructure in urban areas are expected to increase.

4.4 Way Forward

Disaster management, being an all-encompassing and multi-disciplinary activity spanning across all sectors of development, is a *sine qua non* for overcoming vulnerabilities

and minimizing risks. It will not only help in pooling resources but will also facilitate information exchange and expertise across sectors, learn from each other's experience and best practices.

The objective of DM is to consciously move towards strengthening the national capability and take care of the concerns vis-à-vis DM across different sectors. In the aftermath of the Seti flood (Kaski district) and Siraha fire in 2012, the response of the government, civil society, media, voluntary organizations and corporate sector has been exemplary and has earned appreciation from many quarters. The efforts of the government have received commendable support from individuals, organizations, corporate sector and the civil society .

International frameworks such as the Hyogo Framework and MDGs are leading to changes in policy, legislation, financing or programming for DM and sustainable development. However, mainstreaming of gender perspectives in DM still requires greater efforts and priority at all levels, from local to national.

Under-representation and multiple discrimination are major identified challenges of participation and social inclusion. Much still needs to be done to secure concerted and coordinated efforts by national actors to address these challenges.

This apart, ensuring adequate representation of excluded community during assessment, planning and implementation as well as benefit sharing can play a vital role to protect and promote right to participate and social inclusion. Adequate financial investments and tangible commitments are urgently required to pursue gender-sensitive DRR at the operational level. Supporting the development of local technical know-how (such as vulnerability tools and indicators), promoting the use of new social networking media, developing resilience strategies, mainstreaming tools and strategies for predicting how slow-onset disasters unfold and identifying vulnerabilities, and above all facilitating knowledge management and learning, are among the actions which need to be stepped up in future in managing disasters in Nepal.



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CHAPTER 5

Good Practices on DRM



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Introduction

The World Conference on Disaster Reduction (WCDR), held in 2005 in Kobe, Japan, adopted a global blueprint for DRM known as the Hyogo Framework for Action (HFA). The HFA assists national efforts to become more resilient to, and cope better with the hazards that threaten development gains. Its overarching goal is to build resilience of nations and communities to disasters by achieving substantive reduction of disaster losses by 2015—in lives, and in the social, economic, and environmental assets of communities and countries.

The HFA outlines five priorities for action, and offers guiding principles and practical means for achieving disaster resilience. In Nepal, there have been organized efforts on DRR under specified HFA priorities both at the policy and practice levels. Such efforts which can be more accurately recognized as “Good Practices” are scattered in many parts of the country. Amongst such many efforts, nine good practices are presented in this chapter with the view to share and explore the possibilities of replication in other parts of the country.

GOOD PRACTICE 1

Early warning in action

Priority Action 2: Identify, assess and monitor disaster risks and enhance early warning

Every year, floods and landslides cause about 300 deaths in Nepal and economic damages exceeding US\$ 10 million. Lack of focus on investing in DRR has put development efforts at risk. Recognizing this gap, the Government of Nepal launched the Nepal Reduction Consortium (NRRC), which identified 5 flagship priorities for DRR. Under NRRC, CBDRR is a priority. Flagship 4 has created consensus with CBDRR stakeholders regarding the minimum characteristics of a disaster resilient community. Among these characteristics is an inclusive community based early warning system at VDC/ward, district, regional and national levels.

Early warning system serves to provide communities with advanced information on flood risks in order to give people time to respond effectively. Government’s initiatives in Banke district has proved vital in protecting communities from floods as engaging

communities with early warning system is essential to ensure sustainability.

On 3 August 2012 in Banke district, communities were required to utilize early warning to prevent a major disaster. With incessant monsoon rains pushing water off the West Rapti river to danger zone reaching 7.24m, flood was imminent. Fortunately, for downstream communities, early warning system was activated as planned at the first warning level. An electronic display board at the District Administration Office (DAO) sounded a siren when water reached the danger level. At the community level, taskforces at five VDCs affected by the West Rapti River sprung into action, thanks to the CBDRR project that has been implemented in those communities.

Success of early warning system in Banke during the West Rapti flood has saved lives of many individuals. This highlights the importance of preparing communities to natural disasters. Under NRRC, CBDRR projects across the country are ensuring that communities can protect themselves and their livelihoods from the impact of natural disasters.

GOOD PRACTICE 2

Warehousing and stockpiling

Priority Action 5: Strengthen disaster preparedness for effective response at all levels

In 2012, gaps in disaster response in the case of a high magnitude earthquake in Kathmandu Valley (KV) were identified, as the storage would become a major issue along with having an adequate pre-positioning of food stockpiles. For successful relief operations in a major emergency, there is a need to protect and pre-position supplies to cater for disruption to land and air transport links. It is essential that warehouses across the country are constructed, upgraded or renovated, and the development of vital infrastructures expanded.

However, large scale warehousing for humanitarian community is difficult to locate in Nepal. Except for the Nepal Red Cross Society (NRCS), there are no significant warehousing facilities maintained by other NGO partners. Approximate usable floor area of NRCS is 253m² and approximate usable volume is 725m³, which can store up to sufficient food for 10,000 families. The Nepal Food Corporation (NFC) is the largest provider of warehousing, but the availability of storage space is linked to harvest schedules.

Stockpiling enables the ability to utilize life saving goods when a disaster occurs without needing time to conduct consuming market research and procurement. All goods are quality controlled, appropriately packed and ready for immediate dispatch to wherever they are needed. Stockpiling and pre-positioning of relief and rescue materials is essential in the Kathmandu Valley and needs to be scaled up across Nepal, particularly to hazard-prone and densely populated areas.

In KV, the Pre-Positioning of Emergency Rescue Stores (PPERS) have pre-positioned light Search and Rescue (SAR) materials such as ladders, picks, shovels, ropes and first aid kits in eight strategic locations. For non-rescue materials, supporting agencies have built temporary warehouses to store food and non-food items at the Tribhuvan International Airport, Birganj and Nepalgunj.

Pre-positioning and stock-piling of medical supplies and equipments, including vaccines, inter-agency emergency health kits, diarrheal disease and cholera kits, obstetric surgical and midwifery kits, RH kits, post-exposure prophylaxis (PEP) kits, anti-retroviral (ARV) drugs, ORS, etc. have been completed in various locations of Nepal, especially in five regional medical stores. Transport and distribution networks will need to be identified and strengthened, and all regional hubs should have cold-chain facilities for the storage of medical supplies, where necessary. An assessment of potential existing structures (upgrades, renovation, etc.) and the erection of new storage facilities have also been conducted.

Key activities/targets

- Seismic assessment and construction of temporary warehouses (8 mobile storage units which can store 2800 metric tons) to be established in seven locations at the Tribhuvan University Ground, Kathmandu Airport, Tundikhel, Gokarna Gulf Club, Balaju Industrial Estate, Pulchowk Engineering Campus and National Agriculture Centre.
- Temporary warehouses (500 metric tons) to be installed in five locations at Gajuri/Dhading, Dhulikhel/Kavre, Banepa/Kavre, Kulekhani/Makwanpur, and Dakchhinkali/Kathmandu.

- Build five government regional warehouses in Sunsari, Hetauda, Pokhara, Surkhet and Dhangadhi.
- Stockpiles are to be stored in sea containers (20 feet long) located at the NEOC, TIA Cargo Complex, Nepal Army Headquarters and Armed Police Force Headquarters for emergency response.
- Stockpile bailey bridges at Nepal Army camps at Tribhuvan International Airport (TIA) for emergency response.
- Seismic resistant water system development targeting 100,000 internally displaced persons (IDPs) with stockpiling of emergency WASH items at the premises of Tribhuvan University (TU), Kirtipur, and Nepal Agriculture Research Council (NARC), Khumaltar, which has been declared as Open Spaces by the Government of Nepal.

Five regional warehouses have been constructed in Sunsari, Hetauda, Pokhara, Surkhet and Dhangadhi and 15 logistic hubs have been identified in Kathmandu Valley. In addition to the availability of warehouses, it is necessary they are earthquake-resilient. Therefore, a seismic assessment programme was organized at the Tribhuvan University Teaching Hospital (TUTH), Nepal Food Corporation's food storage warehouse building structures at Thapathali, Kathmandu, and at Nakkhu, Lalitpur district.

Furthermore, non-structural retrofitting of buildings in TUTH as well as 250 meter deep well has been dug in TUTH to make sure water will be available in the operation theatres if regular supply breaks down and most importantly, Intensive training has been conducted for the medical staff. Pre-positioning and stockpiling of relief items such as 1,000 dead body kits, medical supplies and equipments, including 3 Inter-agency Emergency Health Kits (IEHK), 3 Diarrheal disease kits, 1 tent and 3 surgical kits have been completed in 2012.

Major achievements

GOOD PRACTICE 3

Capacity building through training and simulation

Priority Action 5: Strengthen disaster preparedness for effective response at all levels

In the last few years, disaster preparedness has gained momentum in Nepal and the country is increasingly recognized as a regional role model in disaster preparedness. Since 2005, the government has been bringing together all relevant partners and created a joint coordination mechanism, which has been instrumental in disaster preparedness and response planning.

The importance of national/local capacity and the role of national/local organizations in emergency response are becoming well recognized. Most notably, the Ministry of Home Affairs (MoHA) has led the process of developing “The Guidance Note on Disaster Preparedness and Response Planning 2011” with the support of humanitarian partners to plan and complete nationwide Disaster Preparedness Response (DPR) planning processes at national, regional and district levels. These workshops have brought together more than 8000 officials from 75 districts, various government line agencies, security forces and secured the commitment of respective authorities and partners for response

preparedness activities at the district level.

Building national capacity has made important contributions to humanitarian response. National partners are always the first responders during emergency response. Building effective partnerships is essential for strengthening coordinated capacity to maintain sustainable system by government, key partners and communities. Given the vulnerability to natural disasters in Nepal, the government ensures that networks are maintained and expanded, especially through the continuation of disaster preparedness and contingency planning workshops, training and simulations at national, regional and district levels.

Key activities/targets

- Develop national capacity (government) on disaster preparedness and response planning;
- Strengthen capacity of humanitarian partners (non-government) on DPR planning for effective humanitarian response; and
- Ensure update, revise and coordinate support for the implementation of district Disaster Preparedness and Response (DPR) plans and advocate for the mainstreaming of DPR plans into the Disaster Management Plan.

GOOD PRACTICE 4

Little support, more resilience

Priority Action 1: Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation

Floods and landslides are major natural hazards

Major Achievements

In order to prepare the national/local partners in emergency preparedness, numerous training, workshops and meetings have been organised. More than 87 workshops have been completed in the last two years (2 national, 10 regional and 75 district-based) on disaster preparedness and response planning. All the 75 districts have completed their Disaster Preparedness and Response Plans. However, it has been noted that there is room for the improvement of quality as well as regular updates and simulations. In addition, there have been 20 sessions on disaster preparedness and humanitarian response mechanisms, 7 training on DPR conducted by Nepal Army and Armed Police Force along with the formation of one monitoring team which, as of December 2012, has monitored 15 districts on disaster preparedness and response plans.

Furthermore, regional emergency education workshops were conducted in 31 districts that have now completed their health sector disaster contingency plan. Similarly, a host of humanitarian organizations have conducted series of simulation exercises on numerous occasions at district levels jointly with the government authorities.

in Nepal. Ill preparedness and lack of public awareness of the community in disaster risk area has further increased disaster vulnerability in Nepal. The Government of Nepal has declared 23 districts as vulnerable areas for natural disasters. District Disaster Relief Committee (DDRC) has to prepare annual plan of district disaster preparedness. Chitwan is the first district that has made a district disaster management plan (*ICIMOD, 2007a*). During

the 1993 flood, which significantly affected five Terai and hill districts, Chitwan was the hardest hit district. Hazard and vulnerability assessment indicates that flood is the most serious hazard in Chitwan district followed by landslide and river bank cutting.

The 1993 (2050 BS), flood of Budhi Rapti river completely devastated ward no. 1, 2 and 7 in which 3 people were killed and more than 143 households were swept away rendering all agricultural lands unproductive and hitting their livelihoods hardest. The entire community of Kathar VDC was displaced after the flood in which they lost their agricultural land, houses and livestock. As most of the people in the area are indigenous Tharu farmer community, agriculture and livestock was their main source of income. Other than this, vegetable farming and other occupational services are their alternative means of livelihoods. Being poor and marginalized, these communities are more vulnerable to climate change as they have less knowledge and they live in vulnerable places.

In 1994, the government had supported NRs. 540,000 and the local communities contributed equal amount of voluntary labour. Soban Chaudhary, former VDC chair and president of Grameen Ekikrit Bikas Samaj cooperative, says that after stone embankment and bio-fencing, the communities have become self-reliant and are now operating two cooperatives –Brahmsthali Milk Producers' Cooperative

and fish farming cooperative—thanks to the community awareness drive initiated by development organizations.

The milk cooperative now sells 500 litres of milk daily to private dairies and the dairy cooperative, employs 7 staff members and makes an average monthly profit of NRs. 50,000–60,000. A total of 168 share members are directly benefitted from this venture.

Again, the Kathar communities have created 230 fish ponds through fish farming cooperative and about 1 quintal of fish is harvested from one *kattha* of land.



Indeed, the 1993 flood has opened our eyes and we have now become self-sufficient as we have significantly improved our livelihoods," says Bishnu Gurung, a member of women group from Kathar VDC-1.

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GOOD PRACTICE 5

Indigenous knowledge and disaster mitigation

Priority Action 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels

Nepal is prone to several natural disasters, including landslides, floods, earthquakes, fire and droughts, due to topography, unplanned development and rapid population growth, among other causes. As a result, many remote and isolated communities have made use of different indigenous mitigation and preparedness practices to minimize the negative impacts of disasters to life and property.

Systematic and in-depth studies on indigenous knowledge for disaster management have not been carried out in Nepal. Nonetheless, Nepal's experiences on indigenous knowledge for disaster management focuses on landslide mitigating techniques that exist and are widely practised in Bardiya, Chitwan, Syangja and Tanahu districts. Local communities living in disaster-risk areas possess a range of traditional measures to mitigate landslides. In addition, the local people observe signs in the environment which allow them to take precautions before the occurrence of any disaster.

Agro-forestry

Experiences of indigenous communities indicate that shrubs and bushes prevent topsoil loss and do not have the risk of falling down during heavy rainfall. Farmers in the Terai plant such species on marginal lands not suitable for cultivation. In addition, farmers plant amriso (*Thysanolaena maxima*) and babiyo (*Eulaliopsisbinata*) to protect the terrace riser. These plants have deep roots scattered around the area, thus firming up top soil. Likewise, bamboo is planted in gullies and shady areas to control water run-off. Bamboos' widely spread roots intermingle in such a way that they act as a natural interlocking system for soil conservation.

Improving terrace riser

In areas where arable land is scarce, people have no option but to cultivate on marginal and steep lands. Most often such lands are vulnerable to landslides. However, for centuries farmers have been developing terraces on steep slopes to reduce water run-off and topsoil losses and to make crop cultivation easy. They are also able to build and manage terraces that have a slight slope on the corner rather than at the end in hills and

mountains. By putting stones and mud blocks at the edge of the terrace, the water retained in terrace is able to pass through the corner. With this practice, land in steep slopes is converted into terraced plain land. Additionally, farmers also allow grasses to grow on the terrace riser. Grasses grown on the terrace riser keep the soil intact and reduce the rate of rain and irrigated water run-off. Consequently, growing grass helps control topsoil loss and reduces the vulnerability of terrace riser from landslides.

Bio-fencing

Bio fencing is practised by a large number of farmers in Terai and other hill villages. It serves as an alternative for dry wall fencing when stones in the desired size and quantity are unavailable. Commonly used fencing plants include sajiwan (*Jatropha curcas* L.), neem tree (*Azadirachta indica*), khirro (*Sapium insigne*), and simali (*Vitex negundo* L.). Some species of fodder trees are also grown (single or mixed with fencing trees) such as badahar (*Artocarpus lakoocha*), dabdabe (*Garugapinnata*), gindari (*Premna integrifolia* L.), koiralo (*Bauhinia variegata*), kutmero (*Litsea monopetala*), phaledo (*Erythrina arborescens*), siris (*Albizia lebeck*), and tanki (*Bauhinia purpurea*) for fencing. These are deciduous and deep-rooted plants which lose their leaves during winters, thus providing sunlight for seasonal crops. The dead leaves also serve as organic matter that enriches the soil. Furthermore, these deep-rooted plants do not compete with cereal crops for nutrient and moisture.

Mixed and inter-cropping

Farmers in the hills as well as in Terai increase crop intensity through mixed and inter-

cropping. In hills, they plant maize with soybean or cow-pea; finger millet with black gram (*Vignaumballata*); wheat with potato, etc. One of the primary objectives of intensifying crops is to increase and diversify harvests. It is also an effective method of reducing topsoil loss since it breaks the rate of surface run-off. Keeping one crop at a time means not leaving the farm fallow and uncovered. Farmers' years of experience have shown that bare fields are prone to soil erosion due to wind, water and landslides. In addition

to these various mitigation techniques, communities also have the ability to recognize warning signs for impending landslides, for which they can prepare before the disaster occurs. For instance, if new faults appear in the earth's surface, it can be an indication of landslides in the immediate future. Water sprouting in new places can be another indication. Furthermore, a change in the posture of the tree in any vertical or horizontal angle may be an indication of landslides in or around the area..



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GOOD PRACTICE 6

Effective DRR mainstreaming into local development process

Priority Action 1: Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation

Nawalparasi is one of the multiple hazard districts due to its topographical variation. During monsoons, major threat comes from regular water-induced disasters. A number of humanitarian and development organizations have conducted interventions to reduce these risks and damages from disasters.

Surrounded by two rivers (Jharahi and Dhanewa), Rampurwa VDC is a highly flood-prone area. VDC secretary Paras Nath Verma is committed to reduce the risk of flooding through risk reduction interventions. The VDC has prioritized to stop open defecation and supported latrine construction in the communities for which the VDC has contributed 80% of the total budget. DRR-friendly latrine construction has been promoted by raising the plinth area of latrines above the identified flood risk levels. These flood levels were identified through participatory risk assessment.

This example is a demonstration of the capacity building initiative undertaken in the district and the efforts to make local development interventions disaster risk-sensitive. These

Box 14: Championing ODF campaign

As most of the people in the community did not have latrine at their house, earlier Mrs. Shreepati Devi Thakur, a resident of Fatuwa Mahespur VDC-5, Rautahat district, had an assumption that only elite groups can afford to construct latrines at their houses. But now she has become an example in her community constructing economical and good model permanent latrine. She had participated in women empowerment centre class wherein she developed an understanding about the importance of latrine, sanitation and health promotion. Strong determination led her to construct permanent latrine utilizing locally available resources such as bamboo, *khar*, water shield pan (made from cement).

Communities of Fatuwa Mahespur VDC have so far constructed 50 latrines and it is now in

initiatives have resulted in safer fecal disposal in the most flood prone communities, which can save lives from secondary disasters such as diarrhea and epidemics.

the process of being declared as the Open Defecation Free (ODF) VDC by 2015. The success of this model is a result of empowered women groups, minimum use of financial resources, dynamic leadership, innovative approach and wider application of locally promoted tools. Therefore, this innovation could be a viable model for scaling up sanitation vis-à-vis mainstreaming DRR into local development efforts.



Newly constructed toilet at Fatuwa Mahespur VDC, Rautahat district

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GOOD PRACTICE 7

Positive legal developments

Priority Action 1: Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation

Community-based DRR initiatives work closely with local and/or district authorities, sharing expertise, providing training and awareness and building the capacity of committees to be able to sustain the CBDRR processes in future. Establishing DRR committees as CBOs aids accountability for management of community revolving relief funds and enables them to

access government resources for future projects.

Overall, there is a well-developed policy framework for DRR in Nepal and it appears likely that the proposed Disaster Management Act will establish new coordination mechanisms at all levels. Some of the good DRR practices enabled by the legal frameworks include the current national disaster management strategy and its implementation process, innovative approaches to addressing earthquake risk, improving building regulation and safety, and planning for new urban developments, as well as registration of C CBDRR committees.

National Strategy for Disaster Risk Management (NSDRM)

- The National Strategy for Disaster Risk Management (NSDRM), approved in 2009, is designed to dovetail with a new Disaster Management Act and appears to be widely accepted and supported at the national level. District governments have already established disaster management plans under this strategy and the next stage will be at local government level.
- An innovative form of international cooperation has been developed to prioritize and implement key elements of the NSDRM. This is the Nepal Risk Reduction Consortium and its Flagship Programmes developed in consultation with the government and other stakeholders.

Building regulation and earthquake risks

- There are many projects to retrofit public schools, hospitals and other public buildings for earthquake resilience, overseen by the Department of Urban Development and Building Construction (DUDBC) with the assistance from multi/bi-lateral agencies.
- The DUDBC has taken a positive approach to the challenge of private building construction regulation through public education on earthquake risk from buildings and through training within the municipalities and building trades to encourage and enable correct implementation of the National Building Codes, especially for larger urban buildings.
- The DUDBC, in partnership with many supporting agencies, has developed and provided training on the Mandatory Rules of Thumb (MRT), a set

of voluntary guidelines in the National Building Codes intended for builders to construct earthquake and fire safety smaller buildings. The MRTs pragmatically recognize that most owners/builders do not generally have the access to engineering advice (as 93% buildings are non-engineered), especially in rural areas. This is a pragmatic approach in the absence of more complete building regulation, which could be replicated in other areas with similar pattern of non-engineered construction where full regulation does not exist.

Land use planning for safety

- The Ministry of Physical Planning and Works (now known as the Ministry of Physical Infrastructure and Transport) has implemented a system of voluntary 'land pooling' in the Kathmandu Valley, which compensates for a lack of prior land use planning overlays or reservation of public land for future urban development. It reaches agreements with landowners who wish to create new urban developments, in which the owners sacrifice a portion of their private land in order to provide proper roads and other infrastructures, including public open space.

The benefit to the landowners is that the value of the remaining land increases greatly, while the self-funding nature of these developments means the government does not need to purchase land or pay for the new infrastructure. An important DRR element is that public safety is improved with good access for emergency vehicles (in fire, earthquake and other emergencies) and the earthquake hazard from falling buildings is reduced by having wider streets and public open space for evacuation.

GOOD PRACTICE 8

Community volunteers provide rapid response

Priority Action 4: Reduce the underlying risk factors

Community Disaster Management Committee (CDMC) of Rampurwa VDC in Banke district provided incredible rapid response to the flood affected people on August 4, 2012. The trained search and rescue first aid volunteers of Rampurwa CDMC were mobilized for rescuing 49 persons (32 female and 17 male), who were stranded in the middle of Rapti river due to flood. The affected families were from Sidhanawa ward no. 8 of Fattehapur VDC. They had crossed the river to cultivate paddy on their farmland. While returning, they were trapped for 48 hours without any food and shelter because of heavy downpour, and were desperately waiting for rescue support from outside.

At first, the DDRC deployed a rescue team by helicopter to rescue them but they were unable

to do so because of unfavourable weather condition. When Rampurwa CDMC received the information, they instantly communicated with the Nepal Red Cross Society Chapter of Banke district about the situation based on which the District Chapter mobilized trained volunteers in the affected zone in coordination with the Nepal Police.

Accordingly, the trained volunteers joined hands with the police by carrying out basic response kits such as life jackets, rubber tubes, rope, etc. that is pre-positioned in the community through NRCS. The joint team rescued and evacuated all the trapped 49 persons from the flooded zone to safer place at a local school (*Madrasa*) of Rampurwa. This apart, the trained volunteers collected rice, pulses, oil and vegetables and provided food for them. Next day, water level receded and the community volunteers again provided service to bring them back to their own home. This kind of rapid response has made the community as a first responder in order to make community resilience as well as contributed to achieve Flagship IV of NRRC.



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GOOD PRACTICE 9

Regional workshops pave way for preparedness and response planning

Priority Action 5: Strengthen disaster preparedness for effective response at all levels

A series of regional workshops were organized in 2012 to review the recommendations and map out actions to strengthen regional response capacity for any future disaster eventuality. Building on the action plan, the workshops held in all the five development regions agreed on the following action points:

A. Institutional strengthening and capacity building

- Disaster Risk Reduction (DRR) Focal Persons to be appointed at the Regional Administration Office to follow-up on the disaster preparedness and response planning process in the district; Regional Disaster Reduction Committee identifies appropriate agencies to coordinate cluster-specific activities (search and rescue, education, WASH, health, nutrition, protection, food, shelter, etc.) in coordination with the regional stakeholders;
- Establishment and operationalization of Regional Emergency Operation Centres;
- Explore the possibility of Village Disaster Reduction Committee and expand DRR structure at the local level;
- Provide targeted training on DRR to security forces at regional and district levels; and
- Strengthen and implement policy and procedures of land use policy and building

codes as risk mitigation measures at regional levels.

B. Preparedness and response

- Warehousing and pre-positioning of relief materials at the regional level;
- Facilitate and provide technical support to conduct simulation exercises on DPRP at the district level;
- Coordinate with humanitarian agencies both at the regional and central levels;
- Mainstream DRR into development planning cycles;
- Prioritize protection cluster plans in all districts with gender-sensitive DRR initiatives;
- Provision of basic response equipments such as helicopter, rubber boat with accessories (depending on the nature and type of disaster);
- Develop Nepal-specific standards for relief materials (Nepal-specific SPHERE); and
- Expedite the provision of District Emergency Response Fund for effective and timely response at the local level.

C. Follow-up, monitoring and reporting mechanisms

- Establish and institutionalize Regional Monitoring Committees. A clear monitoring and follow-up plan to be developed and ensured for effective implementation of DPR plan at the district level; and
- Establish disaster related information centres at the regional level for better coordination with concerned stakeholders.

CHAPTER 6

Lessons Learned and Conclusion



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Lessons Learned

The year 2012 witnessed a few disasters. While loss of life due to natural disaster was not high (in comparison to other years) this should not undermine the importance of mitigating the effects of both natural and human-induced disasters. It will be a huge price to pay if we do not learn from past disasters and prevent future hazards from becoming disasters. We need to incorporate lessons learned from past disasters in our present to break the vicious cycle of hazards turning into disasters.

Four key lessons need a specific mention here. First, there is a need to strengthen national capacity for systematic disaster data collection, interpretation and implementation. Up to date, continuous, credible and accessible disaster data information can play a key role in the development of policy, plans and programmes to adequately address vulnerabilities and disaster risks.

Second, to ensure sustainable development, it is vital to link livelihoods of marginalized communities with DRR. This can be done through awareness raising and training in preparedness. By incorporating DRR into

livelihoods initiatives, communities can see the value of risk reduction and promote long-term community resilience.

Third, the Terai drought drew attention to the fact that it was time to think about the mainstreaming of drought risk management, especially in the areas which are prone to drought. The process of drought risk management can also include policy decisions in the field of water and land resources, to manage fresh water, excess of which results in food scarcity in drought. It should be a holistic approach of integrated water and land management, which is a key to drought proofing so that agriculture sustains even in the absence of a normal monsoon.

Finally, disaster data reveals that the estimated economic loss due to disaster is increasing in Nepal. The socio-economic impacts of disasters are far reaching and possess long-term developmental implications to the country. An integrated, multi-pronged approach for the economic recovery of the affected area is required to ensure the protection of the most vulnerable members of the society. Therefore, a scientifically sound comprehensive socio-economic study from disaster lens needs to be undertaken in immediate future.

From Shared Risk to Shared Value

An overall impression is that despite loss of lives and damage to infrastructure, the Government of Nepal is better prepared to handle disasters today than a decade ago. For example, the 2012 Seti flood in Kaski district and Siraha fire demonstrated stronger institutional support and political will involving a host of supporting agencies, civil society organizations in relief activities and disaster recovery. Again, although extensive headway has been made in legislation and setting up of

a comprehensive structure for DM in Nepal, much work is still needed before this system can be deemed to be fully functional and effective throughout the country.

An extensive capacity building programme is still required for regional, district and local level Disaster Management Committees (DMCs). The existing gap between policy and implementation calls for bridging the same between planning at the national level and implementation at the district level. Proper communication systems need to be set up to

ensure that future response is as integrated as possible with the same message being portrayed all across the country.

Disaster preparedness also needs to be mainstreamed into development programmes conducted at all levels. These programmes can be in the area of community safety nets, strengthening of infrastructure, raising awareness on the need for better systems of natural resource management and encouraging the development of multiple income sources to increase coping strategies at the household level. Further activities need to be designed to include disaster awareness as part of the school curriculum with practical activities and drills on this, in particular in areas where there is a high risk/frequent occurrence of disasters.

The disaster history of 2012 has set the tone for accentuating that investments are made in disaster management in the reconstruction of housing, infrastructure and other community assets. The 2012 disaster data indicates that the estimated annual economic loss is increasing with the increasing frequency of disasters. The number of disasters as well as the number of corresponding casualties demonstrates that the country is likely to face

higher overall economic loss with the passage of each year.

On a positive note, a new paradigm is indeed emerging. The government ministries in close collaboration with non-government agencies have initiated national level risk assessment exercises covering major hazards in the country. Although Nepal is facing a series of disaster related problems, it is gradually picking up the momentum towards improving disaster management programmes.

The NRRC has helped create and retain a focus on disaster risk reduction and preparedness nationwide. Mainstreaming disaster management in sectoral development, effective implementation of building code and building act, implementation of land use and settlement planning, changing mindset of the people, development and strengthening of effective institutions are some pressing issues in disaster management of Nepal.

Therefore, the way forward for disaster management is to view these aspects beyond the scope of this report, and not as a separate entity, but as part of a holistic programme to strengthen development programmes, coping strategies and local level institutions.



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Glossary

Basic terms of disaster risk reduction

Acceptable risk:

The level of loss a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions.

In engineering terms, acceptable risk is also used to assess structural and non –structural measures undertaken to reduce possible damage at a level which does not harm people and property, according to codes or "accepted practice" based, among other issues, on a known probability of hazard.

Biological hazard:

Processes of organic origin or those conveyed by biological vectors, including exposure to pathogenic micro-organisms, toxins and bioactive substances, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Examples of biological hazards: outbreaks of epidemic diseases, plant or animal contagion, insect plagues and extensive infestations.

Building codes:

Ordinances and regulations controlling the design, construction, materials, alteration and occupancy of any structure to insure human safety and welfare. Building codes include both technical and functional standards.

Capacity:

A combination of all the strengths and resources available within a community, society or organization that can reduce the level of risk, or the effects of a disaster. Capacity may include

physical, institutional, social or economic means as well as skilled personal or collective attributes such as leadership and management. Capacity may also be described as capability.

Capacity building:

Efforts aimed to develop human skills or societal infrastructures within a community or organization needed to reduce the level of risk. In extended understanding, capacity building also includes development of institutional, financial, political and other resources, such as technology at different levels and sectors of the society.

Climate change:

The climate of a place or region is changed if over an extended period (typically decades or longer) there is a statistically significant change in measurements of either the mean state or variability of the climate for that place or region.

Changes in climate may be due to natural processes or to persistent anthropogenic changes in atmosphere or in land use. Note that the definition of climate change used in the United Nations Framework Convention on Climate Change is more restricted, as it includes only those changes which are attributable directly or indirectly to human activity.

Coping capacity:

The means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster. In general, this involves managing resources, both in normal times as well as during crises or adverse conditions. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards.

Disaster:

A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk.

Disaster risk management:

The systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.

Disaster risk reduction (disaster reduction)

The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.

The disaster risk reduction framework is composed of the following fields of action, as described in ISDR's publication 2002 "Living with Risk: a global review of disaster reduction initiatives", page 23:

- Risk awareness and assessment including hazard analysis and vulnerability/capacity

analysis;

- Knowledge development including education, training, research and information;
- Public commitment and institutional frameworks, including organisational, policy, legislation and community action;
- Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments;
- Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities.

Early warning:

The provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response.

Early warning systems include a chain of concerns, namely: understanding and mapping the hazard; monitoring and forecasting impending events; processing and disseminating understandable warnings to political authorities and the population, and undertaking appropriate and timely actions in response to the warnings.

El Niño-southern oscillation (ENSO):

A complex interaction of the tropical Pacific Ocean and the global atmosphere that results in irregularly occurring episodes of changed ocean and weather patterns in many parts of the world, often with significant impacts, such as altered marine habitats, rainfall changes,

floods, droughts, and changes in storm patterns.

The El Niño part of ENSO refers to the well-above-average ocean temperatures along the coasts of Ecuador, Peru and northern Chile and across the eastern equatorial Pacific Ocean, while the Southern Oscillation refers to the associated global patterns of changed atmospheric pressure and rainfall. La Niña is approximately the opposite condition to El Niño. Each El Niño or La Niña episode usually lasts for several seasons.

Emergency management:

The organization and management of resources and responsibilities for dealing with all aspects of emergencies, in particularly preparedness, response and rehabilitation. Emergency management involves plans, structures and arrangements established to engage the normal endeavors of government, voluntary and private agencies in a comprehensive and coordinated way to respond to the whole spectrum of emergency needs. This is also known as disaster management.

Environmental degradation

The reduction of the capacity of the environment to meet social and ecological objectives, and needs. Potential effects are varied and may contribute to an increase in vulnerability and the frequency and intensity of natural hazards. Some examples: land degradation, deforestation, desertification, wild land fires, loss of biodiversity, land, water and air pollution, climate change, sea level rise and ozone depletion. Forecast definite statement or statistical estimate of the occurrence of a future event (UNESCO, WMO). This term is used with different meanings in different disciplines.

Geological hazard

Natural earth processes or phenomena that

may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Geological hazard includes internal earth processes or tectonic origin, such as earthquakes, geological fault activity, tsunamis, volcanic activity and emissions as well as external processes such as mass movements: landslides, rockslides, rock falls or avalanches, surfaces collapses, expansive soils and debris or mud flows. Geological hazards can be single, sequential or combined in their origin and effects.

Geographic information systems (GIS):

Analysis that combine relational databases with spatial interpretation and outputs often in form of maps. A more elaborate definition is that of computer programmes for capturing, storing, checking, integrating, analyzing and displaying data about the earth that is spatially referenced. Geographical information systems are increasingly being utilized for hazard and vulnerability mapping and analysis, as well as for the application of disaster risk management measures.

Greenhouse gas (GHG):

A gas, such as water vapor, carbon dioxide, methane, chlorofluorocarbons (CFCs) and hydro chlorofluorocarbons (HCFCs), that absorbs and re-emits infrared radiation, warming the earth's surface and contributing to climate change (UNEP, 1998).

Hazard:

A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydro-

meteorological and biological) or induced by human processes (environmental degradation and technological hazards). Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterized by its location, intensity, frequency and probability.

Hydro-meteorological hazard:

Natural processes or phenomena of atmospheric, hydrological or oceanographic nature, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Hydrometeorological hazards include: floods, debris and mud floods; tropical cyclones, storm surges, thunder/hailstorms, rain and wind storms, blizzards and other severe storms; drought, desertification, wildland fires, temperature extremes, sand or dust storms; permafrost and snow or ice avalanches. Hydrometeorological hazards can be single, sequential or combined in their origin and effects.

La Niña

(see El Niño-Southern Oscillation).

Land-use planning

Branch of physical and socio-economic planning that determines the means and assesses the values or limitations of various options in which land is to be utilized, with the corresponding effects on different segments of the population or interests of a community taken into account in resulting decisions.

Land-use planning involves studies and mapping, analysis of environmental and hazard data, formulation of alternative land-use decisions and design of a long-range plan for different geographical and administrative scales.

Land-use planning can help to mitigate disasters and reduce risks by discouraging high-density settlements and construction of key installations in hazard-prone areas, control of population density and expansion, and in the siting of service routes for transport, power, water, sewage and other critical facilities.

Mitigation

Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards.

Natural hazards

Natural processes or phenomena occurring in the biosphere that may constitute a damaging event. Natural hazards can be classified by origin namely: geological, hydrometeorological or biological. Hazardous events can vary in magnitude or intensity, frequency, duration, area of extent, speed of onset, spatial dispersion and temporal spacing.

Preparedness

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

Prevention

Activities to provide outright avoidance of the adverse impact of hazards and means to minimize related environmental, technological and biological disasters.

Depending on social and technical feasibility and cost/benefit considerations, investing in preventive measures is justified in areas frequently affected by disasters. In the context of public awareness and education, related to

disaster risk reduction changing attitudes and behaviour contribute to promoting a "culture of prevention".

Public awareness

The processes of informing the general population, increasing levels of consciousness about risks and how people can act to reduce their exposure to hazards. This is particularly important for public officials in fulfilling their responsibilities to save lives and property in the event of a disaster.

Public awareness activities foster changes in behaviour leading towards a culture of risk reduction. This involves public information, dissemination, education, radio or television broadcasts, use of printed media, as well as, the establishment of information centres and networks and community and participation actions.

Public information

Information, facts and knowledge provided or learned as a result of research or study, available to be disseminated to the public.

Recovery

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

Recovery (rehabilitation and reconstruction) affords an opportunity to develop and apply disaster risk reduction measures.

Relief / response

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

Resilience / resilient

The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures.

Retrofitting (or upgrading)

Reinforcement of structures to become more resistant and resilient to the forces of natural hazards. Retrofitting involves consideration of changes in the mass, stiffness, damping, load path and ductility of materials, as well as radical changes such as the introduction of energy absorbing dampers and base isolation systems. Examples of retrofitting includes the consideration of wind loading to strengthen and minimize the wind force, or in earthquake prone areas, the strengthening of structures.

Risk

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

Conventionally risk is expressed by the notation:

Risk = Hazards x Vulnerability. Some disciplines also include the concept of exposure to refer particularly to the physical aspects of vulnerability.

Beyond expressing a possibility of physical harm, it is crucial to recognize that risks are

inherent or can be created or exist within social systems. It is important to consider the social contexts in which risks occur and that people therefore do not necessarily share the same perceptions of risk and their underlying causes.

Risk assessment/analysis

A methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend.

The process of conducting a risk assessment is based on a review of both the technical features of hazards such as their location, intensity, frequency and probability; and also the analysis of the physical, social, economic and environmental dimensions of vulnerability and exposure, while taking particular account of the coping capabilities pertinent to the risk scenarios.

Structural / non-structural

Structural measures refer to any physical construction to reduce or avoid possible impacts of measures hazards, which include engineering measures and construction of hazard-resistant and protective structures and infrastructure.

Non-structural measures refer to policies, awareness, knowledge development, public commitment, and methods and operating practices, including participatory mechanisms and the provision of information, which can reduce risk and related impacts.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the

concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and the future needs. (Brundtland Commission, 1987).

Sustainable development is based on socio-cultural development, political stability and decorum, economic growth and ecosystem protection, which all relate to disaster risk reduction.

Technological hazards

Danger originating from technological or industrial accidents, dangerous procedures, infrastructure failures or certain human activities, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Some examples: industrial pollution, nuclear activities and radioactivity, toxic wastes, dam failures; transport, industrial or technological accidents (explosions, fires, spills).

Vulnerability

The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. For positive factors, which increase the ability of people to cope with hazards, see definition of capacity.

Source: UN/ISDR

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Annexes

Annex 1: Agencies Involved in Disaster Management in Nepal

Following national government agencies are involved in disaster prevention and mitigation works in Nepal:

1. Ministry of Home Affairs
2. Ministry of Irrigation
3. Ministry of Energy
4. Ministry of Physical Planning and Works
5. Ministry of Health
6. Ministry of Finance
7. Ministry of Defense
8. Ministry of Foreign Affairs
9. Ministry of Information and Communications
10. Ministry of Forest and Soil Conservation
11. Ministry of Agriculture and Co-operatives
12. Ministry of Education
13. Ministry of Sports
14. Ministry of Science, Technology and Environment
15. Ministry of Women and Children
16. Ministry of Social Welfare
17. Ministry of Industry
18. Ministry of Commerce and Supplies
19. National Planning Commission Secretariat
20. Nepal Army
21. Nepal Police
22. Nepal Scout
23. Department of Water Induced Disaster Prevention
24. Department of Mines and Geology
25. Department of Hydrology and Meteorology
26. Department of Forest
27. Department of Watershed and Soil Conservation

Beyond the above, the following international agencies, national and international non-governmental organizations are also working on disaster management in Nepal:

DPNet-Nepal Members:

1. ActionAid Nepal
2. ADRA Nepal
3. Bagmati Lakhandehi Affected Society
4. Bikalpa, Nawalparasi
5. Care International Nepal
6. CARITAS Nepal
7. CDM-Nepal
8. Center for International Studies and Cooperation
9. Centre for Disaster Management Studies
10. Centre for Disaster Studies (IOE)
11. Centre for Environment and Disaster Management
12. Community Development Forum
13. CORD
14. Dan Church Aid
15. DEPROSC- Nepal
16. Disaster Management Federation Nepal
17. ECO-Nepal
18. FAYA Nepal
19. Focus Ed Nepal
20. Food for Health
21. FOPAD
22. FSCN Lalitpur
23. Handicap International
24. Help Age International
25. International Center for Integrated Mountain Development (ICIMOD)
26. Jagaran Media Nepal
27. Janaki Mahila Jagaran
28. JYCN
29. Kirtipur Volunteer Society
30. Koshi victim Society
31. Mercy Corps
32. Mission East

33. National Disaster Risk Reduction Center
 34. National Institution for Disaster Survivors
 35. Natural Disaster Management Forum NDMF
 36. Nepal Center for Disaster Management
 37. Nepal Christian Relief Services
 38. Nepal Environment and Education Development Society (NEEDS Kanchanpur)
 39. Nepal Geological Society
 40. Nepal GIS Society
 41. Nepal Landslide Society
 42. Nepal National Social Welfare Association
 43. Nepal Red Cross Society
 44. Nepal Scouts National Headquarters
 45. Nepal Society for Earthquake Technology Nepal (NSET)
 46. OCCED
 47. Oxfam GB Nepal
 48. Peacewin, Bajura
 49. Practical Action Nepal
 50. Ratauli Yuba Club
 51. RCDSC
 52. RRN
 53. Rural Service Society
 54. RWUA
 55. Sahmati
 56. Samajik Vikash Anusandhan Kendra, Janakpur
 57. Save the Children
 58. School of Shelter and Environment
 59. Social service center
 60. SOCOD Nepal
 61. South Asia Partnership Nepal (SAP Nepal)
 62. Terre des Hommes
 63. The Lutheran World Federation Nepal (LWF Nepal)
 64. Trust Nepal
 65. UN/OCHA
 66. UNICEF
 67. United Mission to Nepal
 68. United Nation Development Program
 69. Ward DMC (17 Disaster management Committee)
 70. Women and children Development Forum
 71. Women, Children and Environmental Center
 72. World Health Organization, Emergency and Humanitarian Action (WHO)
 73. World Vision International Nepal
- Other Agencies:**
1. Asian Disaster Reduction Center (ADR)
 2. Asian Disaster Preparedness Center (ADPC)
 3. European Union
 4. GIZ
 5. International Red Cross Society (IRCS)
 6. Japan International Cooperation Agency (JICA)
 7. Plan Nepal
 8. United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)
 9. United States Agency for International Development (USAID)
 10. World Food Program (WFP)

ANNEX 2: Disaster Casualties in 2012

Table 3.9: Human deaths caused by disaster in different geographical regions

Disaster type	Mountain	Hill	Terai	Total
Landslide	21	39	0	60
Air crash	15	19	0	34
Thunderbolt	15	65	39	119
Fire	8	48	21	77
Storm	7	3	8	18
Epidemic	4	21	8	33
Rainfall	2	9	0	11
Earthquake	1	0	0	1
Avalanche	0	9	0	9
Boat capsize	0	0	4	4
Cold wave	0	0	1	1
Flood	0	45	7	52
Total	73	258	88	419

Source: MoHA, 2012

Table 3.10: Human deaths caused by disasters in different development regions, 2012

SN	Disaster type	Eastern	Central	Western	Mid-Western	Far Western
1.	Thunderbolt	30	64	11	10	4
2.	Fire	9	31	11	15	11
3.	Landslide	8	23	21	5	3
4.	Storm	4	2	0	1	11
5.	Rainfall	3	0	5	1	2
6.	Cold wave	1	0	0	0	0
7.	Air crash	0	19	15	0	0
8.	Avalanche	0	0	9	0	0
9.	Boat capsize	0	4	0	0	0
10.	Earthquake	0	0	0	0	1
11.	Epidemic	0	0	9	6	18
12.	Flood	0	0	42	8	2
	Total	55	143	123	46	52

Source: MoHA, 2012

Table 3.11: Disaster records by month, 2012

Month	Hill	Mountain	Terai	Total no. of events
January	55	9	45	109
Cold Wave			1	1
Fire	52	9	44	105
Thunderbolt	3			3
February	68	17	49	134
Fire	63	12	49	124
Storm		1		1
Thunderbolt	5	4		9
March	89	9	62	160
Fire	86	7	60	153
Landslide		1		1
Thunderbolt	3	1	2	6
April	109	10	93	212
Fire	63	3	83	149
Landslide	1			1
Storm	9		1	10
Thunderbolt	36	7	9	52
May	110	17	80	207
Air crash		1		1
Epidemic			5	5
Fire	70	4	61	135
Flood	2			2
Hailstone	2			2
Landslide	3	1		4
Storm	5	4	6	15
Thunderbolt	28	7	8	43
June	55	21	59	135
Epidemic	4			4
Fire	22	4	47	73
Flood	2	2		4
Landslide	9	4		13
Rainfall	2	4		6
Storm	8	3	3	14
Thunderbolt	8	4	9	21
July	65	28	34	127

Earthquake		1		1
Epidemic	7	2	1	10
Fire	7	1	10	18
Flood	9		9	18
Landslide	20	7	1	28
Rainfall	12	11	3	26
Thunderbolt	10	6	10	26
August	85	51	37	173
Boat Capsize			1	1
Epidemic	7			7
Fire	12	5	22	34
Flood	3	10	8	16
Landslide	30	32		40
Rainfall	13	4		45
Thunderbolt	20	5	6	30
September	98		35	138
Air Crash	1			1
Avalanche	1			1
Epidemic			2	2
Fire	16		24	40
Flood	4		2	6
Landslide	8	2		10
Rainfall	58	1		59
Thunderbolt	10	2	7	19
October	22	11	30	63
Fire	19	7	29	55
Flood		1		1
Landslide	2	2		4
Storm			1	1
Thunderbolt	1	1		2
November	34	17	80	131
Fire	34	17	80	131
December	41	12	57	110
Fire	41	11	57	109
Landslide		1		1
Grand Total	831	207	661	1699

Source: MoHA, 2012

Table 3.12: Major disasters in 2012 in chronological order

S.N	Date	District	Municipality & Ward No.	Type of Disaster	Death	Missing	Injured	Affected family
1.	9-Jan-12	Kavrepalanchowk	Kushadevi-8	Fire	1			2
2.	18-Jan-12	Dhankuta	Rajarani-6	Fire	5			3
3.	21-Jan-12	Kathmandu	Kathmandu-34	Fire	1			1
4.	24-Jan-12	Kavrepalanchowk	Walting-5	Fire	1			1
5.	24-Jan-12	Kailali	Apsariya	Fire	1			1
6.	28-Jan-12	Lalitpur	Sachal	Fire	1			1
7.	29-Jan-12	Dhankuta	Murtidhunga-6	Fire	1			1
8.	7-Feb-12	Achham	Budhakot-2	Fire	2		1	1
9.	8-Feb-12	Kavrepalanchowk	Ganeshthan-7	Fire	1			1
10.	8-Mar-12	Jhapa	Satashidham	Fire	1			1
11.	8-Mar-12	Rautahat	Bhasaekuwa	Fire	1			3
12.	9-Mar-12	Kailali	Dhangadi-12	Fire	1			1
13.	14-Mar-12	Sunsari	Chimdi-1	Fire	1			1
14.	20-Mar-12	Taplejung	Dokhu-2	Fire	2			4
15.	30-Mar-12	Pyuthan	Dangwang-6	Fire	1			2
16.	2-Apr-12	Kalikot	Mehalmudi-2	Thunderbolt	1		3	1
17.	2-Apr-12	Nuwakot	Kakani-7	Thunderbolt	1			1
18.	4-Apr-12	Saptari	Sambhunath-6	Thunderbolt	1		1	1
19.	5-Apr-12	Myagdi	Darbang-5	Thunderbolt	1		6	1
20.	6-Apr-12	Jhapa	Beldangi-2	Thunderbolt	1			1
21.	1-May-12	Bhojpur	Deurali-3	Thunderbolt	1		2	1
22.	3-May-12	Dhading	Mahadevsthan-1	Thunderbolt	2			5
23.	3-May-12	Kailali	Joshiapur-3	Fire	1			1
24.	5-May-12	Kaski	Sardikhola-7	Flood	40	32	5	31
25.	8-May-12	Sindhupalchowk	Piskar-4	Thunderbolt	1		1	1
26.	8-May-12	Okhaldhunga	Bhusinga-8	Thunderbolt	1			1
27.	9-May-12	Makawanpur	Bhaisae-2	Fire	1			1
28.	15-May-12	Siraha	Aaurahi-3,4,5,6,7	Fire	1		4	477
29.	23-May-12	Banke	Holiya-9	Fire	1			45
30.	28-May-12	Dailekh	Paduka-4	Fire	1			1
31.	30-May-12	Khotang	Lamidanda-4	Thunderbolt	1		1	1
32.	31-May-12	Bajura	Badhu-9	Storm	5		3	35
33.	29-Jun-12	Baglung	Hatiya-3	Landslide	3			22

Source: MoHA, 2012

Table 3.13: Human casualties due to major disasters in Nepal, 2000-2012

Year	Flood & Landslides	Fire	Epidemics	Thunderbolt	Earthquake	Avalanche
2000	173	37	141	26	0	0
2001	196	26	154	38	1	0
2002	441	11	0	6	0	0
2003	232	16	0	62	0	0
2004	131	10	41	10	0	0
2005	141	28	34	18	0	21
2006	114	3	0	15	0	0
2007	216	9	0	40	0	6
2008	134	11	3	16	0	0
2009	135	35	10	7	0	2
2010	240	69	462	70	0	0
2011	263	46	36	95	0	0
2012	123	77	9	119	6	9
Total	2539	378	33	522	1	38

Source: MoHA, 2012